

ARCTIC BIRDS: an international breeding conditions survey



supported by International Wader Study Group and Wetlands
International's Goose and Swan Specialist Groups



Newsletter

No. 1

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A WORD FROM COMPILERS

This is the first issue of a newsletter of the survey aiming at collating information on environmental conditions on the breeding areas of Arctic nesting birds in a persistently updated database. Analyses of data on bird numbers and breeding performance during Arctic summer in relation to climatic, predatory and other relevant factors can give insights into ecological processes acting at wide scale, and also provide valuable information for the conservation of sites and species.

The database of International Wader Study Group and Wetlands International's Goose and Swan Specialist Groups accumulates simple and most up-to-date environmental information, obtained from many Arctic localities primarily by means of distributing questionnaires among Arctic field workers. Although being initially focused on waders and wildfowl and still making main emphasis on these bird groups due to their dominant role in most Arctic bird communities, the database now provides also for accumulation of data on other groups of Arctic terrestrial birds, as their responses to changing environment have often much in common. A bibliographic component (under development) will include published data from previous seasons to allow for thorough analyses of trends in bird breeding success.

Background:

This initiative originates from reviews of wader breeding conditions on Russian tundra that have been published annually over 10 years by Russian wader researches (English version has been reproduced in the Wader Study Group Bulletin) and attracted considerable interest of ornithologists over the world. This interest was driven by perception that much of the understanding of the population dynamics of Arctic waterfowl had come so far from individual studies in small areas of the Arctic, or from *post hoc* interpretation of broad patterns of weather conditions, as well as evidence from banding recoveries and winter population counts. Setting these individual studies in a

broader context would have contributed much to their use in understanding wider geographical patterns in waterfowl populations. This in turn, would be of substantial benefit in providing baseline information in the development of international conservation efforts for migratory waterfowl. Such information could, for example, be used to establish the extent of variation in densities and productivity in different parts of breeding ranges and assist in identification of key zones for conservation attention.

First attempt to release this project at a global pan-Arctic scale and standardise data collection using questionnaire was undertaken in 1995 by Nick Davidson and David Stroud. During the subsequent pilot stage of 1996-98 questionnaires were revised on the basis of comments provided on the pilot form, initial contacts were made with respondents in different countries, and the database established in the Moscow State University, Russia. The progress report on the pilot stage appeared in the Wader Study Group Bulletin (1998, Vol. 87: 43-46).

Current state of the survey:

From March 1999 a WEB site of the project was launched (URL: <http://soil.msu.ru/~soloviev/arctic/>), with certain restricted (at this time) extracts of the database available on-line and updated weekly with newly arriving reports on breeding conditions in the Arctic in 1998.

The current newsletter is dedicated to the breeding conditions for birds in the Arctic in 1998 summer season, and encompasses the following topics:

- ◇ a list of summaries of bird breeding conditions in various Arctic localities, provided by researchers visiting these localities;
- ◇ a review of these reports made for the Russian Arctic;
- ◇ contact information about the survey contributors;
- ◇ a collection of maps illustrating situation with bird breeding performance (as qualified by respondents),

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rodent abundance and some basic climatic characteristics in the Arctic in summer 1998.

The future:

We encourage Arctic researchers and other visitors of Arctic regions to support this survey in 1999 season by filling up the form that can be requested as a paper copy or electronically (Word for Windows document) from any of the addresses below, or from the WEB site. A support from Arctic research community is the necessary prerequisite for the survey to achieve its goals, because sound conclusions about patterns of bird breeding performance in vast regions of the Arctic should be backed by the data coming from multiple localities. By now these patterns have been possible to outline only for the Russian Arctic.

The database is being continually updated, and high value is assigned to completed forms not only from the recent field season, but also from previous years including from expeditions that may already have published material elsewhere. Eventually, as the principals of data use and access are developed with view of guaranteeing author rights of contributors, the data will increasingly be made available for both research and conservation purposes. As the database will be populated with more data from back seasons, the

future issues of the newsletter will stronger emphasise analytical part of the survey, rather than descriptive which dominated in the current issue.

The newsletter is intended for wide distribution, however, contributors to the database will automatically be put on the mailing list, while others should request a copy from the project coordinators.

We would greatly appreciate feed-back of the readers, any comments and suggestions on contents of the newsletter and/or the project in general.

