ARCTIC BIRDS

Newsletter of the International Breeding Conditions Survey

supported by the International Wader Study Group and
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compiled by Mikhail Soloviev and Pavel Tomkovich

A WORD FROM THE COMPILERS

The current issue of the newsletter of the Arctic Birds Breeding Conditions Survey (ABBCS) brings together information about the breeding performance of birds in the Arctic and Subarctic during summer 2003. As in the previous years information was also collected on abundance of rodents, principal arctic predators and weather conditions in the circumpolar area. While total survey coverage decreased compared with 2001 & 2002, all principal arctic regions were represented, and much of this information was of high quality, from expeditions having spent a long time in the field and conducting dedicated research on bird breeding ecology.

According to established tradition, Australian ornithologists provided data on the proportion of juveniles on the wintering grounds which enabled us to put information on the breeding success of birds, available from isolated tundra localities, into the broader, flyway level context. The long-term efforts made by the Victorian Wader Study Group on their end of the East Asian-Australasian Flyway have resulted in a unique dataset, which hopefully, in time will match information from the breeding grounds, collected in the framework of the ABBCS.

The Lena River Delta belongs to that part of the Russian Arctic from which information on bird breeding performance has been consistently reported for many years. A review of the dynamics of lemming numbers in this area, made by Vladimir Pozdnyakov, fills an important regional gap in our insights to the fluctuations in abundance of alternative prey for predators, a critical environmental factor for arctic breeding birds.

The period between the summer seasons of 2003 and 2004 was notable for the research community as a consequence of several events that drew increased attention to the current state of waterbird populations worldwide, sometimes with a particular emphasis on waders and the Arctic. The first milestone was set by the conference of the International Wader Study Group in Cádiz, Spain, in September 2003. This forum reviewed available evidence about the state of wader populations, and indicated declines of a significant proportion of the world's waders (http://web.uct.ac.za/depts/stats/adu/wsg/pdf/the_cadiz_conclusions.pdf).

Given that the reasons for declines of wader populations are poorly understood, a need for more and better population monitoring was identified in the Cádiz Conclusions as an important immediate goal.

The importance of monitoring and research activities for the conservation of waders received further attention, specifically in relation to the Arctic region, during the Pan-Arctic Shorebird/Wader Monitoring and Research Workshop held in Denmark in December 2003. A practical outcome of this meeting was formation of the Committee for Holarctic Shorebird Monitoring (CHASM), with the aim of enhancing coordination of shorebird monitoring in breeding and non-breeding areas (see http://web.uct.ac.za/depts/stats/adu/wsg/pdf/wsgb-apr2004-chasm.pdf for details).

Finally, the *Waterbirds around the World* conference held in Edinburgh, UK, in April 2004, devoted a special session to the Arctic as the source of waterbird flyways. The conference declaration (http://www.wetlands.org/GFC/Declaration.htm) stated that "most of the world's known flyways originate in the Arctic. The recent development of international co-operation between arctic countries is welcome, as is the recognition of the crucial need to involve local communities and their traditional local knowledge in waterbird management".

Apparently these events reflect an increasing recognition of the need for further integration of efforts towards research and conservation of waterbirds, in particular in the Arctic. The desirability of building further monitoring activities on existing monitoring schemes, including Arctic Birds Breeding Conditions Survey, was emphasized. As the ABBCS coordinators, we believe that further integration of monitoring activities in the Arctic may be highly productive, and we welcome proposals for cooperation.

Collecting information on bird breeding conditions in the Arctic in summer 2004 will start in the following autumn, autumn 2004, as the survey's routine activity. Accordingly all visitors to the polar areas are encouraged to share their findings with a view to publishing the relevant extracts electronically to the project websites (http://www.arcticbirds.ru, http://arctic.ss.msu.ru/birdspec/).

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For the latest information about the survey visit the website

http://www.arcticbirds.ru

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The Newsletter is distributed to contributors to the database. Others may request it, free of charge, from the project coordinators.

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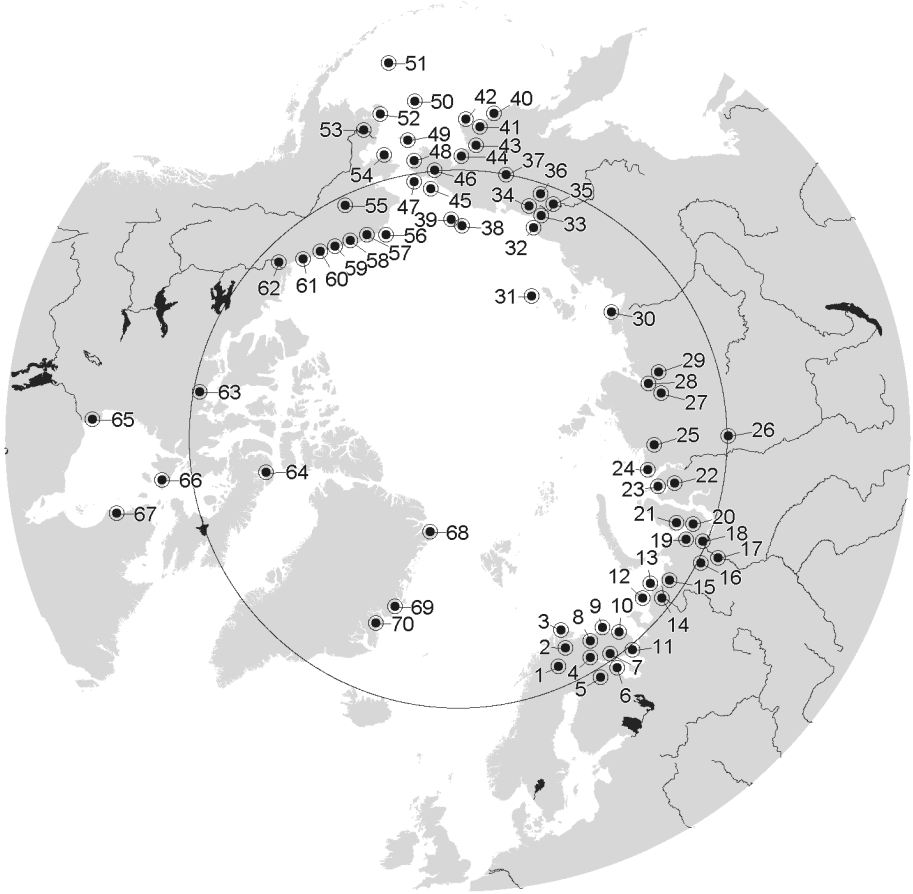

Figure. Arctic localities from which reports about bird breeding conditions were provided

LOCALITY REPORTS

1. Naltijarvi, Finnish Lapland, Finland (68º37'N, 24º40'E)

According to our study, from early June to mid July, we got the impression the season was close to normal in timing, and somewhat drier than normal.

We conducted intensive studies of the Temminck's Stint *Calidris temminckii*, and found 35 nests. Hatching success was quite good (80-90% success). Many chicks died in the eggs within 24 hours of hatching, for no apparent reason. Few avian and no mammalian predators were present: Hen Harrier *Circus cyaneus*, Rough-legged Buzzard *Buteo lagopus*, Common Gull *Larus canus* and Long-tailed Skua *Stercorarius longicaudus* were common, Short-eared Owl *Asio flammeus* rare. Of these only Long-tailed Skuas were breeding and hatched young. Small mammals were not seen, and no evidence of their presence was found.

D.M. Tracy, D. Schamel

2. Finnish Lapland, Finland (69º54'N, 27º01'E)

The spring and early summer of 2003 were fairly late and cold, although the snow had melted over the fjell tops in many places in April, several weeks earlier than average. The weather was more suitable for the breeding birds during mid and late summer. The number of mosquitoes was exceptionally low in common with other recent years. This seemed not to have any general effect on the passerines and other insect eating birds.

The populations of voles were increasing from their lows in 2002, but the numbers did not reach peak levels. There were no Norwegian Lemmings *Lemmus lemmus* during the summer in Northern Lapland.

There is no detailed data on the breeding success of passerines at the moment, but most of them seemed to breed in normal numbers. The same holds true also for waders and other land birds.

The number of breeding Rough-legged Buzzards increased somewhat, but the total population still remained lower than average. They have been absent from large areas due to low vole populations for several years in large parts of Finnish Lapland, and the same holds true also for the Hawk Owls *Surnia ulula*, Long-tailed Skuas and other vole specialists. One pair of Snowy Owls bred *Nyctea scandiaca* in Utsjoki. Breeding of the Arctic Fox *Alopex lagopus* has not been verified since the mid-1990s in Finland, and the total number of wandering individuals must be under ten at present.

The Willow Grouse *Lagopus lagopus* population was high in many parts of Lapland for the second successive year, and although the number of breeding Gyrfalcon *Falco rusticolus* pairs was not increasing markedly, their breeding success was above average.

P. Koskimies

3. Gamvik/Slettnes, Norway (71º03'N, 28º18'E)

The climate in the study area is influenced by the Gulf-stream, i.e. has rather stable weather conditions, with temperatures not too low. No summer snow storms occurred. Snowmelt was earlier than average in 2003.

About 300 pairs of Arctic Skuas *Stercorarius parasiticus* bred in the area (but there was little predation on Dunlin *Calidris alpina*). Red Foxes *Vulpes vulpes* are usually present, including one active den with pups in 2003, but Arctic Foxes were not recorded. There were no obvious fluctuations of small mammals in the area, and almost no lemmings were recorded during the study period. Reindeers *Rangifer tarandus* have fluctuating numbers and can cause nest trampling in some years.

Dunlins started nesting slightly earlier than average with apparent nesting success average for the area (86%) and fledging success slightly lower than average. Dunlin hatching success was high in all years in the area, within the range 78-97%.

H.-U. Rösner, B. Ganter

4. Laplandsky State Nature Reserve, Kola Peninsula, Russia (67º57'N, 31º46'E)

Yearly average air temperature was 1.6°C above the long-term average, and precipitation was 108% of the average. Mean monthly temperatures exceeded the average in all months with the exception of January and June (5.6°C and 2.4°C below average, respectively). We found bodies of Siberian Jay *Perisoreus infaustus*, Siberian *Parus cinctus* and Great *P. major* tits which perished from cold in late January, and several dead broods of Great Tit and Pied Flycatcher *Ficedula hypoleuca* were recorded in June. A small amount of snow accumulated during the winter, and the snow layer was approximately 65-70% of the long-term average on 3 March. Snow cover reduced to 50% on 9 May and rapid snow-melt started on 12-14 May when air temperatures were reaching +14°C in the day time. Snow melted completely from level areas on 20 May which is approximately 15 days earlier than usual. Ice floated down larger rivers on 26 May to 2 June. The water table was low in lakes in spring, and streams were shallow during summer. Air temperatures exceeded the mean long-term monthly averages by 2.4°C in May, 3.1°C in July and 0.5°C in August. Precipitation was 192% of the monthly average in May, 36% in June, 72% in July and 110% in August. Snow had blanketed the ground on 19 October, although it melted on 30-35% of land area during the following periods of warmer weather. The last such period of warm weather before the winter was recorded on 12 November when the temperature reached +1°C and rain occurred. Generally, the weather did not affect the reproductive success of birds.

The abundance of *Clethrionomys* sp. voles increased by a factor of two in 2003, compared with the previous year, and reached 36 animals per 100 trap-nights in the Grey-sided Vole *Clethrionomys rufocannus*. Abundance of Wood Lemmings *Myopus schisticolor* increased by a factor of three, reaching 19 animals per 100 ditch-nights by the autumn.

The first Rough-legged Buzzards arrived on 1 March, which is considerably earlier than the long-term average (28 April, n=51 year), which was probably caused by early snow melt on slopes in a warm February and March (mean monthly temperatures were 7.3°C and 5.1°C above average, respectively). Snow Buntings *Plectrophenax nivalis* also arrived earlier than average (on 15 February vs. 1 April, n=67). Rough-legged Buzzard, Northern Goshawk *Accipiter gentilis*, Gyrfalcon, Kestrel *Falco tinnunculus*, Osprey *Pandion haliaeetus*, White-tailed Sea Eagle *Haliaeetus albicilla* and Golden Eagle *Aquila chrysaetos* nested, the latter two species successfully. Nesting was not recorded in Merlin *Falco columbarius* and Short-eared Owl. Numbers of Arctic Hare *Lepus timidus*, Red Fox, Common Marten *Martes martes*, Ermine *Mustela erminea* and Least Weasel *Mustela nivalis* were high.

Waders bred in usual numbers, including European Golden Plover *Pluvialis apricaria*, Dotterel *Eudromius morinellus* and Whimbrel *Numenius phaeopus* in the mountains. Abundance of waterfowl per unit length of lake and river shoreline was average, but slightly higher than in 2002. Grouse density determined in the course of the August counts was 205 birds/10 km^2 which is the highest value found during 1999-2003, and the proportion of Hazel Grouse *Bonasa bonasia* in the total numbers increased.

The yield of berries was good, but the crop of spruce and pine seeds was very low, which probably led to relatively high predation of bird clutches (31%, n=36) by Red Squirrels *Sciurus vulgaris*.

A.S. Gilyazov, G.D. Kataev

5. Kandalaksha Bay, Karelsky coast, White Sea, Russia (67º00'N, 32º25'E)

Density of voles based on snap-trap catches was 1.0 animals/100 trap-nights in the end of May, and dropped to 0.25 animals/100 trap-nights in September indicating the end of the 3-year cycle. Bank Vole *Clethrionomys glareolus* was the dominant species in the forest, while meadows were mostly inhabited by Tundra Vole *Microtus oeconomus* and Short-tailed Vole *Microtus agrestis* (the latter appeared in autumn). Wood Lemmings were not captured, in contrast with autumn 2002. Mass migration of this species was observed in August-September 2003 on the Kola coast 14-30 km to the east of Kandalaksha. Tens of dead animals were found on roads and hundreds on lake shores (pers. com. E.V. Shutova). A single Wood Lemming was captured later in early October. Ground Vole *Arvicola terrestris* and Norway Lemming were neither recorded visually, nor found in catches, nor in droppings of avian predators.

N.S. Boyko

6. Kandalaksha Bay, Severny Archipelago, White Sea, Russia (67º00'N, 32º34'E)

Snow depth reached 1-1.5 m on forested islands in winter, but only 0.1-0.2 m on woodless islands (ludas). The bay ice broke in mid May. Snow disappeared from the islands almost completely and the sea was ice-free by 19 May, although small ice fragments still could be found on the coast. Mean air temperatures ranged from +6-10°C in the second half of May, and precipitation occurred on 7 of 13

days. The weather in the first half of June was similar to that in May, while the second half of June, July and August were warm and dry, which distinguished the 2003 summer season from 2002. Air temperatures often reached +28-30°C in the summer months, precipitation occurred on 7 days in June, 6 days in July and 6 days in August. Air temperatures dropped after 20 August, and the first night frost was recorded on 19/20 September. Snow cover established on 25-28 October.

A heavy crop of crowberries, bilberries and clusterberries was recorded.

Voles, primarily *Microtus* spp., were seen in July-August on 58% of forested islands and on 24% of ludas. No voles were captured using snap-traps on Ryashkov Island in May, while in autumn the density of voles there was 3.5 animals/100 trap-nights, mostly Bank Voles and some Short-tailed Voles. Given the 2-year cycle on the island since 1994, this increase in vole numbers should be followed by a decline in 2004.

Common waterbirds on islands and ludas of the bay include Common Eider *Somateria mollissima*, Turnstone *Arenaria interpres*, Oystercatcher *Haematopus ostralegus*, Herring *Larus argentatus*, Great Black-backed *Larus marinus* and Common gulls, Arctic Tern *Sterna paradisaea* and Black Guillemot *Cepphus grylle*. Nesting of these species occurred at the usual time in 2003. Several islands and ludas were inhabited by a non-breeding Red Fox in 2003, but the abundance of voles reduced pressure on seabirds. Predation by White-tailed Sea Eagles had a large impact on gulls (mostly juvenile), while among Eiders both juvenile and adult birds were taken, including incubating birds on nests. According to analysis of remains, eagles took 96 female Eiders (2-16 per island) and 22 adult gulls (1-4 per island) by the end of June. Breeding success of Common Eiders, Oystercatchers and Common Gulls is strongly affected by predation of chicks by Herring and Great Black-backed gulls. Remains of Eider eggs and chicks were found in 5.4% of droppings of Herring Gulls (n=110) collected on 21 June and 5 July on 6 ludas, while there were remains of voles in 3%. Despite predation pressure, Common Eider, Oystercatcher, gulls, Arctic Tern and Black Guillemot successfully raised chicks on many islands. Numbers of nesting birds did not differ markedly from previous years.

Two clutches of Short-eared Owls were found on the islands, from which one was destroyed by a Red Fox, while the fate of another one is unknown. Two pairs of Eurasian Kestrel on the islands successfully raised 3 chicks each. Mass appearance of the Thornback *Gasterosteus aculeatus* allowed Arctic Tern colonies to start recovering.

N.S. Boyko

7. Kandalaksha Bay, Severny Archipelago, White Sea, Russia (67º02'N, 32º35'E)

May was relatively warm, June slightly colder than normal and July hot. Snow cover melted completely on 28 May. The whole summer was dry. Extreme weather events were not recorded.

Breeding conditions and numbers of most species were similar to those in previous years. Some increase was recorded in Arctic Terns owing to the mass appearance of the Thornback during the recent 2-3 years. As to avian predators, Common and Herring gulls were breeding in abundance, Northern Goshawk and Rough-legged Buzzard were common without signs of breeding, White-tailed Sea Eagle (breeding), Arctic Skua and Short-eared Owl were present in small numbers.

E.V. Shutova, V.V. Bianki

8. Kolsky Bay, Murman coast, Russia (69º00'N, 33º05'E)

The season was cold and rainy. Snow melted from 50% of the ground on around 1 June.

Burrows and piles of excavated soil reaching 1-2 kg were found on many lawns in Murmansk city after the first snow of early winter melted and everywhere after snow melt in spring. These tracks were presumably left by Tundra, Short-tailed or Common *Microtus arvalis* voles.

Short-eared Owls and Gyrfalcons were seen. Spring migration of waders started on 16 April, when Oystercatchers appeared in the central part of the bay, and was over by mid June. Observations of roding Woodcocks *Scolopax rusticola* were made which is a rare event for the area. As in previous years, Bar-tailed Godwits *Limosa lapponica* were migrating in flocks up to 100 birds, but low abundance of migrating Ruffs *Philomachus pugnax* and Temminck's Stints was, probably, typical for spring 2003. Autumn migration of waders was of low intensity in the southern part of the bay, and was extremely prolonged on the Murman coast. Flocks of Turnstones reaching 100 birds and about 300 birds in total appeared in the central Kolsky Bay in mid September and stayed there until mid October (the last Turnstones were seen on 8 December). Numbers of migrating Ruffs decreased compared with previous years.

Y.V. Krasnov, D.V. Yanina, Y.I. Goryaev

9. Teriberka Bay, Murman coast, Russia (69º12 'N, 35º06 'E)

It was a cold and rainy season, but started no later than usual.

Grey-sided Voles occurred locally in low numbers, based on catches with cylinders (500 cylinder/nights).

All Kittiwakes *Rissa trydactyla* in a small colony (about 100 pairs) in the eastern part of the bay gave up breeding, but 2-3 pairs each of Shag *Phalacrocorax aristotelis* and Great *Ph. carbo* cormorants bred successfully there. Rough-legged Buzzard bred. Short-eared Owl was seen. No Arctic Fox was recorded. Waders occurred in usual numbers, including breeding Oystercatchers, Ringed Plovers *Charadrius hiaticula*, Wood Sandpipers *Tringa glareola* and Temminck's Stints.

Y.I. Goryaev

10. Dvorovaya Bay, Murman coast, Russia (68º27 'N, 38º14 'E)

The survey period, 10-20 June, was warm and dry, and no snow remained on the ground by that time.

Neither rodents, nor traces of their activity were seen.

Rough-legged Buzzard bred, while Arctic Foxes were not recorded. Ringed Plover was the only common breeding wader.

Y.I. Goryaev, A. Ezhov

11. Tersky Coast, Kola Peninsula, Russia (66º11'N, 39º30'E)

During the period of surveys on the coast between Chapoma and Sosnovka rivers, from 25 July to 28 August, the weather was warm and dry.

Pathways, feeding places and latrines of voles were found in large numbers everywhere on coastal meadows and in sedge marshes, while burrows and piles of excavated soil were found in dry habitats. These observations indicate high numbers of voles, probably Tundra and Short-tailed voles.

Arctic Foxes were not recorded. Rough-legged Buzzards and Peregrine Falcons *Falco peregrinus* were common and bred. We also saw Short-eared Owls, Northern Harriers, Kestrels, Merlins and White-tailed Sea Eagles. Willow Grouse were abundant in coastal tundra, and their broods contained 10-16 juveniles.

Among waders, European Golden Plovers, Oystercatchers, Ringed Plovers and Common Snipes *Gallinago gallinago* bred, while the status of the Little Ringed Plover *Charadrius dubius* and Redshank *Tringa totanus* was not determined. Grey Plover *Pluvialis squatarola*, Turnstone, Ruff, Whimbrel, Red-necked Phalarope *Phalaropus lobatus*, Sanderling *Calidris alba*, Dunlin and Greenshank *Tringa nebularia* were migrating in autumn, the latter two species in large numbers. The nesting density of Common Eider was very low: 3 broods per 100 km of shoreline. A large colony of Arctic Terns was found, with several hundred nests in an area of about 1 hectare.

Y.I. Goryaev, Y.V. Krasnov, D.V. Yanina, M.V. Gavrilo

12. Kolguev Island, western coast, Russia (69º10'N, 48º30'E)

Aerial and ground surveys in late August revealed that the principal concentrations of seaducks occurred in shallow waters close to the southern portion of the island. King Eider *Somateria spectabilis* was the most abundant seaduck (22.8%), White-fronted *Anser albifrons* and Bean *A. fabalis* geese were the most common geese on the coast. Bewick's Swans *Cygnus bewickii* with broods were seen on lakes. Juveniles accompanied by alarming adults were also observed in Glaucous *Larus hyperboreus* and Herring gulls and in Arctic Skua.

This island is not inhabited by rodents. Birds of prey were represented by two immature White-tailed Sea Eagles and a pair of alarming Rough-legged Buzzards.

Ruffs were the most abundant among migrating waders, which also included Red-necked Phalaropes, Eurasian Golden Plovers, solitary Dunlin and Common Snipe.

M.V. Gavrilo, Y.V. Krasnov, H. Strøm

13. Kolokolkova Bay coast, Tobseda settlement, Russia (68º35 'N, 52º20 'E)

The mean daily temperature dropped to freezing point on 24 May after an unusually warm period started on 20 May. Sea ice fragmented on 7 June in the Bay, while primary feeding habitats of Barnacle Geese on beaches were still completely covered with snow in mid June, but snow melted on 70% of the surface by 23 June. More inland areas were 50% free of snow on 10 June and cleared by 20 June. The period of adverse weather on 11-13 June with the last snowstorm on 13 June coincided with egg-laying in Barnacle Geese *Branta leucopsis*. The period from 1-20 June was cold, while July and August were unusually warm and dry, but thunderstorms occurred on several occasions.

The first migrating Brent Geese *Branta bernicla* were observed on 25 May. Migration had two peaks on 2 and 7 June and was over by 9 June. Barnacle Geese also arrived on 25 May, but they were migrating in highest numbers on 7 and 10 June. We counted 70,000 Brent Geese and over 8,500 Barnacle Geese during the period of observations. Late migration of Barnacle Geese could be due to adverse weather or feeding conditions somewhere on the migration route (e.g., Kanin Peninsula).

Despite the return of cold weather in June bird breeding conditions were favourable, because the summer was unusually warm and dry. The first nests of Barnacle Geese appeared on 1 June in the colony among the dunes, while the mean date of clutch initiation on the marshes was 12 June. The median first egg dates were 18 June in Dunlin, 22 June in Temminck's Stint, 23 June in Ringed Plover, 24 June in Red-necked Phalarope and 27 June in Little Stint *Calidris minuta*. The first chicks hatched on 1 July in Dunlin.

Numbers of breeding Barnacle Geese increased by a factor of three on the continental part of the Bay, compared with 2002, reaching 1200 nests. Among waders, Dunlins and Red-necked Phalaropes nested at highest densities, while territories of Temminck's Stints were arranged in small groups in specific habitats (in the settlement, near lakes and along the sea shore).

The complete absence of lemmings and Arctic Foxes, typical for extensive coastal salt marshes, and low to average predation rate by gulls and skuas, resulted in successful nesting of birds. Among avian predators, Arctic Skuas were seen attacking waders most often, while the impact of Herring and Glaucous gulls was lower. Merlin and Peregrine Falcon were seen twice hunting in Dunlin territories. Nest success by Barnacle Geese was 87%, mean clutch size 3.9 eggs and mean brood size immediately after hatch 2.8 chicks. Nesting success of waders was also high, and broods were recorded on 70% and 75% of breeding territories in Dunlins and Temminck's Stints, respectively. Conditions during incubation and brood-rearing were favourable, and we counted 5796 moulting adult Barnacle Geese and 4209 chicks on 8 July, which indicates relatively high reproduction. Non-breeding and failed-breeding geese regained the ability to fly in early August, while broods started to fly from mid August.

Reproduction of waterfowl in the area was adversely affected by poaching early in the season.

K.E. Litvin, E.N. Gurtovaya, R. Drent, G. Eichhorn, J. Gregersen, J. Karagicheva

14. Kolokolkova Gulf, Russia (68º17'N, 52º20'E)

The development of spring took place at the usual time. Both break-up of rivers and reduction of snow cover to 50% happened on 15 June, although we experienced three snowfalls in the first half of June and two in the second half of the month. Snow had melted completely by 29 June. No adverse weather events were recorded. In general there was a warm and dry summer in the region, favourable for breeding birds.

No lemmings were observed, by five people, during almost two months; at the same time voles were rarely seen.

Arctic Foxes and Rough-legged Buzzards were present in small numbers, and we did not find any signs of their breeding. Short-eared Owl was observed only once. Arctic Skuas were common. Of potential predators only Herring and Glaucous gulls were numerous.

Good weather and low predation rate seemed to enable good breeding results for birds.

Y.N. Mineev, O.Y. Mineev, G.L. Nakul

15. Malozemelskaya Tundra, Pechora River mouth, Russia (68º05'N, 54º20'E)

Based on observations in the second half of August and two thirds of September, the season was late, warm and rainy. Wind speeds reached 27-30 m/s during a storm on 31 August – 1 September.

The abundance of small rodents, presumably mostly lemmings, was evaluated as intermediate.

Arctic Fox was not recorded. Among avian predators on post-breeding migration, Rough-legged Buzzard, Merlin and Peregrine Falcon were numerous, Northern Goshawk common and White-tailed Sea Eagle, Northern Harrier and Gyr Falcon rare.

I.R. Enaleev

16. Polar Ural mountains, Russia (66º04 'N, 63º22 'E)

Spring was average in timing, summer was relatively warm with average amount of precipitation. Air temperatures dropped to +4-7°C during study period between 27 June and 26 July, and strong winds were common. Apart from a single heavy thunderstorm on 6/7 July with 70-80 mm of precipitation, no extreme weather events were observed. August had been warm and dry, but rains became regular in September, and snow cover established on 5 September in the mountains.

Numbers of rodents decreased in winter and were low in summer. Total catching effort in 13 habitats was 1325 trap/nights, and yielded an average total density of rodents 0.45 vole per 100 trap/nights, including 0.23 in Grey-sided Vole, 0.15 in Middendorff's Vole *Microtus middendorffi*, 0.08 in Short-tailed Vole. Northern Red-backed *Clethrionomys rutilus* and Tundra voles and Northern Pika *Ochotona hyperborea* were also observed. Vole numbers (Grey-sided, Northern Red-backed, Narrow-skulled *Microtus gregalis* and Middendorff's) started to increase in September, according to catches conducted in the Sob' River valley.

Northern Harriers and Merlins nested at densities of 0.03 and 0.1 pair/km^2, respectively, in the main plot, but were more common in the forested river valleys to the north of the study area (1.7 pair/10 km of valley). Solitary nests of Golden Eagle and Rough-legged Buzzard were not occupied in 2003. Two Brown Bears *Ursus arctos* and two nesting pairs of Common Crows *Corvus cornix* inhabited the study area. Owls, skuas, wolves, Arctic and Red foxes were not seen. Predation pressure on birds was probably average.

Successful nesting was recorded in Black-throated Diver *Gavia arctica*, ducks (Common Goldeneye *Bucephala clangula*, Pintail *Anas acuta*, Teal *Anas crecca*, European Wigeon *Anas penelope*, Red-breasted Merganser *Mergus serrator*), Willow and Hazel grouse, Rock Ptarmigan *Lagopus mutus*, Common Gull and passerines. Wader density was low in this upland area. Nesting was successful in Dotterel, European Golden Plover, Wood and Common *Actitis hypoleucos* sandpipers, and Whimbrel, while alarming birds were also observed in Ringed Plover, Terek Sandpiper *Xenus cinereus*, Ruff, Bar-tailed Godwit and Greenshank, indicating breeding.

M.G. Golovatin, S.P. Paskhalny, V.V. Pavlinin

17. Voikar River middle reaches, Lower Ob' River area, Russia (65º48 'N, 63º57 'E)

Snow accumulation was low and it melted relatively quickly, at the average time for the area. Ice broke at the average time on the Voikar (16 May) and Ob' (17-20 May) rivers. Spring development was rapid in May, but cold weather with rains returned in early June, and snow cover re-established in the mountains. Summer was warm in general, but alternating weather prevailed both in spring and summer, when hot days were followed by cold days with rains, wet snow, and frequent storms. The water table was average in the Ob' River.

Rapid spring resulted in intensive bird migration and early growth of vegetation. Numbers of most birds were close to average, with an insignificant decrease compared with 2002. Numbers of Arctic Terns remained low. Abundance of Willow Grouse decreased and a fraction of males failed to pair. Numbers of other species of grouse increased, including Black Grouse *Lirurus tetrix* in the tundra. Breeding Short-eared Owls occurred at low density due to the decrease of rodent numbers after their peak in 2002. Numbers of Common Crows continued to increase although the increase in nesting density was less pronounced.

M.G. Golovatin

18. Enzoryakha River upper reaches, Yamal Peninsula, Russia (67º52'N, 68º30'E)

Spring development was slow due to low temperatures, but the weather changed dramatically after 10 June. Except for a snowstorm on 17 June and rains in late June, the weather was hot and southeastern winds prevailed during the whole month. Waterbodies and marshes were

drying out rapidly, and by mid July 80% of small water-bodies had disappeared and many streams dried out.

Rodent numbers were low, and they were only represented by isolated colonies of Narrow-skulled Voles.

Despite cold weather in early June, the following rapid increase in temperature resulted in mass emergence of Diptera flies on 20-22 June, which is extremely early. High activity of soil invertebrates on watersheds, in particular in mountain tundra, decreased because of drought to a very low level by 1 July, which is also early. However, drought did not lead to any decrease in numbers of nesting waders. After hatching of chicks, many birds with broods moved from watersheds to wetter sites. Many flat-hillock bogs inhabited by Bar-tailed Godwits, Whimbrels and phalaropes dried out completely by hatching time. European Golden Plovers were common in tundra-like habitats along the river valley. Common and Pintail *Gallinago stenura* snipes were equally and highly abundant in the river valley.

Long-tailed Skuas were common and bred (pairs seen every 3-4 km), and a single pair of Arctic Skuas was observed. A single, probably non-breeding pair, of Rough-legged Buzzards and a single pair of Ravens *Corvus corax* were seen. Arctic Foxes were not recorded.

Birds could suffer from predation by skuas and from trampling of clutches by migrating reindeers, several thousands of which were passing through a belt 4 km wide as late as the end of June.

T.R. Andreeva

19. Enzoryakha River lower reaches, Yamal Peninsula, Russia (68º10'N, 68º33'E)

A single Siberian Lemming *Lemmus sibiricus* was seen in the Payuta settlement. No Arctic foxes were noticed.

In the study period from 16 July-1 August waders (Common Snipes, Wood Sandpipers, Temminck's and Little stints) were numerous only in the coastal areas and on river spits. Waders inhabiting quarries and a fraction of European Golden Plovers were still present in their nesting habitats.

T.R. Andreeva

20. Erkatayakha and Payutayakha rivers, Yamal Peninsula, Russia (68º13'N, 69º09'E)

According to reports by local people, spring development was very rapid, snow disappeared from 50% of the tundra surface in the last week of May and completely in mid-June. This resulted in early nesting by some of the early migrant bird species (geese, swans, some passerines). However, adverse weather conditions (frequent snowfalls, rains, northern wind and relatively low temperatures) prevailed during arrival of most species. Thus arrival and start of nesting by most passerines and waders were prolonged. Pelting rain was replaced by abundant snow in the period from 16 to 18 June, and the water table in rivers and connected lakes reached flood-time level. Presumably, high water was responsible for flooding of duck and wader nests, judging by the start of hatching in all found nests of ducks only after 25 July. The weather was favourable for nesting in the second half of June to mid July. Air temperatures were especially high from mid June to mid July and reached +36°C on some days. Second broods were found in some species of passerines.

Local people explain the low numbers of predators in winter as the consequence of frequent rains in October-November 2002, which caused freezing of thin snow into an ice layer. Then the snow was blown away. The bushes were not covered with snow during the whole winter. Presumably, winter weather conditions adversely affected lemmings and *Microtus* voles and did not allow them to reach peak numbers which should have occurred, according to our prognosis. Local herdsmen reported findings of dead rodents during the winter, and also characterized the winter as very unfavourable for reindeer.

We captured 5, 25 and 3 Collared Lemmings *Dicrostonyx torquatus*, Middendorff's Voles and Narrow-skulled Voles, respectively, using snap-traps. Numbers of Middendorff's Voles and, probably, Collared Lemmings had increased by the end of July, and pregnant females of the latter species were found.

According to reports by local people, Willow Grouse were more abundant in winter compared with previous years, and hares also occurred in high numbers. Arctic Foxes were numerous until November, but then they migrated elsewhere. Snowy Owls were not seen in summer, their numbers in winter were not high and reached former levels only in October.

Predation on bird nests was low in summer as only solitary Arctic Foxes were recorded, numbers of skuas were low, Rough-legged Buzzards were seen only in June and their nests failed due to low numbers of rodents. We also observed that nests of birds of prey on bluffs had fallen off after the period of inclement weather from 16-18 June.

The general impression is that reproductive success was very high in passerines and ptarmigans due to favourable conditions during egg-laying, incubation and brood-rearing. Nests of waterfowl and divers placed close to shores of rivers and nearby lakes presumably were flooded in mid June, judging by the relatively high numbers of non-breeding geese in late June and late hatching in ducks.

V.A. Sokolov, A.A. Sokolov

21. Kara Sea coast, Yamal Peninsula, Russia (68º47'N, 69º12'E)

It was a very warm and dry year, a view shared by the native Nenets people. From late June to late September we did not record temperatures below freezing. High temperatures (+25-30°C) prevailed during many days in August.

Of small rodents only a single lemming was observed. Neither Arctic Foxes, nor owls were seen.

Numbers of waders migrating along the Kara Sea coast appeared lower compared with the previous year, and there were definitely fewer Herring Gulls on the sea coast in August compared with 2002. Thus, breeding success was probably low. Also, ca. 50 nests of Herring Gulls produced only ca. 10 nestlings in a colony on the sea coast near Cape Rok, but it is also possible that native people collected most of the eggs for food. Weather conditions were excellent.

D. Nowak, A. Bolek

22. Gydansky Peninsula, Tazovsky District, Russia (71º22'N, 77º27'E)

According to reports by local people, much snow accumulated in the winter. Spring started early, was prolonged and relatively dry. Snow Buntings arrived around 25 April, while snow-free patches appeared on level areas around 5 May, after warming and the first rain. Ice break-up on small rivers started on 20 May, and Arctic Foxes in summer fur appeared about the same time. Ice started to break up in the middle reaches of the Gyda River on 15 June and in lower reaches on 18 June. The last snowfall on 10 June was followed by rapid warming on 13-15 June and hot weather. The first geese appeared on 20 May and mass arrival occurred on 25 May. Red-breasted Geese *Branta ruficollis* arrived on 10 June, divers on 12-13 June and swans on 19-20 June. Generally, the weather in 2003 was closer to average than in cold and rainy 2002.

According to reports of local reindeer herders, lemmings were numerous in spring, but then disappeared.

Snowy Owl was rare, while Rough-legged Buzzard was common and bred, but nesting effort was lower than in 2002. Skuas were common everywhere, but nesting was not confirmed. Geese were common, but rarely bred. Large moulting aggregations of Bean and White-fronted geese were found on large lakes (Periptaveto, Khucheto). Numbers of Willow Grouse increased from 2002.

P.M. Glazov, A.E. Dmitriev, N. Emelchenko

23. Mamonta Promontory, northern portion, Russia (72º00'N, 76º45'E)

Lemmings were common.

Snowy Owl was numerous, Rough-legged Buzzard was common, and both species bred successfully. Geese were common and bred.

P.M. Glazov, A.E. Dmitriev, N. Emelchenko

24. Medusa Bay, Taimyr Peninsula, Russia (73º21'N, 80º32'E)

Snow covered 99% of the monitoring plot (4 km^2) at our arrival on 5 June. Snow started to melt rapidly on 13 June, reached 50% cover on about 16 June, and had almost completely melted by 21 June. Ice on major rivers broke up on 17 June. The weather was very warm from 21-24 June, when air temperatures reached +23°C. July was colder than June. In general, the spring started at the usual time, summer was about average – warm and rather dry.

Lemming abundance was approximately half the density of 2002. Density of Siberian Lemming was 4-6 animals/ha and decreased during summer, while density of Collared Lemming was 0.5-2 animals/ha and increased. Both species bred.

The density of breeding Arctic Foxes was about half the density in 2002. Predation pressure by foxes was high, and they even crossed the ice to islands 3-6 km offshore, where they destroyed almost all nests of Brent Geese and many nests of Herring Gulls. Migration of reindeers was not intensive, and less than 200 animals were counted in the vicinity of the station. Snowy Owls did not bred, while Rough-legged Buzzards bred successfully everywhere (0.4 nests/10 km^2 on surveyed area of 434 km^2), having up to 6 eggs in clutches and up to 4 chicks in broods. Nesting density of Long-tailed Skuas was low and only 2 nests were found. Pomarine Skuas *Stercorarius pomarinus* occupied territories from 18 June, but started to leave in high numbers by 24 June. Nests were not found, but distraction displays of one pair suggested nesting at a low density.

Arrival dates of waders did not differ from 2002. Dunlins and Red Knots *Calidris canutus* first appeared on 7 June, and mass migration of Dunlin, Curlew Sandpipers *Calidris ferruginea* and Purple Sandpipers *C. maritima* started on 8 June. Maximum numbers of waders were recorded on snow-free patches on 11-12 June. Incubation started on 20 June and the first chicks appeared on 10 July. Numbers were similar to those recorded in previous years in Pacific Golden Plover *Pluvialis fulva*, Ringed Plover, Turnstone, Temminck's Stint and Ruff, while numbers decreased slightly in Dunlin and Curlew Sandpiper and decreased considerably in Little Stint and Pectoral Sandpiper *Calidris melanotos*. A nesting pair of European Golden Plover was found on the plot for the first time during the decade of studies in the area. Nesting success of waders (proportion of nests survived to hatch) was 20.5% (n=78), including 54% in Dunlin (n=11), 12% in Little Stint (n=33), 33% in Curlew Sandpiper (n=3), 50% in Temminck's Stint (n=2), 0% in Turnstone and European Golden Plover (n=2 and n=1, respectively), 9% in Pacific Golden Plover (n=22), 33% in Ringed Plover (n=3) and 100% in Ruff (n=1). Nest success was higher in Dunlin compared with other species, many nests of which were destroyed by Arctic Foxes shortly before hatching.

S.P. Kharitonov, T.A. Kirikova, S.A. Korkina, A.G. Bublichenko

25. Pyasina River basin, Taimyr, Russia (73º00'N, 88º00'E)

The weather was very warm from 15 to 22 June on the western Taimyr, and temperatures reached +26-28°C on some days. Ice broke-up in the average time and passed downstream quickly on 20-22 June on the Pysina River and its largest tributaries. Prolonged cooling with air temperatures about +2-6°C and strong northerly winds established in late June onwards, and was interrupted by relatively calm warm weather on 14-16, 24-27 July and 11-16 August only. There was no rain in July, and vegetation development was delayed. The tundra remained dry and did not become green even in late July, while shaded slopes of streams and ravines retained a lot of snow.

High numbers of lemming undersnow nests indicated their successful undersnow reproduction. However, the long thaw in early and mid May was followed by pelting rain, even in the lower reaches of the Pyasina River. Air temperatures dropped to –20°C afterwards, and wet snow turned into ice preventing lemmings from accessing food. Accordingly, most Siberian Lemmings perished, while Collared Lemmings survived only in the stony talus. An expected peak of lemming abundance in summer was not observed, and neither lemmings, nor signs of their activities were recorded during the whole period of studies, between 10 July and 16 August.

Arctic Foxes and Snowy Owls were not observed, while breeding Rough-legged Buzzards, skuas and Herring Gulls were very rare. There was low breeding productivity of geese as they suffered increased predation by Herring Gulls and skuas. Among waders, the abundance of breeding Grey and Pacific Golden plovers seemed to be about average, while Ruffs, Pectoral and Curlew sandpipers, Dunlins, Little and Temminck's stints demonstrated nesting behaviour less often than usual. Breeding Peregrine Falcons occupied 3 nests of 8 inspected on the Pura River, however, new nests were found in the lower reaches of the Pyasina River. The latter broods also more often contained 4 chicks than 3, which could be due to the increased abundance of non-breeding waders as food close to the sea coast.

Y.I.Kokorev

26. Putorana Plateau, Russia (66º30'N, 90º30'E)

Snow cover reduced to 50% on 12 and 20 June in lake valleys and alpine tundra respectively, and completely melted in these habitats on 15 and 28 June. The first 10 days of June were cold with snowfalls and frost, while the rest of month was warm or hot and dry. The weather was cold and rainy in July and the first 10 days of August.

Lemmings and voles were seen regularly on excursions, but we did not catch rodents. *Microtus* sp. voles were rather abundant in the beginning of the summer, but then numbers dropped to the average level.

Arctic Foxes do not inhabit this area in summer. Breeding White-tailed Eagles, Rough-legged Buzzard, Merlin, and Herring Gull were common, while Peregrine Falcon, Common Gull and Short-eared Owl were rare. Breeding by Northern Harrier and Northern Goshawk was not recorded, although possible.

Generally, conditions were favourable for reproduction by birds, although cool and rainy weather in the second half of the summer apparently resulted in a decrease in juvenile survival. Predation on birds was not heavy owing to the rather high abundance of microtine rodents. In the alpine tundra, predation on eggs by Ermines probably resulted in a considerable decrease in productivity of the local population of Lapland Buntings *Calcarius lapponicus*.

A.A. Romanov, S.V. Rupasov

27. Khatanga settlement, Taimyr Peninsula, Russia (71º58'N, 102º26'E)

Spring was early, probably due to low accumulation of snow during the winter. Day-time temperatures were above freezing point in late May, and snow cover reduced to 50% in forest tundra around the settlement on 3 June and on low watersheds farther from the settlement on 7 June. Snowfalls occurred on 3 days in the first half of June, but the weather was generally warm and alternating in this period. The last drop in temperature below freezing occurred on 7 June. Flowering of Glacier avens (*Geum [Novosiversia] glaciale*), appearance of bumble-bees and butterflies were recorded on 9 June. Ice started to break on the Khatanga River on 9 June and the water table started to rise. However, ice jams prevented ice from moving until 14 June. The water level reached its maximum on the Khatanga River on 15 June, while the water level in small tributaries started to drop on 13 June. Sedges *Carex* sp. and willows (*Salix pulchra*) flowered, and larch (*Larix daurica*) buds opened on 14 June.

We did not see rodents on daily excursions from 27 May-15 June and on 11 August, which indicates their low numbers. Undersnow tracks were seen rarely, droppings found at only one place, and remains of a lemming taken by a predator at another. Muskrats *Ondatra zibethicus* were common in waterbodies in the vicinity of the settlement, and one Arctic Hare was seen.

Predators were rare. Few White-tailed Sea Eagle, Northern Harrier, Merlin and Short-eared Owl appeared in the area, while Rough-legged Buzzards bred, and chicks fledged from the nest with a clutch of 4 eggs. Remains of a rodent and wader feathers were found in the buzzard nest on 11 August. Carrion *Corvus corone* and Hooded *C. cornix* crows and probably Ravens nested around the settlement.

The density of waterfowl was low due to hunting pressure and disturbance in spring. Numbers of Willow Grouse also decreased after the start of the hunting season. Reproductive output of passerines and waders was not low, judging by the numbers of juveniles on 11 August.

P.S. Tomkovich, V.V. Golovnyuk, E.N. Rakhimberdiev, M.Y. Soloviev

28. Bludnaya River mouth, Taimyr, Russia (72º51'N, 106º02'E)

Snow cover reduced to 50% on 16 June, while the median date for 10 seasons is 11 June. Snow completely melted on level areas on 20 June, which is also later than average. The water table increased to its maximum on 20 June, and floodplain habitats became available for birds again on 24 June, which is later than in the previous 4 years. Air temperatures rose steeply in the second half of June, reaching an average of +13.2°C between 16-27 June, but dropped to an average of +7.4°C between 28 June—7 July. The rest of July and the first days of August were moderately warm and slightly wetter than normal. A period of adverse weather from 7-9 August with strong wind, driving rain and occasional snow resulted in an unprecedented increase in the river water levels. Generally, the weather was favourable for breeding birds during most of the summer, and chicks in the majority of wader nests hatched after the period of cold weather in early July. However, adverse weather in the beginning of August could have been devastating for chicks from late broods, which is supported by finding dead young Ruffs not long before fledging on 9 August. An exhausted young Shore Lark *Eremophila alpestris* was captured by hand on the same date. In spite of the late snowmelt, dates of plant and insect development were average, probably due to warm weather in the second half of June.

Lemming numbers in 2003 were the lowest on record for 10 seasons. A single under-snow nest was seen on a transect 4.6 km long and 10 m wide, where 33, 7 and 6 nests were recorded in 2000, 2001 and 2002, respectively. Three lemmings were seen in June-July by 5 observers, which is also a record low number.

Arctic Foxes did not breed. They were seen on several days in mid June, but became extremely rare afterwards. Among skuas, Pomarine did not breed, while Long-tailed and Arctic skuas nested in their usual low numbers. Rough-legged Buzzards and Peregrine Falcons nested successfully in low numbers. Merlin and Snowy Owl were rare visitors without signs of breeding.

Nesting of most species occurred around average dates. Estimated densities (in nests/km^2) for common species were: Little Stints – 3.9, Grey Phalarope *Phalaropus fulicarius* – 31.6, Ruff – 10.3, Dunlin – 15.0, Pectoral Sandpiper – 18.4 and Lapland Bunting – 30.0. Both the total density of all species of birds (133.3 nest/km^2) and the density of waders (88.2 nest/km^2) on the main plot on the river terrace in 2003 were slightly above the long-term averages (119.8 and 86.3 nest/km^2, respectively). Among waders, the high nesting density of Grey Phalaropes is notable.

Predators were rare, and nest success of common species was moderate to high: 63.6% in Dunlin (*n*=22), 62.2% in Pectoral Sandpiper (*n*=45), 58.3% in Ruff (*n*=24), 75.6% in Grey Phalarope (*n*=45), 62.5% in Little Stint (*n*=8), 54.6% in Pacific Golden Plover (*n*=11), 88.9% in Lapland Bunting (*n*=36) and 75.0% in Willow Grouse (*n*=8). Nest success in 2003 in all species of waders combined was 62.7±3.5% (*n*=193), which exceeds the long-term average of 47.7%. However, predation pressure of skuas on chicks was apparently high, and taking into account the period of adverse weather in August, reproductive success of birds was unlikely to exceed average.

Breeding records of Buff-bellied Pipit *Anthus rubescens* and Common Scoter *Melanitta nigra* in the area expand northward ranges of these species considerably.

M.Y. Soloviev, V.V. Golovnyuk, E.N. Rakhimberdiev, P.S. Tomkovich, I.V. Travina

29. Fomich River middle reaches, Anabar plateau, Russia (71°40'N, 108°15'E)

Spring was late. On arrival on 19 June the water table reached its maximum, snow patches were still present in the forest and snow cover was 40-60% in the mountains to the north of the study area. Snow melted completely in the Fomich River valley on 22 June. A late spring was followed by a very warm and clear period from 19-26 June, when air temperatures reached +26.2°C, after which cold and rainy weather with temperatures rarely exceeding +10°C prevailed until 11 July. Ice cleared from the large lake near camp on 9 July. Mid July was hot (with record temperatures of +32.5°C on 14 July) with frequent rains and storms. Warm weather with daily mean temperatures of +12-16°C and almost daily rains established from 25 July. The amount of precipitation to fall on 6-9 August exceeded 30 mm, which is approximately one third of the total amount for the period of observations. River waters rose by approximately 4-5 m, and were decreasing to the mean water level until 18 August. Wind velocity exceeded 10 m/s only on 26 June, when it reached 30 m/s. Generally the summer was moderately warm and wet.

Lemmings were not seen or caught, but their remains were found in pellets, and lemming droppings were abundant in mountain tundra. Trapping resulted in 43 voles captured per 1266 total trap/nights (data of M.P.Telesnin and M.N.Korolyova), including 33 Middendorff's and North Siberian *Microtus hyperboreus* voles, 7 Northern Red-backed and 3 Grey-sided voles. Northern Pika was common in stony talus and in river canyons.

Arctic Fox was seen once, and tracks were seen several times, but foxes apparently did not breed and were not resident in the area. We saw tracks of wolves *Canis lupus* several times and tracks of Brown Bear twice. Wolverine *Gulo gulo* was seen once. Long-tailed Skuas were rare and presumably bred only in mountain tundra. Herring Gulls were rare, and a single brood was seen. Four nests of Rough-legged Buzzards were deserted (2 eggs in each of them), and a single successful nest was found in a canyon inhabited by Northern Pikas at a high density. Nesting of Gyr Falcons was successful, probably due to the high abundance of Willow Grouse. Merlins also nested successfully.