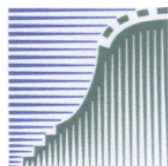
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*For last-breaking information about the survey visit the website
<http://soil.msu.ru/~soloviev/arctic/>*

Newsletter is distributed among contributors to the database. Others may request it from project coordinators. Free of charge.



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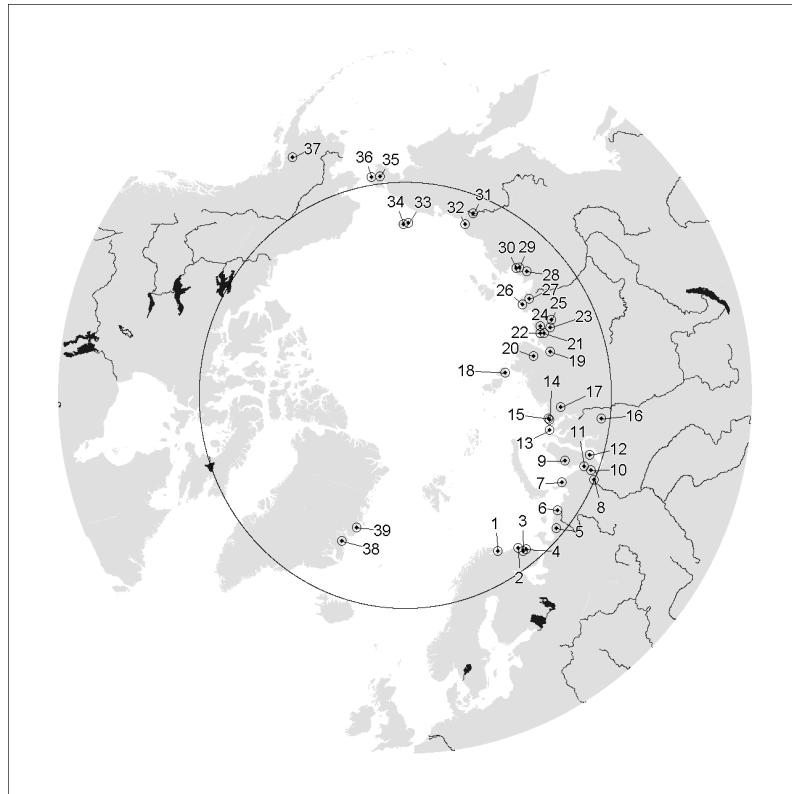


Figure 1. Arctic localities from which bird breeding conditions reports became available.

LOCALITY REPORTS

1. Ainovy Islands, Russia (69°50'N, 31°35'E)

On the islands and Murman coast spring was very late and cold, intensive snowfalls were noted even in early June. On the islands near western Kola Peninsula snow melted in the middle of June (while average date is 27 May), in depressions it retained till the end of June. At the eastern Murman coast snow in depressions retained till the end of August. Summer also was cold, rains were not recorded in its second half.

Lemmings were not recorded in coastal mainland tundra. At the Ainovy Islands wader nesting was successful, in spite of the later than usual breeding dates. Autumn migration was also substantially delayed. Dunlins *Calidris alpina*, Purple Sandpipers *C.maritima*, Turnstones *Arenaria interpres* migrated in usual numbers; other species (Ruff *Philomachus pugnax*, Spotted Redshank *Tringa erythropus*, Bar-tailed Godwit *Limosa lapponica*, Red-necked Phalarope *Phalaropus lobatus*, Little Stint *Calidris minuta*) were less numerous than on average.

I.P.Tatarinkova

2. Sem' Islands, Russia (68°49'N, 37°20'E)

At the Murman coast of the Kola Peninsula spring was late and summer very cold. Precipitation level in summer was substantially lower than usual, which led to underdevelopment of vegetation.

Norway Lemmings *Lemmus lemmus* were recorded in small numbers at Sem' Islands, while Rough-legged Buzzards *Buteo lagopus* and Snowy Owls *Nyctea scandiaca* were virtually absent near colonies of sea birds. Waders nested quite successfully in usual numbers. Their spring migration was delayed by 6 days in Ruff and 11 days in Golden Plover *Pluvialis apricaria* relative to average dates. In contrast, fall migration of many species started earlier than usual - 24 days in Red-necked Phalarope, and 5 days in Ruff.