Hatching was recorded on 30 June in Dusky Thrush *Turdus eunomus* and White Wagtail *Motacilla alba*, on 1 July in Little Bunting *Emberiza pusilla*, on 3 July in Ruff, on 5 July in Spotted Redshank *Tringa erythropus*, on 11 July in Arctic Tern, on 15 July in Ringed Plover, on 17 July in White-winged Scoter *Melanitta fusca*, on 18 July in Long-tailed Duck *Clangula hyemalis* and on 20 July in Black-throated Diver. Redpolls nested in 3 waves: in the first wave, the last nest with a chick still to fledge was found on 8 July, then mass incubation occurred between 10-15 July, and finally the last nest with a clutch was found on 5 August. Many nests from the third wave probably perished during the flood in August when all willow stands were covered with water. Numbers of many birds (Long-tailed Duck, Ringed Plover, Bar-tailed Godwit) dropped considerably from 10-20 August, but apparent migration was not observed.

Predation pressure was low due to low numbers of mammalian and avian predators, predation events were not recorded and chicks hatched in all nests under observation.

Bird fauna of the area includes 60 species, but many occur in very low numbers. Willow Warbler *Phylloscopus trochilus* and Little Bunting were common in the forests of the river valley. Dusky Thrushes *Turdus eunomus* were particularly abundant, their nests occurred every 200-300 m along some forested streams, and juveniles dispersed into all habitats except mountain tundra after fledging. European Golden Plover was common in sparse larch forest and on dry terraces. Spotted Redshank, Ruff, Common Snipe, Arctic Tern and Bar-tailed Godwit were common on mires of the Fomich River valley. Among waterfowl, Long-tailed Duck and White-winged Scoter were common, followed by Pintail. Pairs of Black-throated Divers occurred on almost every large lake. Geese were rare in the area and only Bean Goose nested. Willow stands along the Fomich River were inhabited by Redpoll, Pallas's Reed Bunting *Emberiza pallasi* and Temminck's Stint. Ringed Plover was common on sandy tundra of river terraces, while presumably nesting Grey-

rumped Tattlers *Heteroscelus brevipes* were seen on gravely shores of the river branches. Rock Ptarmigan was common and bred in the mountains, while Shorelark was a rare breeder there. Pacific Golden and Grey plovers, Lapland and Snow buntings, Dotterel and Pomarine Skua were seen only in the mountains. White Wagtail and Wheatear *Oenanthe oenanthe* were numerous on the rocks of small river canyons and coastal cliffs of the Fomich River, respectively.

I.N. Pospelov

30. Lena Delta, southern and eastern portions, Yakutia, Russia (72º48'N, 129º19'E)

Spring was early, but developed slowly. Mean day-time air temperatures were positive on 11-12, 25-26 and 30-31 May, but dropped below freezing on 2-3, 6 and 18 June. Only a small amount of snow accumulated during winter, and snow cover melted completely by the start of our observations on 30 May. Ice on river channels broke-up starting on 9 June, slightly later than normal, and their clearance was prolonged, over 12-14 days because the small amount of melt water was not able to break ice-jams. Bykovskaya Channel in the middle reaches (SE part of the delta) cleared on 20 June, and Trofimovskaya Channel (east of the delta) cleared on 24 June. Mean monthly air temperatures were 2.9°C, 1°C and 2°C above the average in May, June and July, respectively, but the first 20 days of June were cold and wet with rain or snow occurring almost daily. During cold spells, snow cover could reach 5-10 cm deep at night, but then melted during the day. The last 10 days of June and the second one third of July were especially warm, when temperatures reached +13.8 and +14°C, respectively.

Lemming numbers decreased compared to the autumn 2002 due to the low amount of snow in the winter. Undersnow nests were found only in packs of snow near prominent relief features and mostly in human settlements. Active breeding and increase of numbers of rodents were not observed during the summer.

Arctic Foxes and wolves were not seen, but signs of predation by foxes were found in colonies and at isolated nests of waterfowl. Ermines were rare, and their breeding was not confirmed. Brown Bear was seen in the southern delta in mid August. Skuas (primarily Pomarine Skua) were seen in high numbers only on spring migration. Their summer numbers were below the average and nesting was not recorded. Snowy Owl was seen only once on 10 July. Rough-legged Buzzards bred in the southern delta at a low density, which is typical for low lemming years. Numbers of breeding Peregrine Falcons were similar to previous years. A brood of Ravens and two juvenile Kestrels were seen on 17 August in the middle reaches of the Bykovskaya Channel, southeast of delta, while a solitary Kestrel and two Gyrfalcons were noticed on 22 and 26 August, respectively, in the channel source.

The effects of weather on breeding performance differed among species. Early snow melt was probably favourable for nesting by high numbers of Brent Geese and Steller's Eiders *Polysticta stelleri*. We counted approximately 400 pairs of Brent Geese in 5 colonies at the mouth of the Bolshaya Trofimovskaya Channel, including 220 pairs in the largest colony. Steller's Eiders nested at a density of 5-14 pairs/km^2. The relatively cold first half of June led to decreased breeding numbers of Ross's Gulls *Rhodostethia rosea*, while Sabine's Gulls *Xema sabini* nested in their usual numbers. Breeding densities of Grey Plover, Little and Temminck's stints and Turnstone were lower than in 2002, but Grey Phalaropes, Ringed Plovers, Curlew and Pectoral sandpipers and Ruffs bred in numbers similar to 2002.

Predation pressure on bird clutches was considerably lower than in 2002, although locally many clutches could have been destroyed. Nest predation was 66.7-75% in colonies of Brent Geese visited by Arctic Foxes, while large gulls destroyed only 5-11.8% of nests. Nevertheless, combined nest success of Brent Geese in the north-east portion of delta was high, 84.2%. Two colonies (5 and 14 pairs) of Steller's Eiders were destroyed by foxes, but chicks hatched in 88% of nests on an island under control, which was not visited by foxes. Also foxes destroyed one of two nests of Bewick's Swans and two of 21 nests of King Eiders, and presumably this species was responsible for the partial reduction of clutch size in one of 4 nests of White-fronted Geese, because a cached egg was found dug into moss near a goose nest containing a clutch of 3 eggs.

Wandering Pomarine and Arctic skuas were the most active avian predators. The remains of a Ringed Plover, and eggshells of ducks, ptarmigans and waders were found in the stomachs of Pomarine Skua. Nest predation was 33% in Black-throated Diver (n=3), 12% in Steller's Eider (n=25), 25% in Grey Plover (n=4), 40% in Turnstone (n=5), 25% in Grey Phalarope (n=4), 40% in Little Stint (n=10), 100% in Curlew Sandpiper (n=2), and 80% in Ross's Gull (n=5). Nest predation was not recorded in Red-throated Diver, Pintail, Long-tailed Duck, Ringed Plover, Temminck's Stint, Pectoral Sandpiper, Sabine's Gull and Arctic Tern. Apparent nest success in waders was 68.8% (n=32). Broods of Pacific Golden Plover and Dunlin were found at the southeast of the delta in mid July, and a male Red-necked Phalarope was seen, the behaviour of which indicated the presence of chicks. Generally, breeding success was evaluated as average to high in most bird species.

V.I. Pozdnyakov, Y.N. Sofronov

31. Zhokhov Island, Russia (76º10'N, 152º40'E)

The summer was probably slightly warmer than usual. Mean daily air temperatures ranged from +0.1-+5.2°C during the period from 23 June to 14 August. However, night frosts occurred regularly: on 7 days in June, 11 days in July and 4 days in August. The mean air temperature for the whole period of studies between 21 July and 14 August was +1.7°C, with the minimum and maximum –1.2°C and +10.6°C, respectively. By the start of observations on 21 July, snow was absent from flat areas, but snow accumulations in depressions and in protected sites occupied a considerable area. Island beaches and the inshore sea surface became completely free of ice by early August, which contrasted with the situation in the 3 previous years. A snowstorm on 27-28 July resulted in the formation of a snow layer up to 15 cm thick on flat surfaces, but this snow had almost completely melted by 1 August.

Lemmings are absent on the island.

Arctic Foxes were absent this season, although two or three animals had spent the summer on the island in the previous 3 years. Three Polar Bears *Ursus maritimus* stayed on the island during the whole summer. Avian predators were mostly represented by 18-20 Glaucous Gulls, some of which bred. Glaucous Gulls predation was concentrated on the seabird colony, and we found remains of Kittiwakes, Thick-billed Murres *Uria lomvia*, Black Guillemots and their eggs near gull nests. We found the remains of at least 20 Kittiwake eggs and at least 10 eggs of murres near one of the gull nests. Glaucous Gulls were probably scavenging dead birds on the coast near the colony, as active attempts to hunt adult seabirds were not observed. Skuas were rare: one Arctic Skua was seen regularly near the colony, while two Arctic and two Pomarine skuas (all solitary) were trying to catch Kittiwakes and Grey Phalaropes on 2 August, when phalaropes appeared near the coast in high numbers. An Ivory Gull *Pagophila eburnea* stayed on the island on 29 July. Ross's Gulls were often seen from 22 June to 12 August in groups of 2-6 birds (once 12) or as singles. Among 82 recorded birds only one was an adult.

The largest seabird colony, in the southeast of the island, was inhabited by 30,000 Kittiwakes, 5,000 Thick-billed Murres and 500 Black Guillemots. Another colony of Black Guillemots had 180-200 nesting birds. Hatching started after 20 July in Kittiwakes and murres. Waterfowl occurred in small numbers and included nesting Common Eiders (the Pacific race) and non-breeding King Eiders. Turnstone was the only breeding wader with the total population of 20 pairs on the island. Juvenile Turnstones were observed after 31 July. A Knot was seen on 23 July, and small flocks of Grey Phalaropes (up to 10-15 birds) were observed along the coast during the whole period of studies. We counted 2,031 Grey Phalaropes, all in active body moult, feeding or resting along the leeward eastern shore on 2 August, with 1000 birds in the largest flock. Snow Buntings bred successfully and were numerous in the constructions of abandoned polar stations. Juveniles fledged by 21 July. Flocks of 10-30 adult and juvenile Snow Buntings were seen in the first days of August, and most birds had left the island by 10 August.

Judging by the numbers of juveniles, reproduction was successful, and a snowstorm in late July did not have a deleterious impact.

V.I. Pozdnyakov

32. Maly Chukochy Cape, Yakutia, Russia (70º05'N, 159º55'E)

The weather was unsettled during the study period from 28 August to 2 September, including 2 snowfalls and 2 clear days, daily night frosts, and winds ranging from calm to storm-force. There were signs that the summer had been warm and dry.

Lemmings were rare. Arctic Fox, skuas and owls were not recorded, while Rough-legged Buzzards were common and bred. Large numbers of geese and swans stayed on the lagoons and nearby tundra, families of Sandhill Cranes *Grus canadensis* were common, Willow Grouse were only rarely seen.

V.E. Ostroumov

33. Akhmelo Lake vicinity, Kolyma Lowland, Russia (68º50'N, 161º01'E)

Local observers reported early snow melt. The weather was moderately cool in June, extremely hot in July and August and unusually warm in September with monthly mean air temperatures +6°C. Dry conditions resulted in forest fires to the south of the study area.

According to observations in September, small rodents, primarily voles were common at the northern tree-line limit.

Arctic Fox and Rough-legged Buzzard were not observed. Ravens were numerous, gulls common, owls rare. The high abundance of young birds indicated successful breeding by divers, ducks, swans, waders, grouse, skuas and passerines, including Raven.

D.G. Fedorov-Davydov

34. Chersky settl., Yakutia, Russia (68º46'N, 161º21'E)

The period from at least 15 July to 15 August was hot, and this resulted in drought.

Voles were common, lemmings rare. The number of Arctic Foxes was estimated as moderate, and these animals supposedly bred. Breeding Rough-legged Buzzards and owls were common.

Numbers of grouse increased substantially, while waders were less abundant than before.

S.V. Gubin

35. Kolyma River lower reaches, Duvanny Yar, Russia (68º40'N, 159º00'E)

Based on observations from mid July to mid September, the weather was hot in July and early August. Dry weather resulted in forest fires and drying out of small lakes.

Small rodents and Arctic Foxes were commonly seen. Avian predators including skuas and owls were rare, gulls common. Broods of Willow Grouse were especially abundant.

S.V. Gubin

36. Maly Anyuy River mouth, Lower Kolyma, Russia (68º20'N, 161º30'E)

The weather was hot and dry in mid summer.

Small rodents were common, Arctic Foxes were rare in this forest-tundra area. Rough-legged Buzzards, owls and gulls were common and possibly bred.

There was an increase in numbers of grouse.

S.V. Gubin

37. Kupol gold mine, middle Kayemvaam Stream, upper reaches of the Anadyr River, Chukotka, Russia (66º46'N, 169º34'E)

The summer was very dry in the central Chukotka and rains were not observed for almost two months. Total catching effort for small terrestrial mammals was 160 trap/nights during the survey period, 5-11 August, and resulted in catching of 32 small rodents. Large-eared vole *Alticola macrotis* was the most abundant species, followed by the North Siberian Vole, Northern Red-backed Vole and Brown Lemming *Lemmus trimucro-*

natus. Arctic Ground Squirrels *Citellus parryi* and Northern Pikas were common in the area. Rough-legged Buzzards nested at a density of 0.5 pair/km^2 and most birds produced fledged young. Short-eared Owls were rare, and bred successfully. Falcons, Long-tailed and Arctic skuas, Sandhill Cranes were rare. Pacific Golden Plovers, Ringed Plovers, Wood Sandpipers, Grey-rumped Tattlers, Common Sandpipers were seen with fledged or nearly fledged broods. Total density of waders was low probably due to dry season.

I.V. Dorogoi

38. Tundrovaya River valley, Wrangel Island, Russia (71°18'N, 179°48'W)

Lemming numbers were low overall, with the exception of locally average numbers in the central part of the island.

Tundrovaya Mountain area was one of the local patches with average lemming numbers, and four pairs of Snowy Owls nested in one of the stream valleys there.

Arctic Foxes were present in average numbers and bred in the area of the main Snow Goose *Anser caerulescens* colony. However, on the major portion of the island (Southern Plain, valleys of some rivers) foxes were almost totally absent. Pomarine Skuas were rare and there were no indications of breeding by them.

Early spring and rapid snow melt allowed extremely early nesting in Snow Geese. Colony formation was not affected by a shortage of suitable nesting habitat, which resulted in the absence of cuckoldry and egg-laying outside nests. The first nests in the main colony were initiated between 20-25 May, which is 7-10 days earlier than average. The main colony had approximately 25,000 nests. Snow Geese left the colony by 8 July, non-breeding geese started to depart from the island in early August, and the first departing juveniles were recorded on 10 August, which is earlier than average (20-22 August). Despite high nest success (approximately 80%), breeding performance of Snow Geese was average, due to greater pressure of predators during brood-rearing. As usual in the years after lemming peaks, goose broods on the northern plains of the island suffered increased predation pressure from Arctic Foxes and Glaucous Gulls. The proportion of juveniles on the wintering grounds in January was 13%, while nesting success predicted 20%. Wader broods were common in the southern parts of the island where Arctic Foxes are extremely rare.

V.V. Baranyuk

39. Neizvestnaya River upper reaches, Wrangel Island, Russia (71°14'N, 179°20'W)

Ice on rivers broke up in the middle of May in the central part of the island, which is 1-2 weeks earlier than normal (D. Utkin reported the start of flood on the middle Mamontovaya River on 15 May). Almost all snow patches melted by mid July in the Central Mountains which indicates fairly warm weather in June and early July. The rest of the summer was windy, cold and relatively dry. Freezing temperatures were recorded on 24 days. During one of two very cold spells in July snow covered the tundra. Storms and rain in mid August were followed by a snowstorm which lasted for 6 days. Weather conditions were unfavourable from mid July, in particular for waders and Long-tailed Skuas.

Lemming numbers dropped to low and very low values in Siberian and Vinogradov's *Dicrostonyx vinogradovi* lemmings respectively. Siberian Lemmings were more abundant locally in the middle and upper reaches of the Neizvestnaya River and the middle and lower reaches of the Tundrovaya River. Rodents were rarely seen during excursions, and their fresh burrows were almost never found. Undersnow nests of lemmings occurred at a mean density of 3.97 per 1 km, which is typical for low lemming numbers (196 nests were counted at a transect 49.4 km long and 10 m wide).

Numbers of Arctic Foxes on the island were low, in particular in the Gusinaya River valley, but most of the observed animals bred. Among 39 dens inspected in different parts of the island 51% contained broods. In the permanent study plot (45 km^2), Arctic Foxes bred at a density of 0.13 pairs/km^2, and non-breeding animals were not recorded. Mean brood size was 5.78 (n=9) in the plot. Density of Snowy Owls on counting transects dropped to 0.28 birds/km compared with 0.7 birds/km in 2002. In the permanent plot owls occurred at a density of 0.7 birds/km^2 and their nests at a density of 0.15 nest/km^2. Mean size of broods at fledging was 2.45 (n=22, range 0-4), which is low value. We found 9 Common Eider females, 15 Snow Geese, 7 Snow Bunting fledglings, 3 Long-tailed Skua chicks, and 10 Eider eggs in the food remains of Snowy Owls. A high fraction of birds in the owl diet and active hunting on Snow Geese near nests indicates an extreme shortage of basic foods (lemmings) already in June.

The distribution of Long-tailed Skua was extremely uneven, and they occurred at low to average densities in different parts of the island. Most birds nested, but breeding success was extremely low due to heavy predation pressure and unfavourable weather. 16 pairs bred in the permanent plot, and density (0.36 nest/km^2) did not differ from 2002. Of these, 10 pairs (5 with chicks) survived by the start of cold weather on 13 August, but skuas were neither recorded in the plot, nor elsewhere on the island after 18 August. Two broods fledged by 10 August, but both probably perished.

Pomarine Skuas were rarely seen and did not breed. Pairs of Arctic Skuas were recorded in different parts of the island at a low density, and one of them bred successfully in the Gusinaya River valley.

Numbers of waders were lower than usual in the permanent plot according to visual evaluation. Dunlins and Grey Plovers were less common than normal, while Pectoral Sandpipers were very rare. Broods of waders were extremely rare in July and August, and waders were almost never seen after a storm in mid August.

Numbers of breeding Common Eiders were considerably lower than usual. In total 61 nests and 1 brood were found in different parts of the island, and 73.8% of nests were concentrated in 3 high density colonies near nests of Snowy Owls in the middle reaches of the Neizvestnaya River. Nesting success was 80.4% in colonies near owls, 30% of solitary nests near a human settlement and 0% of

solitary nests in the tundra. 26% of all nests were destroyed by predators, including 14.8% by owls and 11.2% by Arctic Foxes.

Numbers of Snow Geese nesting close to owls were lower than usual. Goose nests were found near 17 of 20 inspected owl nests, but colonies exceeding 10 pairs were found near only 3 nests in the Neizvestnaya River basin. Large goose colonies were not found on the Gusinaya and Mamontovaya rivers, and moulting geese with broods were also almost absent there. Nest predation was 27% in small colonies (n=193). Mean brood size in the Tundrovaya River basin during the moult period in early August was 3.9 goslings (n=10, range 2-6), while mean brood size after fledging in the Neizvestnaya River area was 2.42 (n=63, range 1-7). Snow Geese nested near 6 of 7 nests of Snowy Owls in the permanent plot, and the total estimated number of pairs was 220-270 there. Of 120 nests that were found, 24% were destroyed by predators.

The remains of 24 geese were found in colonies near owls nests, among which 15 geese had been taken by owls near nests, and 9 by Arctic Foxes during the movement of broods to moulting areas. Accordingly, predators that are rodent-specialists took approximately 3% of breeding geese on nesting sites outside the main goose colony.

Later in the season, 8-10 flocks of geese with chicks, totalling approximately 400 broods, were found in the 25-km long valley of the Tundrovaya River. Goose remains were found near one of 6 surveyed dens of Arctic Foxes in the area and included remains of 2 adult birds and 19 chicks.

Breeding conditions were unfavourable for most species of tundra birds due to both heavy predation pressure through the season and adverse weather conditions in the second half of the summer.

I.E. Menyushina

40. Imyneiskie Lakes depression, Koryak Highlands, Russia (62º24'N, 175º38'E)

Air temperatures ranged from +6-11°C at night and from +13-21°C by day during the survey period 26-30 June. The tundra was covered with flowers of Labrador tea, cloudberries and Rhododendron. Imagos of mosquitoes, craneflies, bumblebees and butterflies emerged *en masse*. Heavy continuous rain lasted from 18.00 on 27 to 04.00 on 29 June, but was unlikely to have had any significant impact on birds.

Lemmings were not seen, but the tracks of voles were observed. Arctic Ground Squirrels were particularly numerous in the mountains, where pikas were also seen in the stony talus.

Brown Bears were numerous in the tundra, on lake shores and in the mountains, and one Red Fox was seen. At least two White-tailed Sea Eagles were seen hunting on lakes, where Herring Gulls were common. A few pairs of Arctic Skuas nested on tussocky slopes. Arctic Skuas and Ravens were seen regularly near lakes. A single nest of Rough-legged Buzzards was found in the mountains, and one Golden Eagle was seen.

Ringed Plover and Common Snipe were common in the area, and hatching chicks of the latter were found. Wood Sandpiper, Dunlin and Red-necked Phalarope were numerous, and many adult birds of the two former species were alarming near broods. There were few records of Pacific Golden Plover, Ruff, Long-toed Stint *Calidris subminuta* and Grey-rumped Tattler. Lesser Sand Plovers *Charadrius mongolus* and Great Knots *Calidris tenuirostris* were observed in the mountains with small chicks. In general, nesting success of waders was considered to be high, based on the available observations. Broods of Willow Grouse were also common in the mountains. Yellow Wagtail *Motacilla flava*, Red-throated Pipit, American Pipit *Anthus cervinus* and Bluethroat *Luscinia svecica* were feeding chicks, while fledgling Lapland Buntings were observed.

E.E. Syroechkovski, Jr., E.G. Lappo, V.V. Morozov

41. Vaamochka River delta, Koryak Highlands, Russia (62º39'N, 176º38'E)

Snow remained only in several depressions by 12 June, as well as in bush thickets exceeding 1 m in height. The total snow-covered area did not exceed 5% on the plain and 20-40% in the mountains, depending on the exposure and steepness of slopes. The last extensive snow patches had melted by early July. Medium-sized lakes became ice-free on 12-18 June, but Verkhnee Vaamochgyn Lake did not clear completely until 25-26 June. Minimum and maximum air temperatures ranged from +2.0-10.0°C and +10.0-24.0°C, respectively, during the study period which lasted till mid August. Prolonged rains, each resulting in 20-25 mm of precipitation occurred 3 times only: on 25-26 and 28-29 June and from 31 July to 1 August, while showers were rare. The water table in rivers was low during summer, and many streams and lakes among moraine hills dried out. The first snowfall occurred on 15 August in the mountains. No weather anomalies of possible relevance to bird breeding success were observed.

Lemmings were not recorded, and very few winter tracks of rodents were seen, which indicated low rodent numbers since at least autumn 2002. Summer numbers of voles were very low, while the numbers of pikas (in stony talus of the mountains) and shrews were low, but increased considerably by the end of the summer in the case of shrews. Arctic Ground Squirrels were abundant on the plain and in the mountains; they bred with high success and became very numerous by the end of the summer, particularly in the vicinity of Verkhnee Vaamychgyn Lake.

Red Foxes were common and bred very early, judging by the size and high activity of cubs (we inspected 3 dens and found 5, 6 and 7 cubs) in mid July, when they were going as far as 1 km from dens and attempting to hunt juvenile ground squirrels. Adult Red Foxes were often seen in vicinity of the best waterfowl nesting localities and goose moulting sites, apparently preferring bird eggs to rodents. The numbers of Brown Bears were high everywhere, in particular in river valleys and on the sea coast: up to 17 animals per 10 km of a spawning river valley in August. Bears wandered widely until mid July and often dug out ground squirrels from their burrows. Some bears were seen purposely searching for the nests of geese and ducks by moving along the shores of

waterbodies in a zigzag manner. A pair of bears undertook concerted searches for waterfowl nests on 16 June, breaking noisily through the bushes along the lake shore as they searched and eating eggs that they found. The stomach of a 4-year old male bear, that was inspected on 29 June, contained egg-shells of at least 30-32 eggs of Greater Scaup *Aythya marila* and Common Eider, 2 eggs and 3 downy chicks of White-fronted Goose, as well as some mosses, sedges and cotton-grass. Wolves were rare, and we saw fresh tracks only twice.

Rough-legged Buzzards nested at a very low density and only in the nearby mountains, while wandering birds were rare. A single nest with 4 chicks was found. Gyrfalcon, Peregrine Falcon, Merlin, Golden Eagle and Short-eared Owl were all uncommon. White-tailed Sea Eagle was common only in the vicinity of spawning rivers, and immature solitary birds prevailed in the records. Arctic Skuas nested in small numbers, but were more common than Long-tailed Skuas among wandering birds. Several tens of Herring Gulls nested in colonies on the islands of Verkhnee and Nizhnee Vaamychgyn lakes, while Common Gulls inhabited primarily the lower parts of the river deltas. Most of the gull nests on lake shores and nearby islands were destroyed by Red Foxes and Brown Bears.

Ravens were common, but only a small proportion of them bred. They were seen destroying nests of ducks, geese and Sandhill Cranes, in particular after flushing of the incubating birds by humans.

The nesting period was prolonged in most waterfowl. A considerable number of late and presumably replacement clutches of divers and Red-necked Grebes *Podiceps grisegena* were also destroyed, primarily by Herring Gulls. White-fronted Geese nested in a similar time period to that in 2001 and at slightly lower density. At least half of their nests were predated, primarily by Red Foxes and Brown Bears. Both wandering and nesting Emperor Geese *Anser canagicus* were very uncommon, very few nests survived to hatching and only a few broods were seen. Two or three pairs of Whooper Swans *Cygnus cygnus* and a pair of Bewick's Swans presumably did not breed. Pintails were the most numerous dabbling ducks and bred successfully, although clutch losses were considerable. European Wigeon and Teal successfully nested in small numbers in willow thickets. Northern Shovelers *Anas clypeata* were rare and, probably, did not breed. Among seaducks the pressure of terrestrial predators was particularly heavy on clutches of Common Eider, Black Scoter *Melanitta americana* and especially the most numerous Greater Scaup, as their nests were located in a narrow belt of grass along lake shores. While generally uncommon Long-tailed Ducks and White-winged Scoter *Melanitta deglandi* bred successfully.

The numbers of most wader species were not high, but they bred successfully. Broods of Pacific Golden Plover, Lesser Sand Plover and Red-necked Stint *Calidris ruficollis* were often seen in August on slopes with dry shrub tundra and lichen tundra. Broods of Ringed Plover were common along gravel shores of rivers and lakes, while Wood Sandpiper, Dunlin, Red-necked Phalarope and Common Snipe nested with at least good success in cottongrass-moss tundra in river deltas. Clutch loss in Red-necked Phalaropes was the highest as they often nested close to the lake shoreline frequented by Red Foxes and Brown Bears.

Generally, breeding conditions were favourable for most birds with the exception of rodent-specialist predators, while breeding success was average to good with the exception of Emperor Goose, Herring and Common gulls which suffered heavy predation.

A.I. Artyukhov, V.V. Morozov, F.V. Kazansky

42. Meinypilgyno settl. vicinity, Chukotka, Russia (62º33'N, 177º05'E)

According to reports by local people, an unusually small amount of snow accumulated during the winter, and strong winds redistributed the snow unevenly. A little snow remained by the end of winter on sea spits and coastal plain tundra. Snow melt, break-up on rivers and other phenological events occurred earlier in spring than usual. Flood was early, rapid and unusually low. Night frosts did not occur after 14 June. Nyzhnee Vaamychgyn Lake became ice-free on 21-22 June and Pekulneiskoe Lake on 28 June. Midges (Chironomidae) emerged *en masse* on 21 June, while the first mosquitoes were observed on 20 June and appeared *en masse* on 26 June. Bud-burst occurred by 20 June in alder, 25 June in dwarf birch and 1 July in shrub willows. Both spring and summer were dry and relatively warm, with low clouds and fogs typical along the sea coast. Visibility was low in the second half of June and early August due to smoke from fires in the mountains and on the Anadyr Lowland.

Rodents were not seen, except for Arctic Ground Squirrels which occurred in very high numbers, occupied most of their settlements on spits and at mountain foothills and bred with high success.

Red Foxes did not breed closer than 10 km to the settlement due to high levels of activity by people and dogs; tracks of dogs were seen considerably more often than tracks of Red Foxes. Tracks of Brown Bears, including fresh ones, were seen regularly in the vicinity of the settlement, but animals were mostly encountered on the spit that separates Meinypilgyno from the sea. An Arctic Fox was observed by local people on the island colony of Herring Gulls on the Nyzhnee Vaamychgyn Lake.

Birds of prey and owls did not nest near the settlement. Records of White-tailed Sea Eagles, Gyrfalcons, Golden Eagles, Rough-legged Buzzards, Peregrine Falcons and Short-eared Owls were very rare. Solitary pairs of Arctic Skuas bred, but wandering birds were more common. Numerous Herring Gulls occurred in colonies on lake islands and on lake shores as solitary pairs, while Glaucous Gulls were less common and primarily inhabited the sea coast. Ravens, primarily immature non-breeding birds, were very common near the settlement.

Wader species nesting in dry shrub-lichen tundra on coastal spits and along lake shores were represented by common or numerous Lesser Sand Plovers, Ringed Plovers and Spoon-billed Sandpipers *Eurynorhynchus pygmeus*, while Dunlins, Temminck's Stints and Red-necked Phalaropes were very rare. The tundra in the moraine hills to the north of the settlement was inhabited by common Dunlin, slightly less common Red-necked

Phalaropes and Pacific Golden Plovers and rare Red-necked Stints. Common Snipe and Wandering Tattler *Heteroscelus incanus* were possible breeders.

Good weather and low numbers of predators allowed successful breeding by waders compared with waterfowl and gulls. Numbers of broods were considerable in Spoon-billed Sandpiper, Lesser Sand Plovers and Ringed Plovers, and many chicks survived to fledging. Waders suffered from predation by Arctic Skuas, gulls, dogs and, probably, Arctic Ground Squirrels. Clutches of divers, White-fronted and Emperor geese, Common Eiders and other ducks, Sandhill Cranes and gulls were almost entirely destroyed during egging by humans, including replacement clutches of eiders and gulls.

V.V. Morozov, E.G. Lappo, E.E. Syroechkovski, Jr., I.A. Taldenkov, C. Zöckler

43. Lower Anadyr Plain, Russia (64º19'N, 177º05'E)

The season was early, warm and dry. Drought in summer led to fires in the tundra.

Neither rodents, nor terrestrial predators were recorded in August during a survey along the gas pipeline under construction, running southward from Anadyr town.

The surveyed area was affected by fires in 1996 and 2002, which together with increased disturbance by vehicles along the gas pipeline had a negative effect on bird reproduction. Families of Sandhill Cranes were not observed, although adult birds were seen regularly. Several broods of Willow Ptarmigans were seen, but they were generally rare. Gulls were common on Gechmytkukul River, sea ducks on lakes, and skuas in tundra patches were unaffected by fires. Four broods of Teal were seen on the flooded sections of the pipeline ditch.

O.D. Tregubov

44. Anadyr city, vicinity, Russia (64º43'N, 177º29'E)

By the date of arrival on 26 May, the plain tundra adjacent to the Anadyr estuary was snow-free except for the valleys with meltwater streams. The nearby mountains still looked wintry, but snow-cover decreased to 30% by the departure date on 12 June. Ice melted on small lakes and the Anadyr estuary was covered by melt-water in early June. In general spring was early, judging by completion of cotton-grass flowering, mass flowering of willows, appearance of bumblebees, butterflies and Arctic Ground Squirrels in early June.

The warm, dry summer resulted in tundra fires, both on the plain and in the mountains. The total area affected exceeded 350,000 hectares according to official reports, and smoke considerably reduced visibility on some days.

Lemmings and voles were not seen in June, but winter nests of voles were found on marshes and near streams, and a pair of Arctic Skuas was observed eating a vole. Voles were seen near the city in August, and presumably their numbers reached average levels in the summer. Arctic Ground Squirrels were rather common.

Arctic and Red foxes were not seen. Rough-legged Buzzards nested at average density, and two nests contained 4 and 5 eggs. Snowy Owls were not seen, but Short-eared Owls were common, and their clutches in early June contained 5-7 eggs. Long-tailed Skuas had complete fresh clutches on 8-10 June and the general impression was that they nested at average densities for the species, while Pomarine and Arctic skuas were seen on migration only. Hundreds of Herring Gulls nested in colonies on islands and on lake shores, and most nests contained complete clutches by 10 June. Glaucous Gulls nested on rocks in several places along the coast of the estuary.

Displaying Pectoral Sandpipers, common Long-toed Stints, Ringed Plovers, Whimbrels, Skylarks *Alauda arvensis*, Red-throated Pipits, Lapland Buntings and Sandhill Cranes were seen on 27 May near the airport. Geese migration was tailing-off, except for Brant Geese which were still on active passage. Active migration of seaducks, Red-necked Phalaropes, Wood Sandpipers, Red-necked Stints and Grey-rumped Tattlers occurred at the end of May. Most Pacific Golden Plovers, Dunlins, Ruffs, Long-toed and Temminck's stints, Common Snipes, Long-billed Dowitchers *Limnodromus scolopaceus* and Whimbrels occupied territories and displayed at that time. Complete clutches of Ruff, Long-toed Stint, Common Snipe, Pectoral Sandpiper, Red-necked Phalarope, Ringed Plover and Whimbrel were found on 1-5 June, while Long-billed Dowitchers started egg-laying. Pacific Golden Plovers apparently laid eggs too.

No direct data on breeding success of waders are available, but the observed conditions imply average or better success in these birds.

V.V. Morozov, E.G. Lappo, E.E. Syroechkovski, Jr., C. Zöckler

45. Kolyuchin Island and nearby coastal area, Russia (67º27'N, 174º37'W)

The summer was less hot than in 2002, but the amount of precipitation was low in July. Autumn was warm and prolonged. In the second half of the summer it was hazy because of smoke from tundra fires brought in with southerly winds. A snow layer 10-15 cm thick was formed after the snowstorm on 14-15 August, but melted three days later.

No lemmings or other microtine rodents were recorded on the island and, in the vicinity of Nutepelmen village, no rodent activity was recorded in buildings even when the cold period started in autumn, which is unusual.

At least 4 Arctic Foxes spent summer on the island, but it is not known whether they bred. Arctic Foxes fed in the seabird colony. The sea was completely clear of ice around Kolyuchin Island after a storm in mid August when about 20 Polar Bears came to the island. They stayed near the seabird colony, and were a source of disturbance for birds on the rocks. Two pairs of Peregrine Falcons bred on the island and one Gyrfalcon was seen. Fledged juvenile Glaucous Gulls perished *en masse*, and we found 22 dead birds per 500 m of the route along the coast. A young White-crowned Sparrow *Zonotrichia leucophrys* was shot from a flock of Snow Buntings in mid October.

A.P. Golub, A.A. Kochnev, E.V. Golub

46. Yuzhny Island, Kolyuchinskaya Gulf, Chukotka, Russia (67º04'N, 174º42'W)

Sea level increased significantly during strong northern winds in mid August, which resulted in flooding of the waterfowl feeding areas.

Rodent abundance was low for the second year in a row, as no animals or signs of their presence was recorded.

Observations of young Arctic Foxes in early September on the island means that these predators were breeding. Only bird feathers were found near their breeding den.

Snowy Owls were not recorded.

A.P. Golub, A.A. Kochnev, E.V. Golub

47. Chegitun settlement, Chukotski Peninsula, Russia (66°35'N, 171°09'W)

Information from archeologists at the Anadyr Museum indicated that lemmings were at low numbers during the period from 20 July to 25 August because they were never seen in spite of their diggings being found everywhere.

Snowy Owls and skuas were absent. Numerous Glaucous Gulls and some Herring Gulls were typical for the sea coast. A pair of Rough-legged Buzzards defended their empty nest in early August, but it can't be discounted that young had already left the nest and were somewhere in the vicinity. A pair of Peregrine Falcons present in 2002 was absent in 2003. A family of six Ravens stayed in the vicinity.

Brown Bear and Wolf were recorded rather often. Neither Red Fox, nor Arctic Fox was recorded.

Sandhill Crane was common. On cliffs with seabird colonies, Kittiwakes were common, Horned Puffins *Fratercula corniculata* numerous and Tufted Puffins *Lunda cirrhara* more rare. Large flocks of Crested Auklets *Aethia cristatella* were recorded close to the coast in July, Black Guillemot and murres were not uncommon. The only wader species seen was Red-necked Phalarope. The species composition and numbers of passerines did not differ from usual.

D.V. Karelin

48. Lavrentia settlement vicinity, Chukotski Peninsula, Russia (65°35'N, 171°00'W)

The spring was slightly late, on the basis of daily mean air temperatures rising above 0°C around 5 June. However, then temperatures rose quickly to the mean value of about +8°C, which was sustained through the season towards late summer. Snow cover disappeared late due to the large amount of snow accumulated in winter and cool May weather. Snow melt was quick in first days of June. Daily mean temperatures dropped below 0°C from 2 October. The first freezing temperatures were recorded on 29 September, i.e. later than usual. Snow blanketed the ground briefly on 9 and 13 September, for a longer time on 1-6 September, and finally for the winter in mid October. Mean air temperatures in June (+6.7°C), July (+7.8), August (+7.0) and September (+4.0) were above the mean long-term values and as a result the sum of the yearly positive temperatures was the highest ever recorded since 1931 at the nearest weather station in Uelen village. This was followed by the deepest seasonal thawing of the permafrost in the four years of observations. Soil wetting in summer in general was close to normal. However, the last third of June and July were rather dry. In summer, there were no frosts, snowfalls, long lasting rains, hurricanes or other similar events. In general, observations from June to October indicated that weather conditions were favourable for breeding by most birds.

Lemming numbers in 2003 were as high as in 2000. We saw lemmings daily in August and September. Fresh diggings in some places covered 5-10% of the tundra area.

Red Fox was recorded once during the summer, but the absence of Arctic and Red foxes in the vicinity of the settlement was probably due to the presence of dogs. In summer and autumn, semi-wild dogs can be seen as far as 6 km from the settlement. Locals reported that in distant areas numbers of foxes remained at their former level. Only after snow covered the ground did Arctic Foxes appear closer to the settlement and some of them were hunted. Brown bear was twice recorded near the settlement in August, being attracted by remains of hunted whales. Apart from waterfowl hunting, the disturbance of nesting birds by local people was limited because active collecting of berries and mushrooms starts after most young birds are fledged or have moved away to waterbodies.

Predatory birds, such as Long-tailed Skuas, Ravens, Glaucous and Herring gulls concentrated in the area up to 4 km around the settlement, being attracted by waste and the remains of sea products (fishing and hunting). Ravens are typically common near the settlement, but in 2003, their nest location was known. Long-tailed Skuas were less common, but Peregrine Falcon was recorded more often. Pomarine Skua was not recorded at all. Snowy Owls were at higher density than in any other year of the last four years; two young owls were present around the field station in September.

No counts of Charadriiform and Passerine birds were conducted. However, the staff of the ethnic park "Beringia" reported that these birds were as common as usual. Sandhill Crane was numerous and bred successfully, judging by records of young birds accompanied by adults in August. Post-breeding migration of Sandhill Cranes and waterfowl took place on their usual dates, lasting until early October for cranes. In September, Dunlin and Western Sandpiper *Calidris mauri* were common on migration, Pectoral Sandpipers were less common, and Long-billed Dowitchers rare. The general impression was that waders were less numerous on migration than in previous years. Usually numerous Pintails were also recorded less commonly. There were only solitary observations of Brent Geese.

D.V. Karelin, D.G. Zamolodchikov

49. Saint Lawrence Island, Savonga vicinity, USA (63º41'N, 170º29'W)

According to reports from local people, a small amount of snow accumulated during the winter, and spring was early, but later than in 2002. The summer was relatively dry and warm, although not as dry and warm as in 2002.

Rains were rare in July, while August was rainy as usual. Mosquitoes appeared in notable numbers on 27 June, compared with 7 July in 2000, 15 July in 2001 and 25 June in 2002.

According to visual evaluation, Tundra and Northern Red-backed voles were very numerous, even more so than in 2002 (at least Tundra Vole). We have never recorded lemmings on the island, although records of Collared Lemmings were reported in literature.

Arctic Foxes were as numerous as in previous years, and bred successfully. Rough-legged Buzzard was not seen, while Snowy Owls inhabit inland areas of the island 15 km to the south from Savonga, according to reports by the Alaskan Inupiat people. We have never seen live owls, but found wings and feathers of a juvenile on 15 August. Peregrine Falcons were recorded several times during the study period between 5 July and 21 August. In contrast with 2002, Pomarine and Arctic skuas were seen very rarely despite the high abundance of voles. Long-tailed Skuas were seen almost daily in July and the first half of August, although they probably did not breed in the Savonga vicinity. The abundance of Long-tailed Skuas did not reach the levels of 2000 when they were numerous, and they practiced klepto-parasitism in auklet colonies (primarily on Least Auklets *Aethia pusilla*), this behaviour has not been observed formerly in this species on the island.

Among waders, Dunlins, Western Sandpipers and Pacific Golden Plovers were proven breeders around Savonga, while Turnstones, Red-necked and Grey phalaropes presumably bred. The abundance of Dunlins and Western Sandpipers was the same or slightly lower than in 2002, while observations of Turnstones were less abundant. Pectoral Sandpipers and Long-billed Dowitchers did not breed, in contrast to 2002. Pectoral Sandpipers were more abundant on the post-breeding migration in 2003 compared with the previous year, probably due to higher humidity of tundra habitats, while Rock Sandpipers *Calidris ptilocnemis* were less abundant. Red-throated Pipits and Yellow Wagtails were fairly common during post-breeding migration in 2003. Noteworthy vagrants included Little Stint, Black Guillemot and Pine Siskin *Spinus pinus*.

Seabirds started nesting early in 2003, and the first chicks were found in Kittiwakes on 9 July (probably, hatched on 7-8 July) compared with 12-14 July in 2002, in Thick-billed Murres on 13 July vs. 22 July, in Common Murres *Uria aalge* on 17 July vs. 26 July, in Crested Auklets on 21 July vs. 24 July and in Least Auklets on 20 July the latest vs. 18 July the latest in 2002.

Reproduction was, probably, slightly less successful in 2003 compared with 2002 in Crested and Least auklets. The breeding success of Kittiwakes was the largest for the period 2000-2003, in particular due to high hatching success, which was 2.5 times higher in 2003 than in 2002. The high hatching success of this species apparently resulted from the absence of breeding Ravens on the colony in 2003, the primary egg predator in 2002. The increased survival of chicks was probably due to good feeding conditions for Kittiwakes in 2003.

V.A. Zubakin, I. Rose, L. Sheffield

50. St. Matthew and Hall islands, Bering Sea, USA (60º24'N, 172º42'W)

Seasonal phenology probably average, but very little previous data exist to assess this. Weather was cool and foggy during most of the visit (25 May – 9 July) which is typical for the Bering Sea. In total, 15 clear, sunny days were experienced during our stay. Average daily high temperatures were about +13°C, daily low around +4°C. There were periodic winds, storms with rain, drizzle, but nothing unusual for the site.

Because this was our first visit to the island, we are unable to properly assess interannual variation in bird numbers, breeding success, predation pressure, and weather conditions. Furthermore, St. Matthew and Hall islands are uninhabited and only a handful of biologists have ever visited the islands. Thus, very little historical data exist as context for our visit. That said, densities of Rock Sandpipers were comparatively high in certain habitats, compared to study sites on the Pribilof Islands and Yukon-Kuskokwim Delta. Densities of all other wader species were very low; all other breeding wader species were encountered very infrequently. It was our impression that vole numbers were average (endemic vole species *Microtus abbreviatus*). We were the first visitors to document the widespread distribution and breeding of Red Fox, apparently arriving naturally (i.e., not introduced) at the island within the last decade. Weather and seasonal phenology were similar to other sites in the Bering Sea.

Merlin, Gyrfalcon, Pomarine Skua and Short-eared Owl were occasional visitors to the islands. Few pairs of Arctic and Long-tailed skuas bred. Among other potential predators, only Glaucous Gull was common.

We monitored 16 Rock Sandpiper nests and one Semipalmated Plover *Charadrius semipalmatus* nest; at the time of our departure, 6 were still active, 2 had hatched, and 8 had been depredated; the Semipalmated Plover nest hatched successfully. Failed nests were probably depredated by either Arctic or Red fox. Broods of young Rock Sandpipers, Western Sandpipers, and Least Sandpipers *Calidris minutilla* were encountered opportunistically throughout the island towards the end of our stay there.

D.R. Ruthrauff, M.N. Dementiev, J. Johnson, M. Litzov, S. Matsuoka

51. St. George Island, Northwest Alaska, USA (56º36'N, 169º32'W)

According to the local residents, winter 2002/03 was unusually mild and virtually snowless, it was followed by the mildest spring since 1999 – the earliest year for which the NOAA data is available on-line: in April there were only 3 days with the mean temperatures below freezing, and 10 days with minimum temperatures below freezing, in May there were 0 and 3 days respectively. For comparison, in 1999 – one of the coldest springs during the past 5 years, there were 19 and 22 respective days in April, and 5 and 13 in May (www.ncdc.noaa.gov). Thus, the time of snow melt presumably did not directly affect the onset of laying by ground-nesting birds.

Brown Lemmings – the only rodent inhabiting the Island – were present, in seemingly low numbers. I did not see any between 17 June and 31 August, but 2 were seen by others, and one road kill was found.

On my arrival, the Rock Sandpipers – basically the only nesting waders (apart from a single brood of Least Sandpipers – were in all stages of the nesting cycle, from pre-laying to rearing well-feathered chicks. Hatching was prolonged, as previously reported from this locality, and spanned about 55 days. It is not known whether the latest clutches were the original ones, replacements or second broods (after successful fledging of the first one); no reduction of clutch size – often assumed to characterize re-nesting – was seen among the later clutches (mean size was 4.0).

The ground-nesting birds were probably affected by the presence of the following species. Several Snowy Owls were seen on a daily basis throughout the season, nesting of this species was not confirmed. Several Long-tailed Skuas were seen searching for food over the tundra all over the island; they were present only during several consecutive days in the first week of July. Up to three Common Ravens were seen simultaneously on several occasions throughout the season, breeding seems likely, but was not confirmed. The presence of predatory gulls, represented chiefly by Glaucous-winged Gulls *Larus glaucescens* was limited to the coast and they were never seen hunting over the tundra. Arctic Foxes were plentiful around the village, seabird colonies (cliffs and Least Auklet colony on slopes of Ulakaia) and rookeries, however the tundra – with the exception of the area between the village, Ulakaia and the nearest rookery – was generally fox-free. Considering the localized distribution of foxes and abundance of other food (marine birds, dead seal pups, caribou carcases, urchins etc.), both lemmings and shorebirds were unlikely to be an important food for foxes during the summer. However, both might be sought by other shorebird egg and chick predators like skuas, ravens and owls.

Black- and Red-legged *Rissa brevirostris* kittiwakes, Common and Thick-billed murres and Least Auklets were systematically preyed upon by Arctic Foxes. Breeding success of Black-legged Kittiwakes – the only colonial species I have focused on – differed in various parts of the Island from almost total failure to relatively high success, as indicated by the proportion of two-chick broods among fledged and nearly fledged broods. These differences in success were presumed to depend on food availability.

J. Klima

52. Yukon-Kuskokwim outer Delta south-west, Alaska, USA (61°15'N, 165°38'W)

The timing of surveys relative to incubation was later this year compared with 2002 due to the extremely early break-up of ice.

Predation on Brant nests by Arctic Foxes was severe throughout the coastal region this year, as it was in 2001. Except on Baird Island, which has little or no suitable fox habitat, ground-truthing confirmed high levels of nest destruction observed on video images. The nest estimate at Kokechik Bay was the lowest since the surveys began and the number of nests found on ground-truthed transects confirmed the severe decline in number of nests. The total Brant nest estimate was the lowest since the survey began in 1992.

R.M. Anthony

53. Kanaryarmiut Field Station, Yukon Delta National Wildlife Refuge, Alaska, USA (61º22'N, 165º08'W)

Spring melt in this region was early compared to the long-term (15-year) average. Temperatures were mild throughout the spring, and the limited winter snow pack melted early. Kuyungsik River ice broke up on 17 May, Aphrewn River was mostly ice-free on 22 May and Float Plane Lake was ice-free on 22-23 May. No major snow-falls occurred during the season, while frequent flurries in early May did not settle. From Bethel, a long-term weather reporting station 190 km SE of field station, April was 4th warmest and 4th wettest in the last 40 years; May was not extraordinary, being warmer than the 40-year mean, but not significantly so (i.e., barely above the median value).

The last peak in arvicoline rodent populations on the Yukon-Kuskokwim Delta occurred in 2000; another is predicted for 2004 (based on a consistent 4-year cycle since at least 1984). In 2003, voles were observed on 8 days, compared with 38 days in 2000, and an average of 1.25 days in the other 4 non-peak years. Winter nests, conspicuous tunnelling, and clippings were scarce overall, but locally dense along the edges of some uplands, and, overall, more common than in other non-peak years. We hypothesize that the increased observations of voles and rodent signs in 2003 reflected a population building up toward the predicted high in 2004.

The combined frequency of all mammalian predator observations (i.e., Arctic Fox, Red Fox, and Mink *Mustela vison*) was the second highest during the study. In 2003, Mink, Arctic Fox and Red Fox were observed on 18, 23, and 4 days, respectively. There was no obvious correlation, however, between the frequency of predator observations and wader nesting success. For example, during the year of lowest sandpiper nest success (2002), we made less than half as many predator observations as in 2003, and in the year of most frequent predator observations (1999), sandpipers had average nest success. The number of observations of mammalian predators on our study site has not been correlated with our qualitative assessment of rodent abundance.

A very dry winter, a thin winter snow pack, and the very warm April resulted in extensive snow-free tundra when the Western Sandpipers arrived this spring.

Shorebird clutch initiations in heath tundra habitats were the earliest on record. The first clutches of Grey Plovers, Rock Sandpipers, and Western Sandpipers were all initiated in the second week of May. The first Western Sandpiper clutch was initiated on 11 May, nearly a week earlier than the previous early date of 17 May 2002. Overall, however, nesting chronology was not unusually early in 2003. Among Western Sandpipers at our study site, the date of the earliest clutch initiation in a given year is not correlated with mean, median, or peak clutch initiation dates. Mean clutch initiation in 2003 was 1 June (5 days later than in 2002, and just 1 day earlier than the

long-term mean), median clutch initiation was 31 May (8 days later than in 2002, and identical to the long-term mean), and the peak was 24 May (the same as 2002). Wetlands and low meadows become suitable for nesting later than the uplands because snow melt and subsequent drainage occurs later there. Among wetland-nesting species, the first Dunlin and Red-necked Phalarope nests were initiated during the third and fourth weeks of May, respectively.