Y.V.Krasnov

3. Yenozero Lake, eastern Murman coast, Russia (68°10'N, 38°05'E)

Wader reproduction was not completed by 4 August that confirms reports of local people about late and cold spring at the Kola Peninsula.

Rodents were virtually absent, and skuas (mainly Long-tailed *Stercorarius longicaudus*, but also Arctic *S.parasiticus*) preyed primarily upon birds, eggs, and chicks. This determined low reproductive success in waders. Terrestrial predators were not recorded. Four local wader species (Eurasian Golden Plover, Ringed Plover *Charadrius hiaticula*, Temminck's Stint *Calidris temminckii* and Dunlin) accounted in total for 39 pairs and broods in the area of 79 lake islands (135 ha in the eastern part of Enozero Lake) and a patch of shoreline tundra (100 ha).

V.D.Kokhanov

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4. Kola Peninsula, eastern Murman coast, Russia (68°09'N, 39°03'E)

At the Murman coast of the Kola Peninsula spring was late and summer very cold. Precipitation level in summer was substantially lower than usual, which led to underdevelopment of vegetation.

According to visual records voles had high numbers at the coast and in inland areas of the eastern Murman, where Rough-legged Buzzards and Snowy Owls were also recorded. Waders nested quite successfully in usual numbers.

Y.V.Krasnov

5. Indiga River, Malozemel'skaya tundra, Russia (67°24'N, 49°32'E)

Spring and summer were characterised by relatively high mean daily temperatures (June - +10.8°C, July - +18.7°C, August - +10.4°C).

Numbers of lemmings (primarily Collared Lemming *Dicrostonyx torquatus*) and other rodents was very low. Arctic Fox *Alopex lagopus* and Red Fox *Vulpes vulpes* did not breed, their dens were uninhabited. The most common avian predator specialized on rodents was Long-tailed Skua (0.55 pair/sq km), while Rough-legged Buzzard occupied primarily riverine forest patches with a density of 0.07 bird/sq km. Nineteen wader species were recorded, their numbers were not high. The most common breeding species were Red-necked Phalarope (2.3 birds/sq km), Golden Plover (1.46), Wood Sandpiper *Tringa glareola* (1.21), Bartailed Godwit (1.10), Temmink's Stint (0.82), Grey Plover *Pluvialis squatarola* (0.72), Whimbrel *Numenius phaeopus* (0.50), Common Snipe *Gallinago gallinago* (0.47), and Dunlin (0.43 bird/sq km). Less abundant were Ringed Plover, Common Sandpiper *Actitis hypoleucos*, and Ruff; rare - Dotterel *Eudromius morinellus*, Spotted Redshank, Terek Sandpiper *Xenus cinereus*, and Great Snipe *Gallinago media*. Unexpectedly Woodcock *Scolopax rusticola* (upper reaches), and Pintail Snipe *Gallinago stenura* (lower reaches) were found on breeding. Wader nest predation was low - 10-15%, breeding success by the time of fledging can be evaluated as 40-50%.

Y.N.Mineev, O.Y.Mineev, S.A.Ryzhov

6. Khabuika Lake, Russky Zavorot Peninsula, Russia (68°30'N, 53°50'E)

Low temperatures retained until 20s of June, which delayed development of vegetation by one week compared to 1997, and by 2.5-3 weeks compared to long-term means. Snow gone in the first week of June.

A weak increase of lemming and Root Vole *Microtus oeconomus* numbers was observed during the last 3 years, judging by increase of numbers of winter nibbles and other tracks of activity. Arctic Foxes successfully bred: 7 young were found in one of the dens. Birds of prey, gulls and squas retained their numbers at the same level as previously. On the seaside coast near the camp

nesting density of Temmink's Stints decreased substantially, although singing males were common as usual. Wader reproduction was late: the first chicks (in Ringed Plover) appeared on 14 July. Hatching dates in small passerines did not differ from average (first chicks in Lapland Buntings *Calcarius lapponicus* appeared on 1 July). Red-necked Phalaropes did not form post-breeding aggregations on small lakes, typical in previous years. The flocks of male Ruffs that appear in the last ten days of June, were smaller than usual, and their females had lower breeding numbers. Generally, the spring was unfavourable for waders.