Prior to 2002, Western Sandpiper nest density was calculated as simply the number of nests found divided by the study area size (= 16 ha). By this measure, nest density in 2003 was the second lowest recorded to date, 2.81 nests/ha versus a mean of 2.89 nests/ha (range 2.63-3.06) for 1999-2003. The number of nests found, however, is at least partially a function of nest predation (i.e., fewer nests found when predation rates are high). As in 2002, nest predation in 2003 was very high; Mayfield nest success was only 0.13 in 2003, just slightly higher than the value of 0.11 in 2002, and only half of the 6-year mean of 0.27 (range 0.11-0.55). When rates of nest loss are considered, nest density in 2003 may have been as high as 3.37/ha. Excluding re-nests, the calculated density of first nests was 2.77/ha, which may approximate the density of pairs.

High rates of nest loss led to high rates of re-nesting; 29% of pairs that lost nests eventually re-nested (very similar to the value of 35% in 2002). Among clutches which hatched, fledging success (defined as a clutch fledging one or more young) was 43%, compared with 58% and 39% in 2001 and 2002, respectively. As in 2002, when only 4% of clutches produced fledged young, overall productivity on our plot was very poor in 2003. Only 3 of 45 (7%) Western Sandpiper nests initiated on our core plot resulted in fledged young.

We also surveyed 4 randomly-chosen 16 ha plots as part of an international study evaluating the double-sampling approach for estimating nesting shorebird densities (PRISM). On these plots, we found an additional 62 shorebird nests of five species: Grey Plover (2), Western Sandpiper (30), Dunlin (11), Rock Sandpiper (3), Red-necked Phalarope (16). Overall shorebird nest success on these plots was 36%. At the species level, nest success estimates for the three most common species, Western Sandpiper, Dunlin, and Red-necked Phalarope, were 40%, 54%, and 25%, respectively.

The point estimate of Western Sandpiper nest success on PRISM plots was three times higher than on the core plot. We hypothesize that the difference was primarily a function of differences in nest-marking protocols between the 2 studies (i.e., the PRISM plot nests were not marked); this hypothesis will be tested with empirical assessment of nest-marking protocols in 2004.

B.J. McCaffery, D.R. Ruthrauff, M. Johnson, T. Booms

54. Nome area, Alaska, USA (64º32'N, 165º25'W)

The entire region was essentially snow-free when we arrived on 15 June, and vegetative development along with substantial numbers of mosquitoes indicated an early spring. Snow completely melted probably about 1 June. Weather was relatively warm during our stay until 23 June with afternoon temperatures +16-20°C.

As in the 2002 season, there was no evidence of lemmings on our study sites. The only rodents observed were Arctic Ground Squirrels.

The following avian predators were recorded: Long-tailed Skua (common), Arctic Skua (very few), Rough-legged Buzzard (a pair nesting at one of our study sites), Short-eared Owl (1-2 seen daily along the road). We saw no Pomarine Skuas. It appeared that Red Foxes were relatively abundant and several individuals were observed.

We studied American Golden-Plovers *Pluvialis dominica* at three sites along the Nome-Teller Road. We located previously marked individuals and banded additional nesting birds. Of 6 marked pairs last monitored in June 2002, 3 males and 2 females were found in 2003. All of the returnees were mated to new partners, and both females nested at considerable distances from their 2002 nest sites. One female (her 2002 mate was present) paired with an unbanded male about 1,600 m from last season's nest; the other female (her 2002 partner was not found) moved approximately 550 m and nested with a marked male whose 2002 mate was missing. Notably, the latter male (banded in 2002) made a dramatic switch in his choice of nesting habitat from one season to the next. His 2002 nest was on a moist lower slope amidst dense grassy vegetation; from there, he moved about 500 m upslope in 2003 and nested along the edge of an abandoned gravel pit on a dry stony substrate nearly devoid of vegetation. In effect, this male went from one extreme to another spanning the entire range of potential nesting habitat on the study site. One of the other returning males, originally captured in 1993, re-used his 2001 nest cup last season. The minimum age of this bird in June 2003 was 10 years 11months – a new longevity record for the species.

We have shown in previous studies that male American and Pacific Golden Plovers typically return each spring to the same nesting territories, whereas females are much less site-faithful and often are never found again after the season of banding. The 2003 findings support our earlier speculation that missing females may actually be homing back to a general nesting locale, but once there they are not site-specific enough to be detected. We were able to find the two returning females in 2003 because their shifts to new nest sites were within the study area.

The nesting density of *dominica* on our study areas was 3-4 pairs/km^2, the same as in 2002. Although *dominica* and *fulva* nest sympatrically on the Seward Peninsula, the former generally favour higher dry slopes and the latter lower moist habitats. Because nearly all of our fieldwork was on *dominica* on upper slopes, we were unable to obtain meaningful density figures for *fulva*. During our stay, there were two instances of predation involving marked *dominica*: one clutch (out of six being monitored) was taken by a Red Fox (the fox was seen at the nest), and a male at another nest was found partially eaten apparently killed by an avian predator. We departed on 23 June before hatching began so have no knowledge of either subsequent predation or reproductive success.

O.W. Johnson

55. Gates of the Arctic National Park and Preserve, Alaska, USA (67º33'N, 154º14'W)

Over the vast area (34,000 km^2) sampled by point-counts in early June spring appeared to be similar to that experienced the previous two years when work was conducted in the western portion of the Brooks Range (see 'Arctic Birds' No. 4 and 5). At Anaktuvuk Pass, on the north side of the Range, the mean daily minimum and maximum temperatures during the survey period were +2.2°C ±2.6 SD (-1.1–+6.1) and +12.7°C ±4.0 SD (+3.9–17.8), respectively. Conditions, however, changed markedly during the two-week effort, going from freezing evening temperatures, mostly snow-covered frozen ground, and ice-covered drainages during the first week, to open, rapidly flowing creeks, warm temperatures, and little snow cover at lower elevations during the second week of June. At the end of the period, snow remained at lower elevation only on north-facing slopes but persisted throughout most areas above 1000 m.

During 2003, we made a special effort to assess the levels of lemmings and voles through subjective measures of such things as the extent of runways and winter nests, extent of burrows, amount of droppings, and sightings of live animals. Collectively, these signs pointed to relatively low to moderate levels of microtine rodent populations throughout the area. Among the 27 surveyed plots, none or low numbers were detected on 10 (37%) plots, moderate numbers on 10 (37%) plots, and high numbers on 6 (22%) plots. Little else can be said because not all crews distinguished between signs of lemmings and voles.

Neither avian or mammalian predators appeared in numbers that would seemingly have affected reproduction in 2003. Potential shorebird predators recorded on plots (in decreasing order of occurrence) included Common Raven, Common Gull, and Long-tailed Skua. Crews detected no Snowy Owls and only two Short-eared Owls in 2003. Skuas of any kind were recorded on only 10/27 (37%) of the plots. Long-tailed Skuas were the most common, being seen on all ten plots on which skuas were recorded. Additionally, we recorded a single Pomarine Skua and few Arctic Skuas on another plot.

We had potential mammalian predators on 19 of the 27 plots (70%). Arctic Ground Squirrels were recorded on 13 plots (48%), Wolf on 12 plots (44%), and Red Fox on 4 plots (15%). We also had Red Squirrels *Tamiasciurus hudsonicus* on 4 plots (15%), Wolverine on 2 plots, and a Least Weasel on one plot. Brown Bears were recorded on 89% of the plots.

Plots ranged in elevation between 200 and 1400 m (above sea level) and by dominant habitat from mostly forested to patchy alpine tundra and bare ground. In 2003, we recorded a total of 96 species of birds, considerably more than recorded in the previous two years elsewhere in the Brooks Range, but the frequency at which we sighted shorebirds was the lowest among the parks, with shorebirds recorded on only 31% of the counts. The most frequently seen shorebirds were American Golden-Plover, Wilson's Snipe *Gallinago delicata*, Wandering Tattler, Lesser Yellowlegs *Tringa flavipes*, and Red-necked Phalarope.

R.E. Gill, Jr., D.R. Ruthrauff, L. Tibbitts

56. Barrow, Alaska, USA (71º17'N, 156º38'W)

Snow completely covered the ground when we arrived on 1 June. Snow cover dropped to about 50% by 5 June, to 26% by 7 June and to only 4% by 11 June. After a fairly warm first week of June, the weather turned cold and windy, remaining unpleasant between the 9 and 20 June. The latter part of June and early July were warmer, with mid to late July turning very cold, windy and rainy. Weather data are available from NOAA weather station located near Barrow.

We did not capture lemmings. Brown Lemmings were seen almost once per day by the 6-person crew, while Greenland Collared Lemming *Dicrostonyx groenlandicus* was observed once.

Arctic Foxes, Snowy Owls and three species of Skuas were common, and at least the two former species successfully bred

Our study focused on surveying and locating nests of all shorebirds residing on four 600x600 meter plots, two of which had been surveyed in the 1970s and 1990s. The principal species nesting on the study area were Grey Phalarope (n=34), Dunlin (n=20), Pectoral Sandpiper (n=9), and Semipalmated Sandpiper *Calidris pusilla* (n=6), although small numbers of Long-billed Dowitcher (n=3), Red-necked Phalarope (n=2), and American Golden-plover (n=1) were also detected. Additionally 13 nests of three wader species were located near our plots.

The first shorebird clutch was initiated on 4 June and the last on the 4 July in 2003 (median and peak initiation dates were the 14 June). Nests were initiated first by American Golden-plover and Semipalmated Sandpiper (median lay date 9 June for both, n=1 and 5, respectively), followed by Dunlin (10 June, n=20), Grey Phalarope (14 June, n=34), Red-necked Phalarope (15 June, n=1), Pectoral Sandpiper (18 June, n=9), and finally Long-billed Dowitcher (21 June, n=3). Nest initiations began and then were delayed by the cold weather, resulting in a bimodal laying-date distribution. Nest density, calculated as the number of nests found, divided by the study area size (four plots of 36 ha each), was 0.51/ha, although nest density per plot varied from 0.33/ha to 0.72/ha. Nest predation was documented in 42.7% of the nests; most predation was probably by one or more Arctic Foxes that raised young in the area. A comparison of nesting success across species indicated hatching success (nest number hatching at least one young/total number of nests) was highest in Semipalmated Sandpiper (83.3%), followed by Grey Phalarope (47.1%), Pectoral Sandpiper (44.4%) and Dunlin (35.0%); data limited to species with at least five nests. A similar comparison across study plots indicated plots 1 and 2 (52.6 and 46.2%, respectively) had higher hatching success than plots 3 and 4 (38.8 and 33.3%, respectively). We did not follow broods to document fledging success.

We documented only one re-lay on our plots – an American Golden-plover that initiated a clutch on 9 June, later abandoned and initiated again on 26 June. Other birds probably re-nested but the lack of marked adults made this difficult to detect.

R.B. Lanctot

57. NE Planning Area of National Petroleum Reserve, Alaska, USA (70º16'N, 151º30'W)

Snow cover was reduced by half on about 30 May, before the start of our study. Ice broke-up on major rivers on 6 June. There were no snow falls during June and July. In general the season could be characterised as being late in timing and cold.

Lemmings, voles, Arctic Foxes and skuas were common and bred. Snowy Owls were rare without signs of breeding. Rough-legged Buzzard and Pomarine Skua were not recorded.

Lapland Bunting hatched approximately 10 days later than in 2002. We found 20 species nesting on 24 10-ha plots yielding an overall density of 86 nests/km^2. Lapland Bunting (32 nest/km^2), Semipalmated Sandpipers (12 nests/km^2), and Pectoral Sandpipers (11 nests/km^2) were the most numerous nesting species. Overall densities and nesting success was similar to 2002 values, but there were some species differences. Shorebird nesting success was 64% (calculated from daily survival rates) and Long-billed Dowitchers (86%) had highest success. Waterfowl nesting success was 26% (lowest for ducks, highest for Greater White-fronted Geese *Anser albifrons gambeli*). Nesting success for Greater White-fronted Geese on larger area was ~66% which was average to higher than average for recent years. Swan nesting success was low in one study area, but high in another that was ~25 km east. Some birds may have been affected by snow and cold during hatching in early to mid July.

R. Johnson

58. Kuparuk Oilfield, USA (70º17'N, 149º45'W)

Upon arrival on 2 June, snow cover in the flat areas was roughly 25-35% (noticeably more than 2002), and it was the date when the Kuparuk River broke up. The second week of June was particularly cold (near or just below 0°C). July was warmer than June with only one major rainstorm on 3 July. In general the season was late and cold.

All 4 observers over 2 months in the field only observed lemmings a few times. No trend in lemming abundance was apparent during the course of the season. We did not capture lemmings.

Mean nest initiation dates were later in 2003 than in 2002. For two species, Lapland Bunting and Greater White-fronted Goose, this trend was significant – possibly the result of the later snowmelt during the 2003 season.

We discovered and monitored all nests on 24 10-hectare study plots every 3-6 days until nesting fate was determined. We discovered 223 nests of 17 species from 8 June to 25 July. Nests of Lapland Bunting, Pectoral Sandpiper, Semipalmated Sandpiper, and Greater White-fronted Goose accounted for the majority (75%) of those found. Of the 223 nests, 65 were discovered off-plot. One hundred and thirty-one nests hatched successfully, 74 failed, and we were unable to reliably assess the fate of 18 nests. Most nests failed due to predation (67 of 74 nests, 91%). Other causes of nest failure included: human-induced (n=5) and infertile eggs (n=3). Mayfield estimates of nesting success for the three most common species were: Lapland Bunting (n=58): 0.466, Pectoral Sandpiper (n=28): 0.379, and Semipalmated Sandpiper (n=19): 1.0.

We conducted three 10-minute point count surveys for potential nest predators on all plots with a total of 3 replicates of this survey on all plots during the course of the season. A total of 7 potential predators were detected (number of detections in brackets): Peregrine Falcon (n=1), Common Raven (n=4), Arctic Fox (n=5), Pomarine Skua (n=2), Arctic Skua (n=70), and Long-tailed Skua (n=42), Glaucous Gull (n>100). The most common potential predators were Glaucous Gull, Arctic and Long-tailed Skuas, while Arctic Foxes and Ravens were much less abundant. Snowy Owls were rare in the area and there were no signs of breeding.

Overall nest densities were similar at this site between years (64.6 nests/km^2 in 2003, 60.4 nests/ km^2 in 2002). However, there were considerable fluctuations in nest density among some of the species between years. A slightly higher percentage of nests were successful in 2003 versus 2002, but these differences (per species) were rarely significant in terms of daily survival rate. Predation was the most important cause of nest failure in both years. The same potential nest predators in relatively the same proportions were recorded in both years.

J.R. Liebezeit

59. Prudhoe Bay Oilfield, USA (70º17'N, 148º42'W)

The Kuparuk River broke on 2 June. Upon arrival on 2 June, snow cover in the flat areas was about 80%; it reached 50% on 5 June. On some of the study plots snow depth was >0.5 m. It appeared that the study plots closest to the Beaufort Sea had the deepest snow and highest snow cover. At this site, our study plots range 2-13 km inland from the coastline. The second week of June was particularly cold (near or just below 0°C). July was warmer than June with only one major rainstorm on 3 July. In general the season can be characterized as being late, cold and wet.

Two observers over 2 months in the field only observed lemmings a few times. No trend in lemming abundance was apparent during the course of the season. We did not capture lemmings.

We discovered and monitored all nests on 12 10-hectare study plots every 3-6 days until nesting fate was determined. We discovered 132 nests of 21 species from 7 June to 15 July. Overall nest density was 68.3 nests/km^2 at this site. Of the 132 nests, 49 were discovered off-plot. Sixty-four nests hatched successfully, 54 failed, and we were unable to reliably assess the fate of 14 nests. Most nests failed due to predation (49 of 54 nests, 91%). Other causes of nest failure included: weather (n=1), human-induced (n=1), infertile eggs (n=1), and for unknown reasons (n=2). Mayfield estimates of nesting success for the three most common species were: Lapland Bunting (n=15): 0.509, Pectoral Sandpiper (n=13): 0.539, and Semipalmated Sandpiper (n=19): 0.569.

We conducted three 10-minute point count surveys for potential nest predators on all plots with a total of 3 replicates of this survey on all plots during the course of the season. A total of 6 potential predators were detected (number of detections in brackets): Common Raven

(*n*=3), Arctic Fox (*n*=3), Arctic Skua (*n*=18), and Long-tailed Skua (*n*=5), Glaucous Gull (n>50). The most common potential predators were Glaucous Gull, Arctic and Long-tailed Skuas.

J.R. Liebezeit

60. Canning River Delta, Arctic National Wildlife Refuge, Alaska, USA (70º10'N, 145º50'W)

Early June in 2003 was colder and there was greater snow cover than that period in June 2002. However, median nest initiation dates were earlier in 2003, which is probably explained by initiation of nests by some birds before the cold spell in early June.

During June and early July we frequently observed lemmings and voles. This did not occur in 2002. We did small mammal trapping late in the season, after nests had hatched. At that time it appeared that the small mammal populations had declined and we caught very few lemmings (we have no trapping effort for 2002).

In 2003 we continued work at a study site within the Arctic Refuge on the Canning River Delta, adding seven more study plots to the nine monitored in 2002. During the 2003 field season, we located 155 nests of 12 species. The most abundant species were King Eider, Dunlin, Pectoral Sandpiper, Semipalmated Sandpiper, Stilt Sandpiper *Micropalama himantopus*, Grey Phalarope, Red-necked Phalarope, and Lapland Bunting. Nest success and daily survival rates were generally higher in 2003 than 2002. Mayfield estimates of nest success of the most abundant tundra nesting birds was 100% in Dunlin (*n*=5), 92.3% in Pectoral Sandpiper (*n*=38), 76% in Semipalmated Sandpiper (*n*=23), 54.3% in Stilt Sandpiper (*n*=6), 78.9% in Grey Phalarope (*n*=20), 48.3% in Red-necked Phalarope (*n*=8), and 58.2% in Lapland Bunting (*n*=40). However, predator abundance was also higher, and higher nest success could be due to higher small mammal populations in 2003. Also, there were some noticeable shifts in abundance of birds. Most notably, nesting density of Pectoral Sandpipers in 2003 was 18.1 nests/km^2 compared with 7.8 in 2002, while nesting densities of phalaropes halved.

We counted very low numbers of Pomarine Skuas and Snowy Owls during surveys in 2003.

S. Kendall

61. Point Thomson, Alaska, USA (70º10'N, 146º10'W)

During summer 2003, LGL Alaska Research Associates, Inc., was funded by the Point Thomson Unit owners to conduct a tundra-nesting bird study in the Point Thomson area about 80 km east of Prudhoe Bay. This was part of a cooperative study involving three other study site locations on the North Slope. Twenty 10-ha study plots were surveyed to determine nest density and success, species composition, and predator levels. These study plots were also surveyed during summer 2002, with 2003 marking the third consecutive year of bird study in the Point Thomson area.

Although no detailed analysis of the data was undertaken in 2003, preliminary results indicated that overall nest density was about 60 nests/km^2, and nest success was about 70% based on the number of successful nests divided by the total number of nests. Twelve species were discovered nesting on study plots, with Lapland Bunting the most abundant species followed by Pectoral and Semipalmated sandpipers. These three species accounted for about 84% of all nests.

The most abundant predator observed on study plots was the Arctic Skua. They and Glaucous Gulls were observed with almost equal frequency off study plots. Arctic Fox was observed once during predator counts. Nest success was much higher in 2003 than in 2002, probably because two fox dens that were occupied during the 2002 field season were unoccupied during 2003.

B. Rodrigues

62. Mackenzie River delta, Canada (68º13'N, 134º24'W)

Surveys indicated a good nesting effort by Tundra Swans *Cygnus columbianus*, in contrast with the past two years of relatively low production.

J.E. Hines in: Canadian Wildlife Service Waterfowl Committee. 2003. Population Status of Migratory Game Birds in Canada: November 2003. CWS Migr. Birds Regul. Rep. No. 10.

63. Karrak Lake, Queen Maud Gulf Bird Sanctuary, Nunavut, Canada (67º14'N, 100º15'W)

Small mammal abundance was average with 1.8 captures/100 trap-nights. Most captures were Red-backed Voles even though we captured some Collared Lemmings as well. Brown Lemmings have been low in all years and we did not capture any Brown Lemmings in 2003.

Fox abundance appeared to vary among years with 1.0, 2.3, 1.5, and 1.8 foxes per 30 km travelled in 2000 to 2003, respectively. Fox abundance appeared to be higher in goose-nesting areas than in areas outside the influence of nesting geese; we saw 0.5, 0.5, 0.5, and 2.0 foxes per 30 km travelled in non-goose areas in each year, respectively, compared to 1.5, 4.0, 2.5, and 1.5 foxes per 30 km travelled in goose-nesting areas in each year, respectively. The density of breeding dens varied among years and was 1.5, 0.75, 0, and 1 breeding den/25 km^2 in 2000 to 2003, respectively.

Despite the heavy winter snow cover, the melt was rapid and nesting of Snow Geese began early. The area used by nesting Ross' *Anser rossii* and Lesser Snow Geese *A. caerulescens atlanticus* has been increasing exponentially. In 2003 the area of terrestrial habitat occupied by nesting geese at Karrak Lake increased from 165 km^2 to 177 km^2. Similarly, at the East McNaughton colony of light geese, about 90 km east of Karrak Lake, the area of terrestrial habitat occupied by nesting geese increased from 151 to 173 km^2.

G. Samelius, R. Alisauskas, D. Kellet

65. Bylot Island, Nunavut, Canada (73º08'N, 80º00'W)

Spring 2003 was characterized by an early snowmelt due to a very thin snow-pack and mild temperatures. Snow depth on 2 June was 7 cm compared to a long-term average of 32 cm. The temperature in spring was also relatively mild with an average air temperature of +0.45°C between 20 May and 20 June compared to a

long-term average of –0.08°C. Consequently, the rate of snowmelt was rapid and comparable to the earliest years such as 1997 and 1998. Precipitation was extremely low for the first half of the summer (only 8 mm from 1 June to mid-July) with very long spells of sunshine and warm temperatures. This weather, in combination with the limited spring run off, led to almost drought conditions in early July. However, there was a dramatic turnaround in weather conditions as the rest of the summer was cool with little sunshine and very high precipitation (35 mm of rain from mid- to late July and 49 mm from 1 to 20 August), including a precipitation record for a single day (24 mm on 4 August). This resulted in extensive flooding of the lowlands in August, especially the polygon tundra which was covered by several cm of water for several days. Finally, the ground was partially or totally covered by snow from 13 August until camp closure due to frequent snow showers.

For our small-mammal survey, we accumulated 1648 trap-nights in three trapping sites, but no lemmings were captured. Therefore, they were still in the low phase of their cycle on the island following the peak of 2000 at the Base-camp Valley and 2001 at Camp-2. Based on the 3 to 4-year cycle of abundance that prevail on Bylot Island since 1993, we expect a peak in lemming abundance in 2004.

Breeding activity of Arctic Foxes was low. Given the absence of lemmings this year, not a single nest of Snowy Owls was found despite extensive searches.

Arrival of geese on Bylot Island was relatively early in 2003 compared to previous years, which is in accordance with the favourable weather conditions prevailing in spring on Bylot Island. The median egg-laying date was 9 June, which is a few days earlier than normal. Reproductive effort of geese was very high at the main breeding colony. Average clutch size was 3.90, which is above the long-term average. As with nest initiation date, it is the first year that clutch size is higher than the long-term average since the instauration of the spring hunt in 1999. Nesting success (proportion of nests hatching at least one egg) was very good this year (82%), and among the highest values ever reported. Activity of predators at goose nests, especially Arctic Foxes, was low even if the lemming population (the main prey of predators) was still very low on Bylot Island following the peak of 2000. Peak hatch was on 6 July, also earlier than normal. The gosling:adult ratio among geese captured at banding (1.31:1) and mean brood size (2.74 young, SD=1.14, n=54) were both above the long-term average. By combining information on brood size and young:adult ratio at banding, we estimated that 96% of the adults captured were accompanied by young. All these values are indicative of very good production of young on Bylot Island this year. Indeed, the value of 27% young in the fall flock in Quebec was slightly above average (24%).

G. Gauthier, A. Reed, J.-F. Giroux, D. Berteaux, M.-C. Cadieux. Population Study of Greater Snow Geese on Bylot Island (Nunavut) in 2003: a Progress Report. 20 November 2003.

65. Hudson Bay area, Canada (58º00'N, 93º00'W)

All parties working in the area report high numbers of small mammals, as evidenced by the presence of nesting Snowy Owls and Short-eared Owls among other species.

J. Dubois

66. East Bay, Southampton Island, Nunavut, Canada (64º00'N, 82º00'W)

Nest density of Turnstones was high – 8.6 pairs/km^2, while Mayfield hatching success was 0.33 (0.19-0.55, confidence interval 95%) over the 23-day incubation period (321 exposure days).

D. Perkins

67. Polemond River, Ungava Peninsula, Canada (59º31'N, 77º36'W)

Upon our arrival at the study area on 17 May, ground snow cover was approximately 75%. Temperatures, however, were mild and snowmelt was rapid and we were able to begin searching for nests on 24 May.

For the second consecutive year, there was a high abundance of small mammals on the study area. Trapping took place between 14 July and 25 July, during which time 30 small mammals, primarily Ungava Lemming *Dicrostonyx hudsonicus*, were caught. This number was similar to the number caught in 2002 (32 microtines). This phenomenon may help explain the lower than expected nest predation by Arctic Foxes on the study area where we found four active den sites as well as two other dens within a few kilometres of the study area.