Y.M.Schadilov, A.V.Belousova

7. Amderma, Yugorsky Peninsula, Russia (69°45'N, 61°40'E)

The season was late, judging by observations in mid August, and by evidence provided by local people.

Siberian Lemmings *Lemmus sibiricus* were abundant in the end of summer: they were met everywhere, and nests with young were found. Arctic Foxes were rare in the settlement vicinities, but bred. Rough-legged Buzzards and Pomarine Skuas *Stercorarius pomarinus* were breeding. The former reached a density of 10 pairs per 10 km of a transect. Snowy Owls were abundant in August (2-3 birds per 1 km of transect), but breeding not recorded. Yet not fledged broods of sea ducks (Greater Scaup *Aythya marila*, Long-tailed Duck *Clangula hyemalis*, and Common Eider *Somateria mollissima*) were recorded on lakes and sea, and of Ringed Plovers - in the village. Generally, the season seemed favourable for reproduction of tundra birds.

M.V.Gavrilo, K.Isaksen, H.Strøm, Y.Krasnov

8. Salekhard, western Siberia, Russia (66°32'N, 66°36'E)

The spring was late and cold. Warming and snowmelt started in late May. Ice-break on Ob' occurred on 5-6 June, which is a week later than average. Beginning of June was cold, middle and end - relatively warm, moderately rainy and windy. Floodplain remained under water unusually long - to the end of August.

Wader arrival coincided with warming in late May (24 May - appearance of Ringed Plover and Common Sandpiper, 25 May - Wood Sandpiper, 27 May -Terek Sandpiper). Among waders migrating in the Ob' floodplain in late August-early September Ruffs were especially numerous. In September there was a lot of voles in the floodplain, which attracted migrating Rough-legged Buzzards.

S.P.Paskhalny

9. Mutnaya River, Yamal Peninsula, Russia (70°27'N, 68°20'E)

The weather was rainy in the beginning of August.

Lemmings were absent, but Middendorff's Vole *Microtus middendorffi* was numerous in the areas

dominated by sedge-moss tundra with dwarf shrub and willow (up to 20 animals/100 trap-nights). Arctic Fox and skuas were absent. Non-breeding Snowy Owls had density of 0.38 bird/km, Rough-legged Buzzard - 0.25 pair/km. Buzzard broods had up to 3 chicks. Waterfowl and Willow Ptarmigan *Lagopus lagopus* were rare. Wader broods (Ringed Plover, Temmink's Stint, Little Stint, Ruff, Red-necked Phalarope) were common, which indicates good breeding success in these species.

V.G.Shtro

10. Schuchya River, middle reaches, Yamal Peninsula, Russia (67°16'N, 68°42'E)

Winter weather retained till 20 May, but following quick warming turned tundra snow-free by June (except for certain floodplains). Schuchya River and tributaries experienced ice-break in early June; the following flood was very high. Lakes became ice-free by 1-2 July. June was cool and dry, July - warm in the beginning and then hot. Mid August was cool again with occasional rains, fog and drizzle. Generally, summer was warm and with average amount of precipitation that is favourable for bird breeding.

Insects were abundant (crane-flies, gnat, butterflies, etc.). Lemmings were not recorded in the forest-tundra parts of the region, while in southern tundra both Siberian and Collared lemmings were very rare. Narrow-skulled Voles *Microtus gregalis* increased from average number in June to high in July, especially in tundra zone floodplains. Red Foxes were not met, and dens not found. Arctic Foxes were totally absent at the major part of the region, a single den found only near foothills of the Polar Ural. Long-tailed and Arctic skuas bred at low density, and most of the former were wandering non-breeders. Rough-legged Buzzards bred at low density. Their clutches were large (4-6 eggs), but reproductive success - low (no more than 3 fledglings per pair), and at least one third of the pairs were failures. Hen Harriers *Circus cyaneus* were rare and did not breed. Neither did Short-eared Owls *Asio flammeus*, wandering in southern tundra, while Snowy Owls were not recorded. Numbers and productivity of White-tailed Sea Eagle *Haliaeetus albicilla*, Peregrine Falcon *Falco peregrinus*, and Gyrfalcon *F.rusticolus* were lower than in previous years. Hooded Crow *Corvus cornix* and Raven *C.corax* were breeding at usual density along Schuchya River. Eurasian Golden Plover was abundant everywhere. Wood Sandpiper, Terek Sandpiper, Pintail, Common, and Jack snipes *Lymnocyptes minimus*, Whimbrel were common and evenly distributed in forest tundra and southern tundra. Ringed Plover and Temmink's Stint were common in tundra; Ruff, Common Sandpiper and Red-necked Phalarope - rare. Bar-tailed Godwit had patchy distribution, and reached substantial density in some of the spots. Waders bred in usual dates, and with high success due to favourable weather, absence of terrestrial predators, and low activity of avian ones. This is evidenced by high numbers of adult birds alarming near chicks, and frequent records of recently fledged young.

V.V.Morozov

11. Erkuta River, Yamal Peninsula, Russia (68°10'N, 69°00'E)

The spring was very late and cold, with a steep temperature increase in late May. However, geese migrated in usual dates. June was colder than average, as well as the first half of July, but a period from 18 July to 2 August was hot.

Bird counts were carried out in the second half of July in the area where Erkuta River neighbours constructed railway Obskaya-Bovanenkovo. Lemmings were absent, but Narrow-skulled Voles were abundant in areas dominated by sedge-moss tundra with dwarf shrub and willow (12 animals/100 trap nights). Arctic Fox, Snowy Owl, and Pomarine Skua were absent. Wildfowl and Willow Grouse were rare; Rough-legged Buzzard was common and at a transect reached density of 0.2 pair/km. Waders (Ringed Plover, Temmink's Stint, Red-necked Phalarope) were abundant; their breeding success can be evaluated as good.

V.G.Shtro

12. Yamalsky settlement, Yamal Peninsula, Russia (68°00'N, 72°30'E)

The weather was rainy in early August.

Few Siberian Lemmings were caught, voles abundant like at the south-west of Yamal. Arctic Fox, Snowy Owl, Pomarine Skua were absent. Supposedly wader breeding success exceeded average here.

V.G.Shtro

13. Neupokoev Island, Kara Sea, Russia (73°07'N, 76°41'E)

Lemmings, voles, and Arctic Foxes were not recorded. Arctic and Pomarine skuas were rare, so were Snowy Owls which did not breed. Among waders hatching recorded for Turnstones, among wildfowl - for White-fronted Geese *Anser albifrons*.

A.V.Molochaev

14. Medusa Bay, Taimyr Peninsula, Russia (73°21'N, 80°32'E)

The spring was late, windy and cool, the last snowfall occurred on 7 July. The weather was warm and clear from 5 to 12 July.

Siberian Lemmings were scarce, Collared Lemmings - not recorded. At least 3 Arctic Foxes inhabited study area. Of avian predators only Long-tailed Skuas were breeding (2 nests). Predation of Arctic Foxes and skuas on bird nests was heavy. Brent Goose *Branta bernicla* did not breed. Solitary broods of Little Stint, Curlew Sandpiper *Calidris ferruginea* and Dunlin hatched in the second week of July.

R.Felix, C. van Turnhout, S.Khomenko

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15. Dickson Island, Taimyr Peninsula, Russia (73°30'N, 80°55'E)

Snow and ice melted later than usual, but summer was warm, and without snowfalls till late August.

Lemmings were rare: Siberian Lemmings were caught in small numbers when searching for inhabited burrows in the optimal (wet) habitats; Collared Lemmings were even less abundant. Arctic Foxes were met only twice. Birds of prey were not breeding, including Snowy Owls, old nests of which were checked. Warm summer attracted a lot of wandering reindeers. A brood of Brent Goose was met on Dickson island, flocks of Brent Geese and White-fronted Geese were frequently met during summer. Some wader species, passerines, and Rock Ptarmigans *Lagopus mutus* were breeding, and fledglings were met, but generally tundra produced impression of uninhabited.

D.Ehrich, V.Belov

16. Bolshaya Kheta River, upper reaches, Russia (67°30'N, 83°20'E)

Neither lemmings, nor their tracks were observed. Arctic Foxes were not recorded, but they are rare in this area in summer anyway, likewise Red Foxes. Ruddy *Clethrionomys rutilus* and Root Voles (adults, subadults, and young of 2-3 months old) were found in entomological cylinders during short-term catching of insects, which implies that both species were common in floodplain. Broods of Wood Sandpiper, Whimbrel, Eurasian Golden Plover, and unidentified snipe were regularly met on mires and in lake depressions, but were missing in watershed shrub tundra inhabited by passerines. Solitary broods of Spotted Redshank and Greenshank *Tringa nebularia* were recorded. Predation was, probably, low, or less than average.