A total of 675 nests of Canada Geese *Branta canadensis* were eventually found in the 34.5 km^2 main study area, resulting in a nest density of 19.6 nests/km^2 (highest density since the study began in 1997). Mean nest initiation and hatching dates in 2003 were 28 May and 27 June (range: 21 June-13 July), respectively. Mean clutch sizes for the main study area (4.5) and at the secondary sites (4.3) were close to the long-term average – the 1997-2002 averages were 4.5 and 4.1 for the main and secondary sites, respectively. Apparent nesting success for the main study area was 74%, higher than the 1997-2002 average of 66%. Predation (24%) and nest abandonment (2%) together accounted for all nest losses. Herring Gulls and Arctic Foxes were the principal egg-predators.

Plumage characteristics of goslings captured between 29 July and 8 August in the Ungava Bay region suggested that most goslings hatched during mid-June, earlier than average. Gosling production was good to excellent in most areas with only a few areas yielding fewer brood flocks than expected.

R. Cotter, J. Lefebvre, T. Nichols. 2003. 2003 Canada Goose nesting study and preseason banding report from Hudson Bay and Ungava Bay Regions in Nunavik, Quebec. Sep. 2003. http://lavoieverte.qc.ec.gc.ca/faune/sauvagine/html/can_goose_breeding.html.

ARCTIC BREEDING CONDITIONS

68. Northern Greenland, Denmark (81°35'N, 16°41'W)

The lemming situation was assessed in August as part of an exploratory journey during shorter stops in various sites between Hochstetter Forland (75° N) and Kap Morris Jesup (83°40'N). Apart from Henrik K.Holme (81°35'N, 13°43'W), indirect indicatios of lemming presence were obtained for all of 8 sites, but in none could we find any indication suggesting a high lemming density.

Because searches of winter nests of lemmings and active burrows could not be done on a systematic basis, and because the habitats visited belong mostly to polar deserts, this assessment gives only a rough idea about the lemming number patterns. Not very frequent finding of recent winter nests and absence of breeding avian predators (Snowy Owls and Long-tailed Skuas) in these sites were indications of low lemming numbers north of 75° N. However, at least 3 fresh lemming carcases were found in nests of Ivory Gulls near Station North (81°35'N).

Records of breeding Knots, Ringed Plovers, Sanderlings and Turnstones north of 80° latitude (even up to Kap Morris Jesup) are of interest, but they reveal little in terms of annual trends since data from previous years are not available.

O. Gilg, B. Sittler

69. Zackenberg, Greenland, Denmark (74°28'N, 20°34'W)

The summer was once again very favourable for the waders and other waterbirds at Zackenberg Research Station in High Arctic Greenland. The weather was excellent most of June and July, and there were no spells of seriously inclement weather. Snow cover was extensive in early June and reached the 50% level on 16 June, but it was thin and disappeared earlier than we have experienced since we began our monitoring in 1996. The summer was warmer than recorded before during 55 years of records in northern Greenland.

Only one lemming was seen, by three people, during the 3-month study period.

Like 2002, the early snowmelt and fine weather resulted in early egg laying with median 1st egg dates between 8 June in Ruddy Turnstone and 13 June in Sanderling. The very first clutches were initiated as early as around 2 June (Dunlin and Ruddy Turnstone). In spite of intermediate numbers of lemmings last year and an absolute record low this year, Arctic Foxes bred in at least three dens inside the valley, and nest predation was higher than we have recorded before (38-43% of 47 nests found). This may be biased, however, since an intensive research programme involved repeated visits and intensive activities at most nests found, so that we may have increased predation. This will be analysed now. Counts of juvenile waders at the coast in August confirmed that 2003 was also a productive season regionally. Of the other waterbird species, we had 'normal' populations of divers, geese, ducks, gulls and terns, but the Long-tailed Skuas had a poor breeding season due to the very low number of lemmings. Snowy Owls were not recorded.

H. Meltofte

70. Traill Island, Karupelv Valley, Greenland, Denmark (72°30'N, 24°00'W)

Judging from snow melt conditions on our arrival in the field on 25 June, evidence was that snow cover was rather lower than average, with less than 2% of the tundra still covered with snow. Sea ice also receded earlier than on average, the fjord having been cleared of main ice around 10 July.

There were various indications that a winter lemming low continued into the summer season. With only 56 lemming winter nests recorded, this was the absolute minimum in the 16 years' time series. Not surprising then was the failure to capture any lemming in the traps, suggesting densities below the level of detection (less than 1 animal/10 ha).

In agreement with low lemming abundance were the densities and behaviour of the main predators. As expected, Snowy Owls were totally absent, and no breeding attempt of Long-tailed Skuas was observed in the restricted study area. Likewise, apart from two dead pups in the main den, no other indications of reproduction attempts were observed among Arctic Foxes. It seems likely that apart from this pair, no other foxes were present in the surveyed area of 20 km^2. Stoats that had occupied 4 of the 56 winter lemming nests during the winter had probably moved away from this part of the valley in summer. Indeed, beside the lack of any direct observation, trapping also failed to reveal the presence of these predators in summer. The absence of any ptarmigan observations during the whole season was also noticeable, contrasting with the discovery of the remains (winter-carcases) of at least 19 pluckings. Likewise, not a single King Eider was found breeding. Among waders, the reduced number of families of Turnstone (only two) and Dunlin (2 pairs) deserves mentioning. These preliminary data suggest that in general breeding success among waders was low during the summer 2003.

B. Sittler

INFORMATION PROVIDED BY RESPONDENTS WAS EDITED AND TRANSLATED INTO ENGLISH (IF NECESSARY) BY PROJECT COORDINATORS

BIRD BREEDING CONDITIONS IN THE ARCTIC IN 2003

Pavel S. Tomkovich & Mikhail Y. Soloviev

This evaluation of bird breeding success in different regions of the Arctic (in its wide sense) was based on analyses of information obtained from various sources for 70 localities or areas. Data sources included Internet and unpublished reports, but most of the information was obtained from completed questionnaires or texts directly submitted by visitors to the Arctic and Subarctic in 2003. Unfortunately, some respondents did not complete questionnaires, but submitted instead their information as short notes for the newsletter (in total 41 forms were received). This always resulted in the loss of information and certain difficulties in interpreting data. Some respondents tried to combine information from several localities in a single form or report, which also resulted in additional correspondence to try to rectify unclear statements, or in failure to use the uncertain data. However, we tried to use all available information for the review, hoping that uncertainties from some localities could be compensated for by more precise information from the others.

Weather and other abiotic factors

Weather and related environmental impacts are undoubtedly of great importance for the successful reproduction of Arctic birds. Mass arrival of birds and the start of breeding occur in June in most regions to the north of the Arctic circle. The map of deviations from the average over the last 10 years of monthly mean air temperatures for June 2003 (Fig. 1 on page 43) shows that three warm regions alternated with three cold regions around the Arctic. Low June air temperatures occurred across northern European Russia, in most of Yakutia (Siberia), and in western and central Canadian Arctic. Regions with warmer than normal weather are spread over the north of Western and Central Siberia, Beringean area and a wide area of the Northern Atlantic.

The evaluation of spring phenology by respondents in most cases agreed with the distribution of air temperature deviations in June. Inconsistencies observed in certain regions were due to the onset of spring in May (Kola Peninsula in Europe) or particular patterns of snow accumulation in winter. Thus, unusually heavy snow in north Alaska resulted in the delayed development of spring despite close to normal June temperatures, whilst the small amount of snow on Bylot Island in Canada melted quickly and this led to early onset of spring.

July was warm across most of the Arctic (Fig. 2 on page 43). The largest area with especially low air temperatures was centred on the Kara Sea, while smaller negative deviations in temperatures occurred in the north of Alaska and in the northwest of Canada. Evaluations of summer weather by respondents were consistent with recorded July temperatures, with the exception of northern Kola Peninsula and Finnish Lapland, from where reports of a cold summer were received. However, in the two cases of cold summer reported in northern Europe, it was clear that respondents were referring to June rather than July, and June was really cold there.

Extreme events, such as summer snowfalls or flooding of nests, were reported from surprisingly few localities in 2003. Snowfalls occurred on the Lower Ob' River in June and on Zhokhov Island in the New Siberian Archipelago, Wrangel Island and north-eastern Alaska in July, but they were unlikely to have much effect on bird breeding productivity. Heavy snowfalls took place on Wrangel Island, in the north of the Chukotsky Peninsula (Yuzhny Island) and on Bylot Island in Canada in mid August, but this was late enough to have a pronounced negative impact on birds. Cold weather and heavy rains on 7-9 August in the eastern Taimyr led to death of at least a proportion of late broods in waders and passerines.

Dry conditions were considerably more common in summer 2003 than rainy (23 and 7 localities, respectively), and prevailed in Russia and western Alaska. Drought resulted in wide-spread tundra fires in Chukotka, and was probably responsible for changes in distribution of wader broods associated with the remaining wet habitats (reported from the Yamal Peninsula). Unfortunately, no data is available regarding the influence of drought on chick survival.

Breeding success of tundra birds could also be affected by weather via influence of the latter on rodent abundance. Respondents from western and central Siberia reported periods of intensive snow thaw in winter which were followed by coverings of ice over the tundra and, as a result, mass death of rodents. These events were believed to be responsible for low numbers of rodents in summer in these regions.

Rodents abundance

Predators like Arctic and Red foxes, owls, skuas and others utilize rodents as alternative prey to birds, their eggs and chicks. Thus abundance of rodents, primarily lemmings (genera *Lemmus* and *Dicrostonyx*) can be of critical importance both for the reproductive success of rodent-specialist predators and ground-nesting birds in general.

Low rodent abundance was reported in 2003 from about a half of the localities in the Arctic (n=34), and about one third of reports (n=22) indicated average abundance (Fig. 3 on page 44). Rodents do not inhabit the islands of Kolguev and Zhokhov, no unambiguous data on rodent abundance were available from 8 localities, while high abundance of rodents was observed in only 6 localities (10% of sites with reported rodent abundance). Thus, areas with high rodent numbers were neither common, nor widespread.

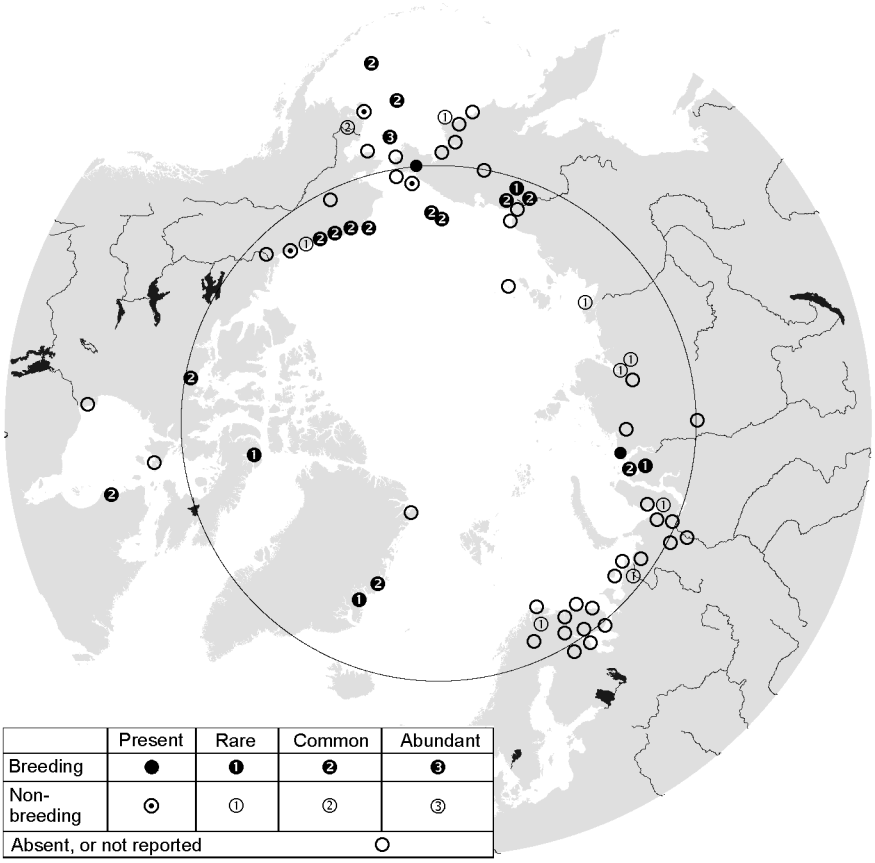

Figure 1. Abundance of Arctic Foxes in the Arctic in 2003

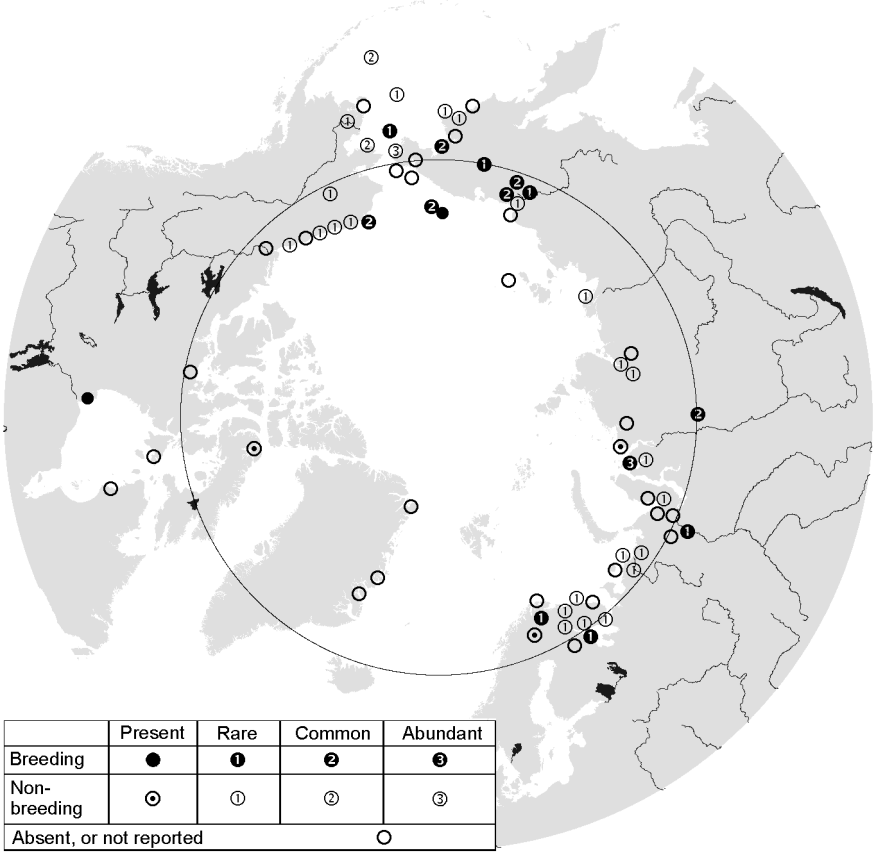

Figure 2. Abundance of owls in the Arctic in 2003

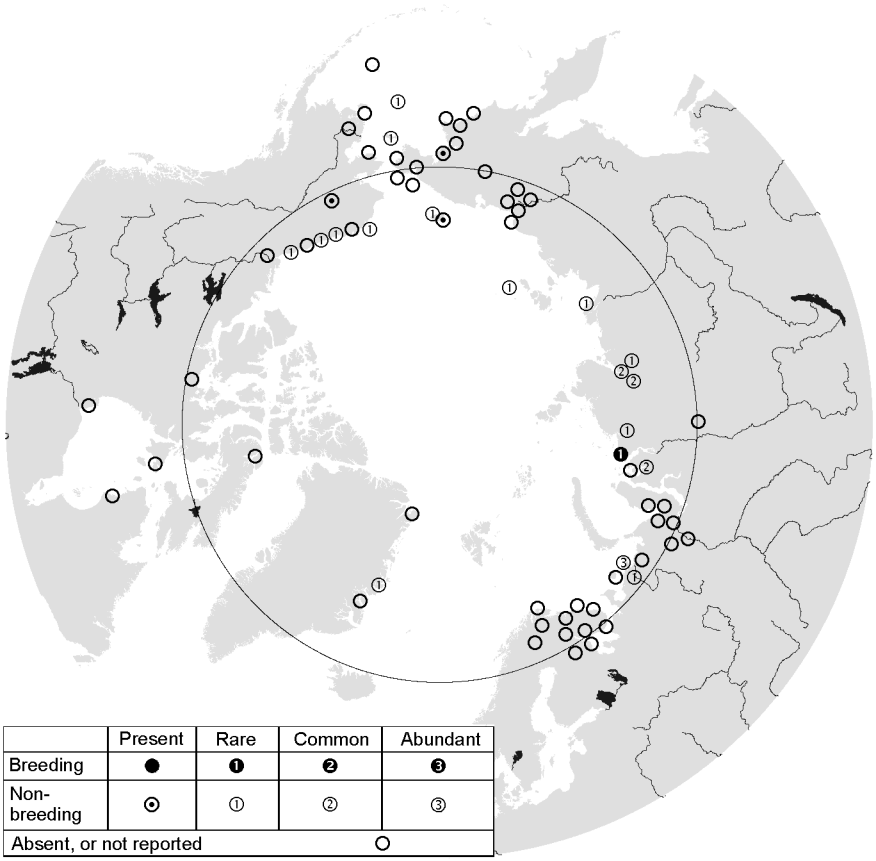

Figure 3. Abundance of Pomarine Skuas in the Arctic in 2003

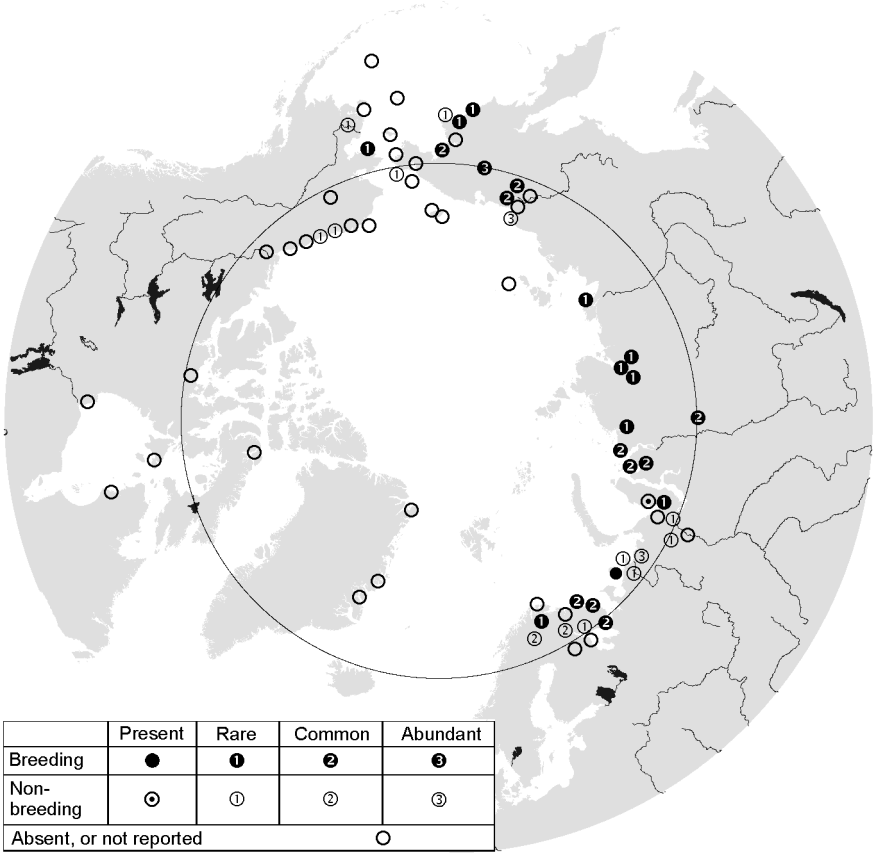

Figure 4. Abundance of Rough-legged Buzzards in the Arctic in 2003

High lemming numbers were observed in 3 regions. These included local peaks in the southern Kola Peninsula (Wood Lemming *Myopus schisticolor*) and eastern Chukotsky Peninsula. Also high numbers were presumed over a wide area of the western and eastern coasts of Hudson Bay in the Canadian Arctic, for the second consecutive year on the eastern coast. Sites with average lemming numbers were not numerous (n=8), and they were dispersed among larger areas where low numbers prevailed. Lemming abundance was definitely decreasing during summer in two localities with average numbers (Mamonta Promontory in West Siberia and Wrangel Island) and in two localities with low numbers (north-western Taimyr and another part of Wrangel Island). Increasing numbers of lemmings were not reported during summer.

Voles (genera *Clethrionomys* and *Microtus*) generally have a more southerly distribution than lemmings, and their numbers were high in 3 localities: Tersky Coast on the Kola Peninsula, St. Laurence Island and in the vicinity of Churchill in Canada. Voles were common at 13 sites, including several localities on the Kola Peninsula. Vole numbers were decreasing during summer on the coast of Kandalaksha Bay in the White Sea and in the Putorana Plateau in central Siberia, and increasing on islands in Kandalaksha Bay.

Comparison of rodent abundance in summers 2002 (see Fig.3 on p.52. "Arctic Birds" No.5) and 2003 clearly indicated a decreasing tendency in north-east Greenland, north of the Kola Peninsula, north of West and Central Siberia and on Wrangel Island. Rodent numbers increased in 2003 in the east of the Chukotsky Peninsula, northern Alaska, Canada near Churchill and on Karrak Lake; indications of a slight increase were noted in the Yukon Delta in western Alaska and on Bylot Island in the Canadian Arctic.

Predators

Most species of avian and mammalian predators in the Arctic switch to lemmings or voles as their primary food in seasons when rodents are abundant. However, the degree of dependence on rodents is variable between species, as well as their impact on the breeding productivity of ground-nesting birds in the case of prey-switching.

Arctic Foxes were not abundant breeders across most of the Arctic in 2003 (Fig. 1 on page 28), with the only exception being St. Laurence Island where breeding foxes were numerous. Arctic Foxes were common breeders in most regions where lemming numbers continued to remain average to high (Mamonta Promontory in West Siberia, Wrangel Island, Ungava Peninsula in Canada) and where lemming numbers were increasing (north Alaska). Surprisingly, active reproduction of Arctic Foxes was observed in Zakenberg (Greenland) where lemmings were rare. Average numbers of voles in the Lower Kolyma area (Siberia) and on Karrak Lake (Canada) also enabled breeding by foxes. Arctic Foxes did not breed in northern Europe, on the Yamal Peninsula, in eastern Taimyr or in western Alaska. Death of a litter was observed in the east of Greenland, where rodents were absent. Oddly, non-breeding Arctic Foxes were not recorded in high numbers anywhere. An increased density of foxes was observed in eastern Taimyr during snow melt (after which they disappeared) and in the Yukon Delta.

Among other species of mammalian predators, Red Fox was common and bred in some localities, namely, on the Kola Peninsula, the south of the Chukotka and on the Seward Peninsula in Alaska. High numbers of Brown Bears were reported from south Chukotka, Ermine from Laplandsky Nature Reserve on the Kola Peninsula and American Mink from the Yukon Delta. Brown Bears were reported systematically searching for eggs and chicks of waterfowl on Chukotka, which could have a considerable impact on bird breeding productivity.

The Snowy Owl is a rodent-specialist, and this species was recorded only in two localities with high numbers of lemmings: the Mamonta Promontory, West Siberia and the east of the Chukotsky Peninsula, with mass reproduction only at the former site (Fig. 2 on page 28). Average numbers of breeding Snowy Owls occurred on Wrangel Island and near Barrow in Alaska, but distribution at the former site was patchy due to the uneven distribution of lemmings there. Decreases in the abundance of lemmings during summer on Wrangel Island led to increasing predation by owls on eiders, geese and waterfowl chicks. The abundance of breeding Snowy Owls on the Hudson Bay coast near Churchill is not known, while breeding in Finnish Lapland was solitary. Non-breeding Snowy Owls were observed in a few localities where they were mostly rare, with exception of St. George Island (Pribilof Islands) and eastern Chukotsky Peninsula.

Short-eared Owls were reported from 19 localities (compared with 18 for Snowy Owls). However, they bred in 4 sites vs. 7 for Snowy Owls, and had a generally more southerly distribution. Short-eared Owls were common breeders at just one site, near Anadyr city, Chukotka, while the abundance of breeding birds in the Hudson Bay area remained unknown. Non-breeding Short-eared Owls, like Snowy Owls, were solitary in most localities, with the exception of the Seward Peninsula, Alaska, where they were common.

Pomarine Skua is an Arctic rodent-specialist heavily dependent on rodents during breeding. As lemmings were not numerous anywhere in the High Arctic, sites with Pomarine Skuas breeding in considerable numbers were not reported either (Fig. 3 on page 29). One pair of skuas was supposedly breeding on north-western Taimyr. Non-breeding Pomarine Skuas were common only in the Pechora Delta area in northern European Russia and during spring migration on the Gydansky Peninsula and eastern Taimyr (Siberia).

Distribution and numbers of breeding Rough-legged Buzzards also depend on the abundance of rodents, but high or even average numbers of rodents is not an obligatory requirement for nesting by these birds. Rough-legged Buzzards can feed their young on chicks, pikas and Ground Squirrels, when microtine rodents are at a low. This is why breeding Rough-legged Buzzards were found across the entirety of northern Eurasia in 2003, but nesting in high numbers was not observed

(Fig. 4 on page 29). The birds were common breeders on the Kola, Gydan and west of Taimyr peninsulas, in the lower Kolyma reaches and near Anadyr on Chukotka, i.e., in localities where any rodents were present in sufficient numbers. Nesting by solitary pairs was recorded in 11 localities from Finnish Lapland eastward to western Alaska. Reports of buzzards from the American Arctic were restricted to Alaska where they occurred in few localities. One respondent observed the desertion of clutches by Rough-legged Buzzards on the Fomich River, south-eastern Taimyr, although voles were not very rare there.