E.E.Syroechkovski, Jr.

17. Pura River, Taimyr Peninsula, Russia (72°15'N, 85°38'E)

June was cold, and phenologically 10 days later than average. Quick warming in the end of June led to simultaneous ice-break on rivers. The flood was high, which probably affected bird breeding in floodplains. July was windy, moderately warm, and brought phenological events in accordance with perennial average. August was warmer than July, air temperature reaching 30°C in mid month. Extremal weather events were not recorded.

Lemmings and Arctic Foxes were not recorded, reproduction of geese was bad: only solitary broods were recorded. All nests of Red-breasted Geese *Branta ruficollis* in Herring Gull *Larus argentatus* colonies were depredated, as well as some situated near Peregrine Falcons' nests. Five solitary Snowy Owls were only met during air surveys at central and western Taimyr on 2 July at a route of 900 km. Rough-legged Buzzards were not breeding. Wader breeding density was low at watersheds, but somewhat higher in

floodplains. Reproductive success of waders and wildfowl was low.

Y.I.Kokorev

18. Bolshevik Island, southern part, Severnaya Zemlya, Russia (78°22'N, 102°08'E)

Judging by August, summer was dry, relatively warm for polar desert, and what is the most important - almost windless. The first snow fell on 2 September, and permanent snowcover established from 8 September. (Unlike 1997 when snow fell on 10 August and then snowfalls occurred periodically during that month).

Collared Lemmings were not met, unlike 1997 when they were common and often captured by people and dogs. Neither Arctic Foxes, no Snowy Owls were met in both seasons.

N.V.Matveeva

19. Khatanga River mouth, Taimyr Peninsula, Russia (72°51'N, 106°02'E)

In this year snowfree tundra areas reached 50% on 12-13 June, which is a bit later than in early seasons 1995 and 1997, but apparently earlier than in late 1994 and 1996. Fresh snowcover after a single snowfall on 18-19 June melted quickly and did not affect bird distribution and breeding. Generally, weather in early and mid June was favourable for bird reproduction. However, late June and July were meteorologically the most unfavourable in 5 study seasons: windy, rainy, and accordingly, cold. This, probably, determined low density and late breeding of waders, in particular Pectoral Sandpipers *Calidris melanotos*.

Lemmings were recorded in total 10 times for the whole season by 3 observers (mainly during snowmelt), which corresponds to depression of population. Breeding of skuas (including Long-tailed Skua) and birds of prey was not recorded. Arctic Foxes were not breeding, but actively preyed upon bird clutches. Among waders only Dunlin had relatively good nest success (54.5%), in other species chicks hatched in 0% to 7% of clutches, which is the lowest nesting performance in 5 study seasons.

M.Y.Soloviev, V.V.Golovnyuk, T.V.Sviridova,
V.N.Krainov

20. Bikada River, central Taimyr Peninsula, Russia (74°50'N, 106°20'E)

The spring was late, but snowmelt was quick due to small amount of snow. Flood was lower than usual. Air temperature had pronounced fluctuations; abundant rains occurred between 5-6 July and 12-16 August. A period 16-22 August was hot.

A single Siberian Lemming was met during summer. Arctic Foxes were rare, and not breeding. Snowy Owls were met, but did not breed, Rough-legged Buzzard was breeding with low density (5 nests/550 sq.km) and entirely unsuccessful. Nests of 90% of tundra birds were

depredated by Arctic Foxes, including clutches of gulls, ducks and Brent Geese in colonies on the river islands. Ringed Plover nests were flooded. Early nesting passerines were more successful breeders than waders. Unusually numerous on breeding were Steller's Eiders *Polysticta stelleri*, while Red-necked Phalarope, Ruff, Temminck's Stint (recorded previously) were missing.

I.N.Pospelov, M.N.Koroleova

21. Anabar River, lower reaches, Yuryung-Khaya settlement, Yakutia, Russia (72°49'N, 113°15'E)

Ice-break occurred on 19 June near Yuryung-Khaya; the flood was high due to large amount of snow.