Many other species of avian predators feed on lemmings and voles, but they either occurred in low densities, or showed a highly variable pattern of rodent-dependence across the Arctic, making it difficult to summarise the general tendencies. Large gulls, namely Glaucous and Herring (*Larus argentatus* sensu lato), were the most widespread and common breeders, as well as Long-tailed and Arctic skuas. White-tailed Sea Eagles and Northern Harriers appeared in the reports of respondents unusually often (n=14 and n=7, respectively), although these birds are typical only for southern portions of the Arctic. Both species are neither rodent-specialists, nor do they specialize in catching birds or eating eggs, but still they can exert predation pressure on populations of northern birds (e.g., White-tailed Sea Eagles were reported taking adult females of Common Eiders from nests on the White Sea).

Spring hunting adversely affected the reproduction of tundra birds in Topseda (northern European Russia) and the Khatanga area (south-eastern Taimyr), while egging by humans occurred in the southern Chukotka and the Yukon Delta, Alaska.

Distribution and numbers of tundra birds

Grey Phalaropes occurred at high density in eastern Taimyr, while their numbers halved in the Canning River Delta in Alaska in 2003.

Willow Grouse were abundant in Finnish Lapland, on the Tersky Coast of the White Sea, in the Pechora delta, on the lower Ob' River, Gydan Peninsula, Putorana Plateau, the lower Kolyma River, Koryak Highlands and in the north-east Alaska.

Breeding success

Direct estimates of nesting success by some species of tundra birds were available from 17 localities, and another 16 sites yielded an evaluation of breeding performance based on indirect criteria, or assessment by compilers of the newsletter (Fig. 4 on page 44). Breeding success of tundra birds was high in 10 of 33 localities in total, average in 18 and low in 5.

As in the previous year, sites with high and low breeding success were scattered in the circumpolar Arctic in 2003. The most consistent data at a subregional level came from Alaska, where poor breeding performance was reported from the Yukon Delta, while breeding in the north of Alaska was not below average. It is noteworthy that these areas with different breeding success were characterized by similar stages of dynamics of microtine rodents, i.e. vole numbers started to increase in the Yukon Delta, while lemming abundance started to increase in northern Alaska. The increasing stage in rodent populations normally causes predators to reduce their predation pressure on birds' eggs. However, very high bird densities in the Yukon Delta still probably made searches for bird clutches profitable for predators.

Increasing numbers of lemmings in the Lena River Delta and on Bylot Island, and peak numbers on the Ungava Peninsula resulted in high reproductive success for geese in these localities. At best, low or average breeding success was reported from regions where lemming numbers had decreased by summer 2003, namely, Yamal and Taimyr peninsulas, Wrangel Island, north-eastern Greenland. Thus, both high and increasing numbers of lemmings were associated with good bird reproduction, while decreasing rodent numbers resulted in poor breeding success. However, as high rodent numbers had not spread widely across regions in the previous year, 2002, we can suppose that numbers of predators did not increase sharply in 2002 either. Possibly this was why predation pressure in most areas did not result in complete breeding failure by birds in 2003, although birds experienced increased predation in regions with decreasing numbers of rodents.

Comparison with predictions for 2003

The predicted scenario for breeding success by tundra birds in 2003 was based on the expected changes in abundance of microtine rodents and the related response by predators (see «Arctic Birds» No.5, pp. 33-34). It was not possible to include the effects of extreme weather events in the scenario, but the weather happened to be generally favourable for bird reproduction in 2003, and accordingly did not lead to marked deviations from the prediction. A comparison of predictions with information received from respondents shows that the predictions were close to the real situations in most localities.

Rodent numbers increased as expected on the Kola Peninsula in Europe, which resulted in successful nesting by birds. However, the population of Norwegian Lemmings did not reach its peak stage, instead Wood Lemmings peaked on the south of the peninsula. Information was not received from Bolshezemelskaya Tundra at the very northeast of Europe, so it was not possible to verify the prediction for this region. Rodent numbers decreased on Yamal, Gydan (West Siberia) and western Taimyr as expected, but high numbers of lemmings remained until summer 2003 on the Mamonta Promontory (northern Gydansky Peninsula). Breeding success data are scarce from these regions, and they range from low to average, as predicted.

Our hopes of high lemming density and associated good breeding productivity by birds on eastern Taimyr were not justified as lemming numbers dropped to a low point. However, Arctic Foxes migrated from the area early in the summer, and birds were able to breed with average though not high success. Increasing lemming numbers in the Lena River Delta in Yakutia, as expected, provided conditions for good nesting success by birds. The situation on Wrangel Island developed in line with one of the two proposed scenarios. The lemming

abundance dropped considerably there, and the reproductive success of birds was reduced substantially by predators.

Lemming numbers stayed at a low in the north of the Chukotsky Peninsula, but their population peaked unexpectedly in the east of the area, which allowed Snowy Owls to nest. Unfortunately, information on breeding success of birds was not available for the peninsula.

The prediction of increasing numbers of voles in the west and lemmings in the north of Alaska was confirmed. However, numerous predators did not relax their pressure on bird clutches in western Alaska where reproductive success was low. Breeding success of birds on the North Slope of Alaska was average or high, as predicted.

Numbers of Arctic Foxes were expected to decrease in two localities of Canada to the north of the Arctic Circle (Karrak Lake and Bylot Island) which should have created favourable conditions for breeding birds. Increasing vole numbers in the former locality actually led to improved conditions for breeding birds there. Rodent numbers and reproductive success of birds were expected to increase on the Hudson Bay coast near Churchill and to drop on the Ungava Peninsula. In reality peak lemming numbers extended for the second year in the latter area, while lemming and vole abundance reached a high in the former, the combined effect of which probably led to low predation pressure on breeding birds across a vast region.

The stage of increasing numbers of Greenland Lemming in 2002 in north-eastern Greenland was not followed by the population high in 2003 as everybody expected, but instead developed into the low stage. Birds experienced considerable predation there, but wader breeding performance was still evaluated as average in one of the localities.

Predictions for summer 2004

The cyclical nature of rodent dynamics can be used to predict the population stages, based on previous knowledge. In turn, these predictions can be applied to infer possible predation pressure on the clutches of eggs and chicks of ground-nesting birds and finally on bird breeding success. The validity of such an approach is supported by the significant correlation of breeding success of tundra birds with rodent abundance, showed in the previous issue of the newsletter («Arctic Birds» No.5, p. 33).

Reliable information on the population stage of microtine rodents in the north of Europe was received from the Kola Peninsula. As vole numbers increased considerably on the peninsula in 2003 (with exception of the north-east), and the population of Wood Lemmings in the south reached its maximum level and has started to crash, we may expect that rodents will generally be at a low in 2004. However, the stage of high numbers may reach the north-eastern coast of the peninsula. The outcome for birds may be very different, depending on the time when rodents decline after their peak. Breeding success of birds should be low if the main decline occurs in spring or early in the summer, but birds may have a good breeding season if the rodent decline occurs later in the summer. The latter scenario seems less likely, and birds accordingly have a higher chance of good reproduction in the north-east of the peninsula with a supposedly delayed decline of rodent populations.

Voles and lemmings should be at a low in West and central Siberia. Lemming populations are expected to reach their minimum level in the north of the Gydansky Peninsula and on western Taimyr, while the stage of increasing numbers may occur elsewhere in the region. Arctic Foxes were not abundant in this region in 2003, and they are not likely to impact much on breeding birds in 2004. Average reproductive success of birds should predominate.

Peak lemming numbers and successful reproduction of birds are expected in the Lena River delta. However, the peak stage may be reached during winter, with the following decrease during summer, as happened in 2003 in the north-west Taimyr. In this case, predators will switch to birds, leading to, at best, average bird breeding success then.

Lemming populations on Wrangel Island should be at a low, and the chances are minimal for birds having successful reproduction, due to increased predation pressure. Fluctuations of rodent numbers on Chukotka show a low degree of synchrony between different areas, probably due to the highly fragmented territory with mountains and bays. Still rodent numbers are expected to increase considerably across several areas of the Chukotsky Peninsula, Anadyr lowland and Koryak Highlands, reaching peak values at some localities and permitting successful nesting by birds. As the lemming population peaked in 2003 in the Lavrentia Bay area, both rodent numbers and breeding success by birds are expected to drop.

Increasing numbers of voles in the Yukon Delta and lemmings in the north Alaska may lead to local peaks or even the appearance of a widespread area of high rodent numbers. Accordingly, bird breeding should be successful in these areas of Alaska. Similarly, increasing numbers of rodents in the Karrak Lake area and on Bylot Island in Canada should be highly favourable for birds. In contrast rodent populations should crash on the Hudson Bay coast, with subsequent heavy predation pressure on birds and low productivity by the latter.

The low stage of lemming populations in north-eastern Greenland should be replaced by an increase. Accordingly, decreased predation pressure and average to high breeding performance by birds may be expected.

In summary, low reproductive success by birds may occur in 2004 in a few Arctic regions predicted to be: Kola Peninsula, Wrangel Island, Hudson Bay coast. Regions with optimistic expectations are more numerous, with the chances of good reproduction being highest on Chukotka, Alaska and High Arctic Canada. Average reproductive success is the likely outcome elsewhere in the Arctic. Weather effects, as usual, may contribute to alterations of the above predictions.

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CYCLICITY OF LEMMING POPULATIONS IN THE LENA RIVER DELTA, SIBERIA: SYNTHESIS OF AVAILABLE INFORMATION

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Pronounced fluctuations of predation pressure on breeding birds, related to changes in abundance of alternative prey, microtine rodents, are characteristic of Arctic ecosystems. Thus, understanding the patterns of rodent dynamics and the prediction of rodent numbers for the next breeding season can be instrumental for the assessment of processes in bird populations and for effective planning of future studies.

This paper aims to bring together available information on the long-term dynamics of lemming numbers in the Lena River Delta, which belongs to one of the most important areas of the Russian Arctic in terms of its biodiversity. Being the second largest (28 500 km^2) after the Mississippi Delta, the Lena Delta is situated between 71º42'–74º00'N and 120º00'–129º30'E in north-eastern Asia. The Delta extends far north into the Laptev Sea from the mountainous continental area, consists of lowland plain split into numerous islands by 6500 channels, and contains over 30,000 lakes of various origin (Zalogin & Rodionov 1969). The Delta is situated in one of the coldest parts of Eurasia, where the warming influence of Atlantic and Pacific oceans is negligible while the influence of the continental climate of Northern Asia is strong. The mean annual air temperature is negative (–14°C), while the mean temperature of the warmest month (July) is +8°C in the extreme south and +4°C in the extreme north of the delta. The mean duration of the period with positive air temperatures is 45-58 days in the south and about 40 days in the north. Mean monthly relative humidity and mean annual wind speed are high, ranging from 78-93% and from 5-7 metres per second, respectively (Desyatkin 1985). Northern subarctic tundra prevails in the inner Lena Delta and breaks the coastal belt of the arctic tundra at the north in the mouths of large channels (Perfilieva 1985). The State Nature Reserve "Ust'-Lensky" was established in the Lena Delta in December 1985, after which regular environmental observations started. Observations by the reserve staff and expeditions from other institutes have been collated annually in the "Archives of Nature" since 1986.

The delta is inhabited by 5 species of microtine rodents: Siberian Lemming *Lemmus sibiricus*, Collared Lemming *Dicrostonyx torquatus*, Narrow-skulled Vole *Microtus gregalis*, Middendorff's Vole *M. middendorffi*, and Tundra Vole *M. oeconomus*. Voles are sporadically distributed in the southern part of the Delta, while lemmings occur everywhere, and numbers of the Siberian Lemming are approximately 3 times higher than numbers of the Collared Lemming (Volpert & Sapozhnikov 1996).

An analysis of lemming dynamics in the Lena Delta has been hampered by an almost complete absence of appropriate information, because the few dedicated studies of small mammals either did not span the period between peaks over a whole cycle, or had been restricted to a relatively small study area.

The first focused research of small mammals in the Lena Delta was carried out by A.A. Mezhenny (1975) from 1961-1966 at a single site in the south-eastern delta, on the Bykovsky Peninsula near Tiksi. Peaks of lemming abundance were observed in 1961, 1964 and 1966. A short period of low numbers between peaks in 1964 and 1966 were explained by asynchronous dynamics of the populations of two lemming species. The high point coincided in both species in 1961, after which populations of Siberian and Collared lemmings peaked in 1964 and 1966, respectively (Mezhenny 1975).

A single research programme on the numbers and distribution of small mammals across all principal landscapes of the region, from the mountains to the arctic tundra subzone, was conducted by Y.L. Volpert in 1993-1994 when lemming populations were at a low or decreasing. The maximum number recorded during this study (31 animal/100 trap-nights) was reached by Siberian Lemmings in 1993, in graminaceous arctic tundra on the first river terrace, and was followed by a decrease in numbers later in the year (Volpert & Sapozhnikov 1996).

O. Gilg with colleagues (Gilg et al. 2000) carried out studies in the Lena Delta in 1997 and discovered that lemming populations had crashed after the peak numbers in 1996.

L.G. Emelyanova (unpublished data) conducted short-term observations on islands in the southern part of the delta in 2000, during the latest peak of lemming numbers. Absolute numbers of Siberian and Collared lemmings there in late July-early August were 150 and 110 animals/hectare, respectively.

Results of the above-mentioned dedicated studies in the 1990s agree with our observations in autumn 1992 and 1994-2003, made in course of ornithological research. The evaluation of lemming numbers, using a ranked scale of "high", "average" and "low", confirmed population peaks in 1996 and 2000 (Pozdnyakov et al. 1998; Pozdnyakov 2001).

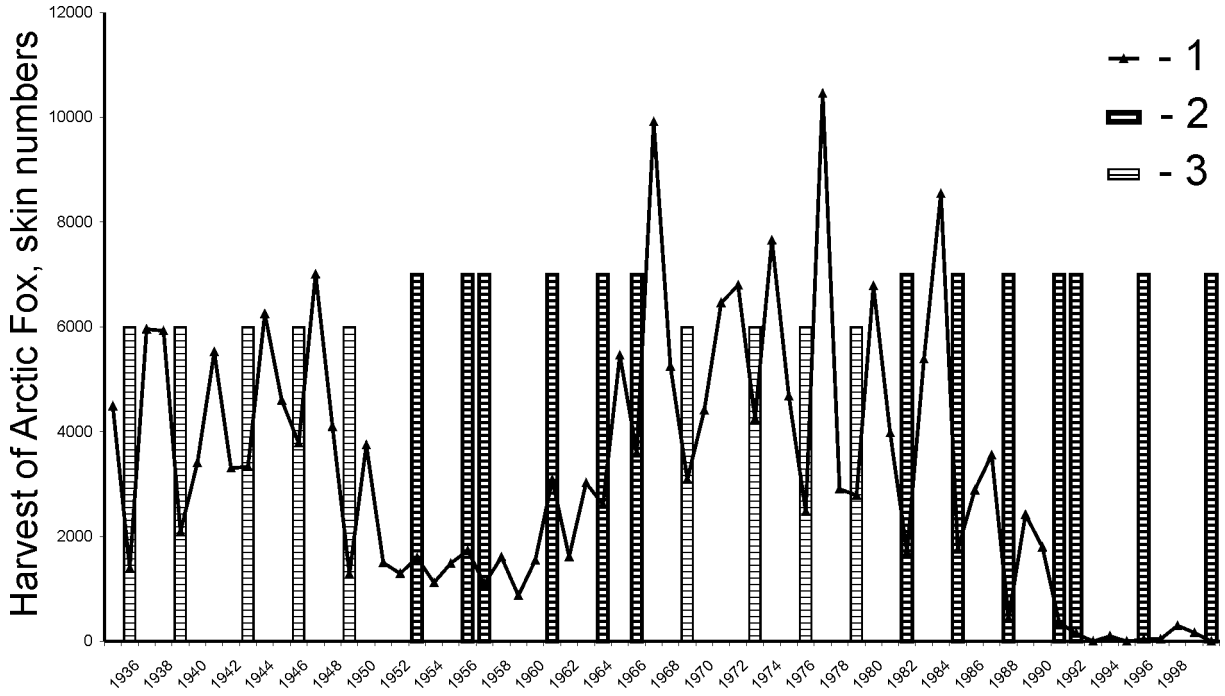

Figure. Dynamics of the harvest of Arctic Fox skins (1) and peaks of lemming numbers (2 – observed, 3 – presumed) in the Lena River Delta. The height of bars depicting peak lemming years is arbitrary, because quantitative information was not available for this parameter.

Additional information about lemming peaks in the delta was obtained from ornithological publications by V.I. Kapitonov (1962), O.V. Egorov (1965) and Y.Y. Blokhin (1987). Their observations on avian predators, in particular, Snowy Owl *Nyctea scandiaca*, contributed considerably to our understanding of lemming dynamics. Snowy Owls are known to breed almost exclusively in years with sufficiently high lemming abundance (Osmolovskaya 1948; Litvin & Baranyuk 1989; Litvin & Ovsyannikov 1990; Kretchmar et al. 1991; Kalyakin 2003), which permits the use of Snowy Owl reproduction as an indicator of peak lemming numbers when mammalogical research was not conducted.

The Snowy Owl was noted by V.I. Kapitonov (1962) as a common breeder in the lower Lena River in 1953, 1956 and 1957, although nests were not found, while only one bird was seen during 1954 and 1955. A single owl was recorded during an aerial survey of 500 km long in 1963 (Egorov 1965), which points to low lemming abundance across the whole delta area and supports the local data of A.A. Mezhenny (1975). Both nesting Snowy Owls and high abundance of lemmings were observed in 1982 and 1985 of 1981-1985 (Blokhin 1987). During the period of our observations in the Lena Delta, high abundance and reproduction of owls was also observed only in years of peak lemming numbers (1996 and 2000), while records of Snowy Owls in other years were solitary.

"Archives of Nature" of the reserve reported observations of nests and broods of Snowy Owls in the delta in 1988, 1991 and 1992 during the period 1986-1992, when no data were collected by scientists. A senior reserve ranger, V. Dormidontov, recorded high activity by lemmings in spring 1991, observing both tracks and the animals themselves (V. Dormidontov, pers. comm.).

D.V. Solovieva (2000) discovered a high abundance of lemmings in the lower reaches of the Bolshaya Tumanovskaya Channel in the north of the delta in 1993. However, Snowy Owls did not breed and were rare in the delta in 1993 according to the "Archives of Nature", which agrees also with the results of mammalogical studies by Y.L. Volpert and G.V. Sapozhnikov (1996). Lemming populations were decreasing in 1993 according to the latter study, while not a single Snowy Owl was seen by Y.L. Volpert (pers. com.) for the whole period of work in his study site. The decline in lemming numbers had probably started already in summer 1992, because we did not see Snowy Owls in late August – early September in that year. However, breeding of another rodent-specialist, the Pomarine Skua *Stercorarius pomarinus*, was recorded in 1993 in some parts of the delta. It is likely that patches with increased numbers of lemmings remained in 1993 on some islands of the delta and permitted nesting of Pomarine Skuas at a low density there, despite the general decline of rodent populations. We observed the same scenario in 2001, the year following peak lemming numbers, when Snowy Owls were absent, but solitary pairs of Pomarine Skuas bred.

Data are not available on the degree of synchrony of increase or decline of rodent numbers between different parts of the delta. However, high points were reached simultaneously across the whole delta, judging by synchronous nesting of Snowy Owls. The high degree of fragmentation of the delta area into islands probably had

no great impact on the synchrony of population dynamics, because the channels separating the islands are not particularly wide and are covered by ice for about 8 months of the year. It is probable that local patches of increased numbers of lemmings, permitting nesting by Pomarine Skuas, remained during widespread lows due to specific microrelief or increased accumulation of driftwood on some islands, creating favourable conditions for the formation of a deep snow layer, used for shelter by the lemmings.

Summarizing the available information, we may conclude that 11 summer seasons of 37 years (periods 1953-1966 and 1981-2003) in the Lena River Delta were characterized by high lemming abundance (Figure). In two cases (1956-1957 and 1991-1992) population peaks extended over two consecutive summer seasons. While observation data are absent for the period between peaks in 1957 and 1961, rodent populations were apparently at a low point then. The peak period was 4 years in 3 cases, 3 years in 5 cases and 2 years in one case from the 37 years of data. In both cases, when peaks extended over 2 years, the next peak occurred after 3 years of low numbers. The last interval between peaks has already lasted for 3 years following the peak in 2000. It is noteworthy that 3-year cycles with 2-year intervals between peaks prevailed in former times, but the last 3 cycles lasted 4 years, and peaks were separated by 3-year intervals. This change may be caused by changes in ecosystems of the Lena River Delta, affecting the dynamics of lemming populations.

Arctic Fox *Alopex lagopus* – is one of the principal predators of the tundra, the numbers of which are related to lemming abundance. We analyzed the dynamics of harvesting of Arctic Fox skins in the Bulunsky District of Yakutia, in relation to the dynamics of lemming numbers (Figure). The largest part of the Bulunsky district mainland territory is covered by mountains with sparse larch forest, while the Lena Delta occupies approximately one fifth of this territory. However, the majority of the human population is concentrated in the delta where the principal fishing and hunting activities are conducted. Reports on the harvest of Arctic Fox skins, available from 1935, were obtained from the Yakutian Department of Statistics.

Two periods lacking pronounced dynamics between years can be clearly seen on the figure showing the harvesting of Arctic Foxes: from 1951-1960 and from 1991-2000. Fortunately, reliable information on lemming peaks is available for both periods. Skin harvesting remained at a low level (900-1500 skins per year) during the10 years from 1951-1960 for unknown reasons. The low harvest from 1991-2000 was apparently related to the considerable decline in demand for Arctic Fox fur since the late 1980s, which has resulted in very low prices and virtual termination of the trade by local people. Subsequently, Arctic Foxes have been taken in very small numbers, mostly for personal use.

Thus, the relationship between the harvesting of Arctic Foxes and lemming numbers can be analysed using peaks of lemming abundance in 1964, 1966, 1982, 1985 and 1988. The Figure shows that years of minimum harvest coincide with the years of peak lemming abundance. An apparent contradiction is explained by the peculiarities of the fur harvest and its statistical reporting. Fur taken during winter is included in the accounts for the next calendar year after the year of actual reproduction by the animals. Accordingly, accounts of the Arctic Fox harvest in years of high lemming abundance correspond to animals actually taken in the previous year, in the winter preceding the summer season with the peak rodent numbers. Also, fur harvested at the end of a year with high lemming numbers is included in statistics for the next year.

The coincidence of low fur harvest with lemming peak numbers was used to reveal lemming highs in periods when direct data on rodent abundance were absent, while Arctic Fox harvest showed apparent dynamics between years. In total, 9 years of presumed high lemming abundance could be inferred for a period of 32 years (periods from 1935-1952 and from 1967-1980). In 3 cases, the peaks occurred in the 4th year after the previous one and in 7 cases in the 3rd year. It is possible that the presumed peak in 1969 lasted for two years, because the harvest of Arctic Fox skins was increasing for three years in a row, while the next interval between peaks dropped from 3 to 2 years.

In total, information about years of peak lemming numbers in the Lena River Delta were available for a period of 69 years, during which time there were 20 peaks and 20 between-peak intervals took place. In 6 cases the peak occurred in the 4th year, in 12 cases in the 3rd year, and in one case in the 2nd year after the previous peak. The last between-peak interval has already lasted for 3 years following the peak in 2000, and may last longer, because lemming numbers in 2003 were even lower than in 2002, according to our observations.

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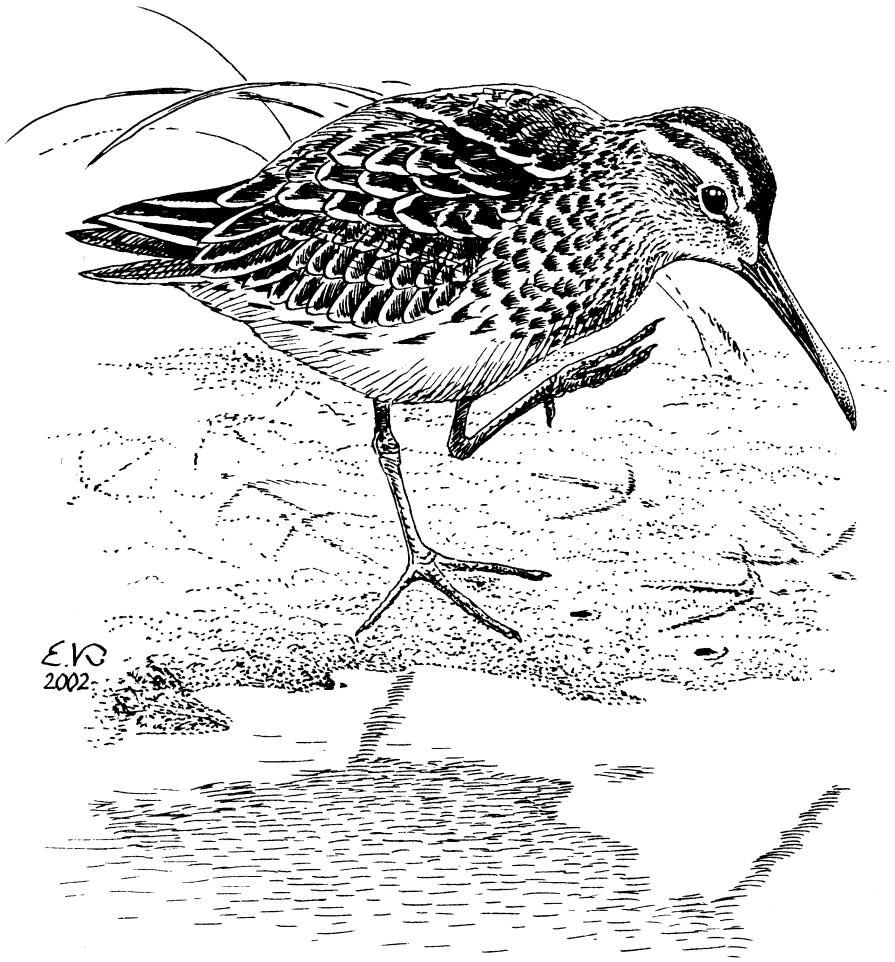

ARCTIC BREEDING SUCCESS IN 2003, BASED ON JUVENILE RATIOS IN WADERS IN AUSTRALIA IN THE 2003/2004 AUSTRAL SUMMER

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Introduction

Monitoring the annual breeding success of wader populations which spend the non-breeding season in Australia is a key element of the fieldwork programs of the Victorian Wader Study Group in South East Australia (Victoria and South East of South Australia) and the Australasian Wader Studies Group (North West Australia). The percentage of juvenile birds in catches is used as a measure of apparent breeding success.

Data from previous years has been published in "Arctic Birds" newsletters 2, 3, 4 and 5. This article gives data on the results obtained in the 2003/04 Austral summer relating to outcomes of the 2003 Arctic breeding season.

Objectives

This data is collected and published annually in the "Arctic Birds" newsletter for three principal reasons:

a. To put on permanent record the percentage juvenile data collected on a variety of species in the non-breeding season in two different parts of Australia. By publishing this data it will not be lost and will be available to relevant researchers to use both now and in the future.

b. This percentage juvenile data from birds caught from banding data complements reproductive success data obtained by other methods and published annually in the "Arctic Birds" Newsletter.

c. It is hoped that publication of this data will stimulate other banders elsewhere in the world to plan and undertake their wader banding activities in a manner, which will generate similar data on other wader populations.

Methods

The same data collection methods and criteria were used as in previous years. As far as possible conditions are standardized to minimize variations caused by catching factors. Only birds caught by cannon netting were counted, though some additional mist netting information is, for the first time, included here for comparison. Only birds caught in the period when populations are considered to be most stable are counted, i.e. after the majority of the juveniles have arrived and before adults depart on northward migration. In North West Australia this covers the period 1st of November to the 20th of March and in South East Australia, 15th of November to the 20th March also (except for Sharp-tailed and Curlew sandpipers♣ where the end date is the 28th of February).

There are potential biases in data collected in this way due especially to inhomogeneity in the flocks of birds caught in the cannon nets. There is considerable data which shows that on some species there is significant regional and local variation in the distribution of the different age groups and that even in a single roosting flock there can be a patchy distribution of the age groups. It is hoped that such effects are minimized by trying to collect data from as many different catches and locations as possible throughout the study areas and this is why details of the number of catches for each species are given. Please see earlier publications in the "Arctic Birds" Newsletter series for a more detailed discourse on the subject of potential biases.

Results

The detailed results for the 2003/04 season are given in tables 1 and 2 for South East Australia and North West Australia, respectively. Table 3 gives some information on waders mist netted, as opposed to cannon netted, in North West Australia. Tables 4 and 5 summarize the percentage juvenile data in South East Australia and North West Australia for the last 6 years.

South East Australia

The outstanding feature of the 2003/04 data is the extremely high breeding success of Sharp-tailed Sandpipers with 39% juveniles in 989 birds caught in 10 catches. It was extremely noticeable from early October onwards to any wader watcher in the field that there were unusually large numbers of juvenile birds present.

In contrast Red-necked Stints (23%) and Curlew Sandpipers (15%) had average breeding years in 2003 but Ruddy Turnstone (6.7%) and Sanderling (2.7%) clearly had very poor breeding years in 2003. Samples of Bar-tailed Godwit and Red Knot were small but both probably also had poor breeding seasons in 2003. The Red Knot figure should not be taken as indicative because of the high level of segregation of juvenile Red Knots into selected areas away from the normal locations of the main flocks of adult non-breeding birds. The fact that

♣ see tables for scientific names of birds

only 22 Red Knot were caught is in itself an indication that juvenile numbers were low.

North West Australia

Overall wader populations spending the non-breeding season in North West Australia seemed to have had a poor breeding season in 2003. Red-necked Stint (10%) and Curlew Sandpiper (7.4%) had much lower proportions of juveniles than populations of the same species in South East Australia. Red Knot (3.4%) also fared badly in 2003. Turnstone fared even less well than in South East Australia with no juveniles present in a sample of 57 birds caught. Only Great Knot (16%) seemed to have a good breeding outcome, being the only species where the proportion of young was higher than the six-year average.

As usual breeding outcome data is given from a number of species which breed in non-arctic regions of Siberia. Greater Sand Plover (24%) again produced a high proportion of juveniles, but this is normal and the 2003 figure was actually marginally below the six-year average. On the other hand Terek Sandpipers seemed to have a good breeding season (19%) and relatively better than the closely associated (in the non-breeding season) Grey-tailed Tattler (14%). Oriental Pratincoles were sampled for the first time and had only a modest 8.3% first year birds, meaning that the huge concentrations (2.88 million) of this species located at 80 Mile Beach were not in any way caused by an exceptionally good breeding season in 2003.

Some mist net catches are included for the first time. Mostly these are of small numbers of birds and of species which are normally not caught by cannon netting. Whilst there is a tendency for mist netting to produce a higher proportion of first year birds in catches than cannon netting it would nevertheless appear from this data that Sharp-tailed Sandpipers and Long-toed Stints must have had a good breeding season in 2003.

Discussion

Overall the 2003 breeding season produced more variable percentage juvenile results in South East Australia than usual and overall poorer results than usual in North West Australia.

The outstanding success of 2003 seems to have been the Sharp-tailed Sandpiper. Quite why this species should have done so well when other similar size species breeding in the same general areas of the Arctic should have fared significantly less well is unclear. Clearly Ruddy Turnstone, Sanderling and Red Knot, which all share similar habitats in parts of the breeding range, all had a uniformly bad 2003 breeding outcome. The fact that the North West non-breeding population of Red-necked Stints and Curlew Sandpipers had only half the proportion of juveniles of the non-breeding populations of the same species in South East Australia suggests that there may be differences in the specific breeding areas of the populations of these two species in the Arctic. At present there is insufficient recovery or leg flag data to determine any difference in the breeding areas of the SEA and NWA populations.

It is interesting that the Great Knot had a markedly different outcome in 2003 to most other species. It breeds on mountains in North East Siberia, in a quite different habitat to most other wader species. The results here suggest that it was subject to more favourable weather/predation pressures in 2003 than most other wader populations breeding in northern Siberia. This is the second good breeding year for Great Knots after three of the four previous years showed poor breeding outcomes.

Conclusion

A great deal of field work effort is required to obtain a satisfactory population monitoring data in each year in these two widely separated regions of Australia. Apart from Red-necked Stints, which can almost be caught at will in South East Australia, specifically targeted catching activities often repeated several times in a season are required to obtain adequate samples of other species. In North West Australia there are the added constraints caused by the very high temperatures (typically +35-40°C) experienced in the November to mid-March period and the potential and actual interruptions to field work caused by the January/February wet season.

Nevertheless it is the intention of VWSG and AWSG to avidly pursue these percentage juvenile breeding success measurement programs in the future because such data is key to helping explain population changes in species. Such changes are particularly likely to result from reductions in the volume and quality of habitat at migratory staging areas in Asia and longer term from the effects of climatic change on habitats used throughout the annual cycle of waders.

Data will be generated in South East Australia by the VWSG through regular field work activities throughout the monitoring period. In North West Australia the bulk of the data will need to be gathered through special three week banding expeditions to the region each season, supplemented by catches made by the local North West Wader Study Group/Broome Bird Observatory (organized by Chris Hassell).

Table 1. Percentage of juvenile/first year waders in cannon net catches in South East Australia in 2003/2004

Species	No of catches		Total caught	Juv./1st year	%Juv./1st year
	Large (>50)	Small (<50)			
Ruddy Turnstone – *Arenaria interpres*	0	9	122	8	6.7
Red-necked Stint – *Calidris ruficollis*	12	7	5470	1259	23
Sharp-tailed Sandpiper – *C. acuminata*	3	7	989	388	39
Curlew Sandpiper – *C. ferruginea*	2	6	233	34	15
Sanderling – *C. alba*	0	4	74	2	2.7
Red Knot – *C. canutus*	0	1	22	19	(86)
Bar-tailed Godwit – *Limosa lapponica*	0	1	43	1	(2)

Also Greenshank (2 caught, 1 juvenile), Great Knot (1, 1) and Pacific Golden Plover (1, 0). All birds cannon-netted in period 15 Nov to 28 Feb except for Red-necked Stint, Ruddy Turnstone and Sanderling where catches up to 23 Mar are included.

Table 2. Percentage of juvenile/first year waders in cannon net catches in North West Australia in 2003/2004

Species	No of catches		Total caught	Juv./1st year	%Juv./1st year
	Large (>50)	Small (<50)			
Ruddy Turnstone – *Arenaria interpres*	1	3	57	5	8.8
Red-necked Stint – *Calidris ruficollis*	2	9	303	30	10
Curlew Sandpiper – *C. ferruginea*	0	12	122	9	7.4
Great Knot – *C. tenuirostris*	3	7	579	94	16
Red Knot – *C. canutus*	1	2	157	5	3.2
Broad-billed Sandpiper – *Limicola falcinellus*	0	1	12	3	(25)
Bar-tailed Godwit – *Limosa lapponica*	2	7	312	28	9.0
Non-arctic northern migrants					
Greater Sand Plover – *Charadrius leschenaultii*	3	6	499	121	24
Lesser Sand Plover – *Ch. mongolus*	0	3	9	2	
Oriental Plover – *Ch. veredus*	0	2	10	2	(20)
Greenshank – *Tringa nebularia*	0	2	7	2	
Marsh Sandpiper – *T. stagnatilis*	0	1	12	5	(42)
Grey-tailed Tattler – *Heteroscelus brevipes*	0	7	158	22	14
Terek Sandpiper – *Xenus cinereus*	2	4	254	47	19
Oriental Pratincole – *Glareola maldivarum*	2	2	228	19	8.3

Also Black-tailed Godwit (5 caught, 0 juvenile), Grey Plover (2, 0) and Eastern Curlew (1, 0). All birds cannon netted in period 1 Nov 2003 to 29 Feb 2004 (actually all in period 25 Jan to 13 Feb 2004).

Table 3. Percentage of juvenile/first year waders in mist net catches in North West Australia in 2003/2004

Species	No of catches		Total caught	Juv./1st year	%Juv./1st year
	Large (>50)	Small (<50)			
Pacific Golden Plover – *Pluvialis fulva*	0	1	3	0	
Oriental Plover – *Charadrius veredus*	0	2	9	2	
Wood Sandpiper – *Tringa glareola*	0	3	20	4	(20)
Greenshank – *Tringa nebularia*	0	2	6	4	
Marsh Sandpiper – *T. stagnatilis*	0	3	11	1	(9.1)
Common Sandpiper – *Actitis hypoleucos*	0	2	7	3	
Long-toed Stint – *Calidris subminuta*	0	3	17	16	(94)
Sharp-tailed Sandpiper – *C. acuminata*	1	2	87	49	56
Pin-tailed Snipe – *Gallinago stenura*	0	1	1	1	
Swinhoe's Snipe – *G. megala*	0	1	2	2	
Oriental Pratincole – *Glareola maldivarum*	0	2	22	2	(9.1)

All birds mist-netted near Broome (NW Australia), in period 15 Nov 2003 to 4 Feb 2004.

Table 4. Percentage of first year birds in wader catches in South East Australia 1998/1999 to 2003/2004

Species	98/99	99/00	00/01	01/02	02/03	03/04	Average
Ruddy Turnstone – *Arenaria interpres*	6.2	29	10	9.3	17	6.7	13
Red-necked Stint – *Calidris ruficollis*	32	23	13	35	13	23	23
Curlew Sandpiper – *C. ferruginea*	4.1	20	6.8	27	15	15	15
Sharp-tailed Sandpiper – *C. acuminata*	12	10	17	7.8	20	39	18
Great Knot – *C. tenuirostris*	-	7.5	(3.7)	8.2	-	-	(7.9)
Sanderling – *C. alba*	10	13	2.9	10	43	2.7	14
Red Knot – *C. canutus*	2.8	38	52	69	(92)	(86)	27
Bar-tailed Godwit – *Limosa lapponica*	41	19	3.6	1.4	16	(2)	13

All birds cannon-netted between late Nov and third week in Mar (except Sharp-tailed Sandpiper and Curlew Sandpiper to end Feb only). Averages exclude figures in brackets (small samples) and years when no sample was obtained (-). NB. Some of the figures for earlier years in the above table have been revised from those published in "Arctic Birds" Newsletter No. 4 (and earlier). This results from some small changes to the range of catch dates for which samples are included.

Table 5. Percentage of first year birds in wader catches in North West Australia 1998/1999 to 2003/2004

Species	98/99	99/00	00/01	01/02	02/03	03/04	Average
Grey-tailed Tattler – *Heteroscelus brevipes*	26	(44)	17	17	9.0	14	17
Red-necked Stint – *Calidris ruficollis*	26	46	15	17	41	10	26
Curlew Sandpiper – *C. ferruginea*	9.3	22	11	19	15	7.4	14
Great Knot – *C. tenuirostris*	2.4	4.8	18	5.2	17	16	11
Red Knot – *C. canutus*	3.3	14	9.6	5.4	32	3.2	11
Little Curlew – *Numenius minutus*	57	33	-	36	30	-	39
Bar-tailed Godwit – *Limosa lapponica*	2.0	10	4.8	15	13	9.0	9.0
Non-arctic northern migrants							
Greater Sand Plover – *Charadrius leschenaultii*	25	33	22	13	32	24	25
Terek Sandpiper – *Xenus cinereus*	12	(0)	8.5	12	11	19	13

All birds cannon-netted in the period 1 Nov to mid-Mar. Figures in brackets are from small samples. A (-) indicates no sample.

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MAP COLLECTION

Four maps below are provided to illustrate various aspects of bird breeding conditions in the Arctic in 2003.

Figures 1 and 2 represent an overlay of the map layers reflecting two different types of information. The first one is the deviation of the mean June/July temperature in 2003 from the mean June/July temperature averaged for the period 1994-2003. This deviation indicates whether the respective month in 2003 was warmer (positive value) or colder (negative value) than average. The colour of the points at different study sites reflects a subjective evaluation by respondents of the spring as being early, average/moderate, or late (Fig. 1), and the summer as warm, average/moderate or cold (Fig. 2). Please note that, also referring to roughly the same period during the summer, the two types of information reflect essentially different phenomena that should not necessarily agree – for example spring could be early and cold. Temperature data were obtained from the National Climatic Data Center (USA, http://www.ncdc.noaa.gov/ol/climate/climateresources.html). Only stations with 26 or more daily records for a month were used for interpolation. The grid map was constructed using inverse distance interpolation in MapInfo Professional GIS software, with the following settings: cell size 50 km, search radius 500 km, exponent 1. The area covered by the grid includes the territory obtained from an overlay of Arctic boundaries, as defined by CAFF and AMAP, plus an additional 100-km buffer.

Figures 3 and 4 illustrate rodent abundance and bird breeding success, basically as these were reported by respondents. In some cases when respondents did not explicitly qualify breeding success or rodent abundance, but these were fairly obvious from the other information supplied, the site was assigned to a respective category based on the judgement of the compilers.

Base maps were downloaded from GRID-Arendal's WEB site (http://www.grida.no/db/gis/prod/html/arctic.htm), projection – Lambert Azimuthal Equal-Area.

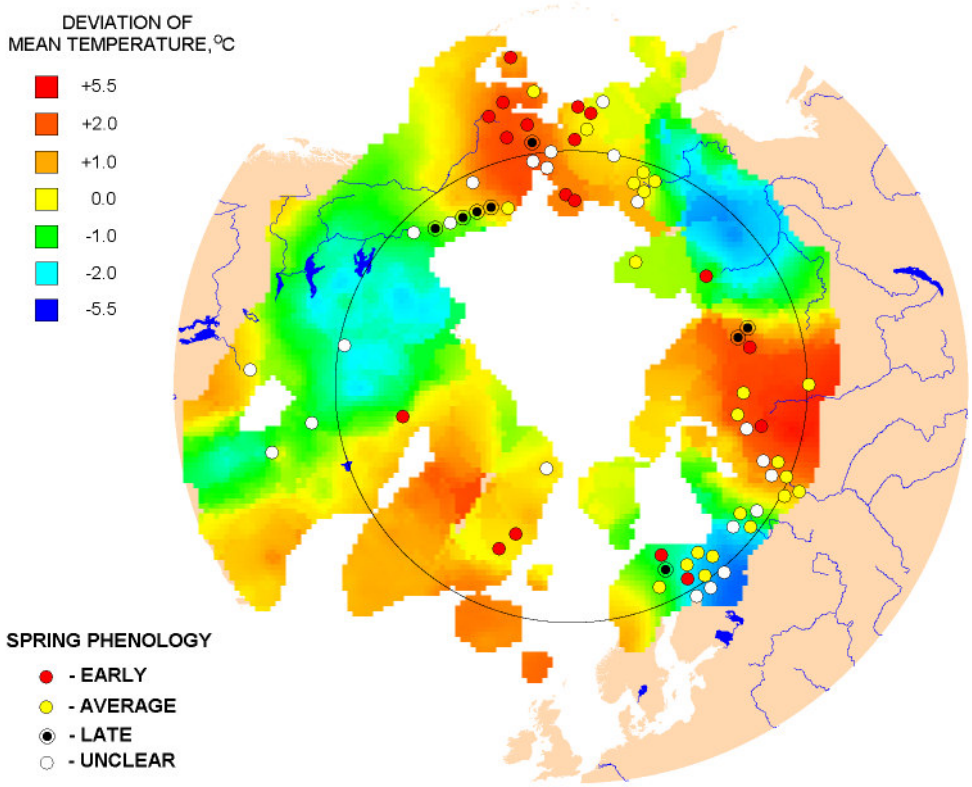

Figure 1. Temperature and phenological characteristics of spring in the Arctic in 2003. See text above for legend

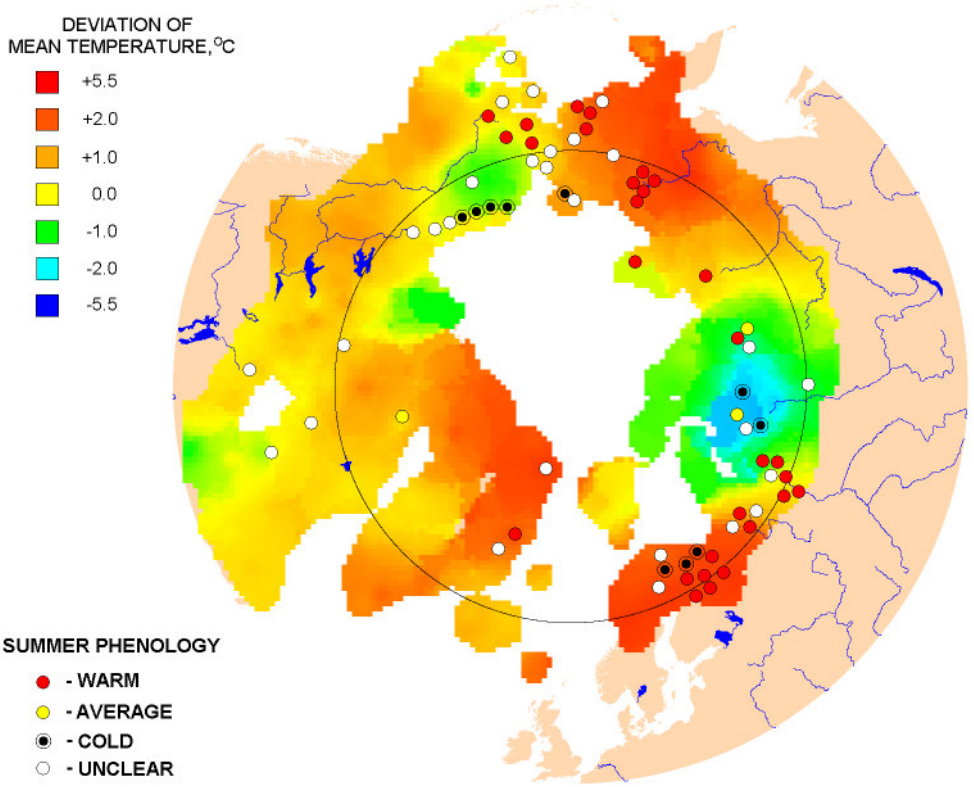

Figure 2. Temperature and phenological characteristics of summer in the Arctic in 2003

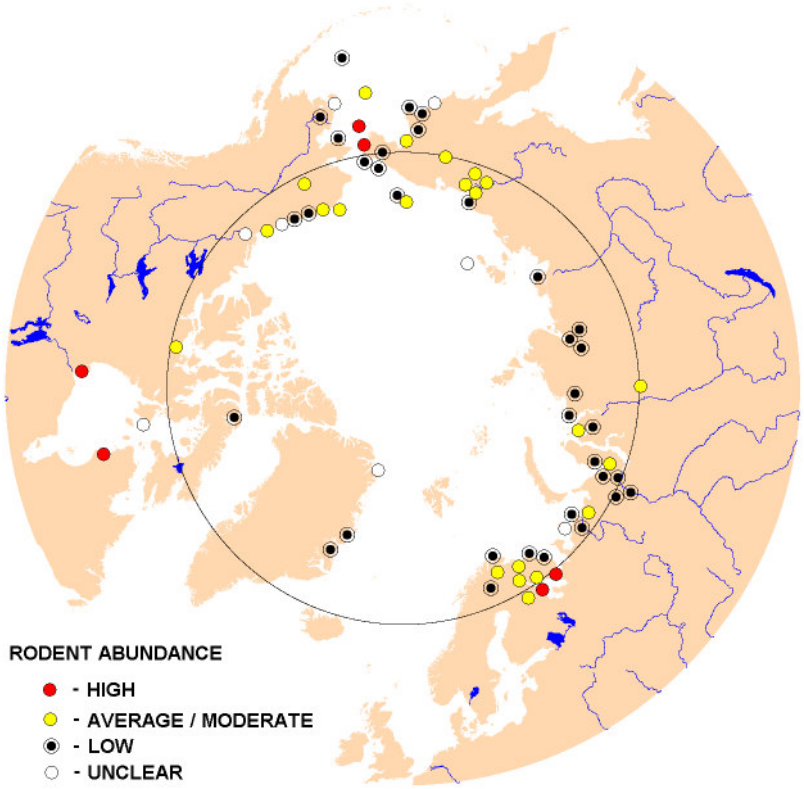

Figure 3. Rodent abundance in the Arctic in 2003

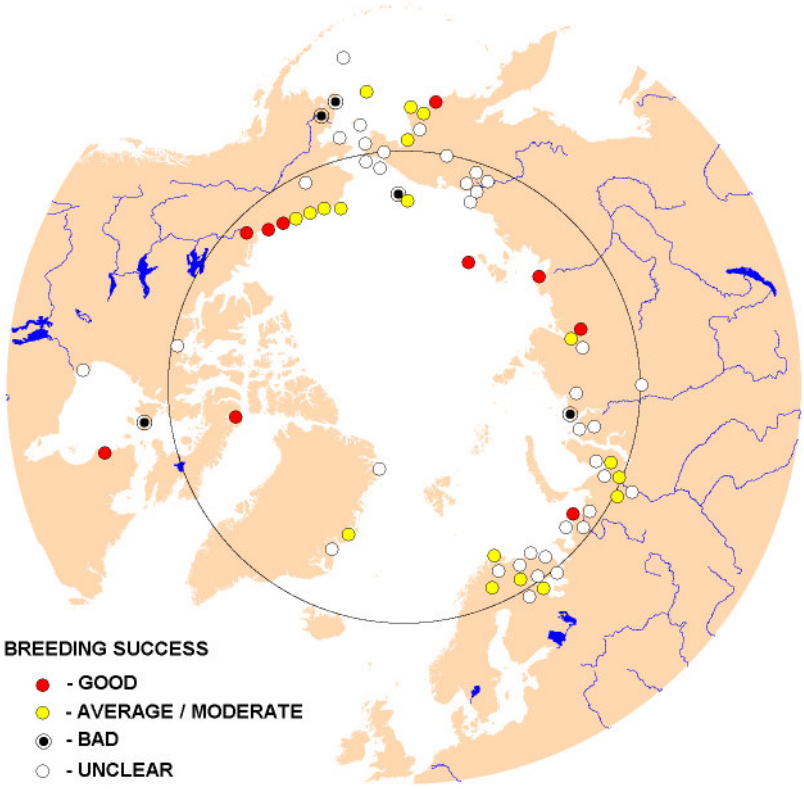

Figure 4. Bird breeding success in the Arctic in 2003