Siberian Lemmings were rare, but winter tracks were found. Arctic Foxes were numerous in spring. Few unidentified voles were met in floodplain. Most of the wader nests near settlement were destroyed by local people, gathering eggs for food. Rough-legged Buzzards were breeding at a low density and had small clutches. Among skuas only Long-tailed Skua was found breeding with low numbers. In typical tundra relatively common were Bar-tailed Godwit, and Long-billed Dowitcher *Limnodromus scolopaceus*.

E.E.Syroechkovski, Jr., E.G.Lappo, T.Kuppel,
M.Begerhausen

22. Anabar River, lower reaches, Tostuya settlement, Yakutia, Russia (73°12'N, 113°39'E)

Siberian Lemmings were rarely met, but numerous winter nests and other tracks were found. Also nearly all droppings of Herring Gulls at the colony on Arangastaakh Island in Anabar Bay (about 100 nests) contained lemming remnants, and gull clutches were large. Tracks of Arctic Foxes were recorded almost daily, but wader density was high, and until mid July intensive predation on their nests was not observed. Perhaps, in winter and spring lemming numbers were high enough to support the Arctic Fox population. Rough-legged Buzzards were breeding at a low density and had small clutches. Among skuas only Long-tailed Skua was found breeding with low numbers. Many hundreds of waders (mostly Grey Phalaropes *Phalaropus fulicarius*, Ruffs, Dunlins, Pectoral Sandpipers, less often - Spotted Redshanks, Long-billed Dowitchers) were feeding in the marshy lowlands on 3-5 July. Ruffs were then migrating west, Grey Phalaropes and Pectoral Sandpipers - east. According to somewhat contradictory interview data lemming numbers were relatively high in 1996-97, but a pronounced peak was not recorded.

E.E.Syroechkovski, Jr., E.G.Lappo, T.Kuppel,
M.Begerhausen

23. Anabar River, middle reaches, Saskylakh settlement, Yakutia, Russia (71°58'N, 114°10'E)

Ice-break occurred on 6 June near Saskylakh. The flood was high due to large amount of snow.

Both lemming species in early June were rare near Saskylakh, and met only on watersheds. However, numerous winter nests and other tracks were found. Arctic Foxes were not recorded. Wader density was low in late July, but this is likely to be typical for the area. Predation was low, or moderate. Rough-legged Buzzards were breeding at a low density and had small clutches. Among skuas only Long-tailed Skua was found breeding with low numbers. Territorial pairs of Eurasian Golden Plover *Pluvialis apricaria* and Grey-rumped Tattler *Heteroscelus brevipes* were observed, and nests of Turnstone and Curlew Sandpiper found nearly 100 km from a seaboard.

E.E.Syroechkovski, Jr., E.G.Lappo, T.Kuppel,
M.Begerhausen

24. Uele River, middle and lower reaches, Yakutia, Russia (72°51'N, 116°05'E)

Spring events were delayed 5-8 days compared to average. Flood was lower than usual, ice on deep lakes melted on 18-19 July.

Lemming numbers were very low, unlike the previous year when lemmings were abundant. Wandering Arctic Foxes were common, but a single case of breeding was recorded at the lower reaches of Uele River. Among skuas only Long-tailed Skuas were breeding with a low density. Herring and Glaucous gulls *Larus hyperboreus* made aggregations of 30-120 birds (1 Glaucous per 6-10 Herring gulls) along the river, but few of them bred. Common Gulls *L.canus* were rare wanderers. Four to five pairs of Peregrine Falcons were breeding on 200 km stretch of the river. Snowy Owls did not breed, were rare in middle reaches, and more common farther down. Tundra was heavily trampled by numerous wild, and occasionally domestic reindeers, especially along waterbodies.

Numbers of most wader species, wildfowl, divers, and ptarmigans were low. The most abundant was Pectoral Sandpiper, locally Pacific Golden Plover *Pluvialis fulva*, Ringed Plover, Red Phalarope, Little Stint, and Temminck's Stint. Occasional and rare species: Grey Plover, Red-necked Phalarope, Dunlin, Curlew Sandpiper, and Bar-tailed Godwit. Breeding of Broad-billed Sandpiper *Limicola falcinellus* and Turnstone was recorded. Breeding success can be evaluated as lower than average, or low.

A.I.Artyukhov, A.V.Astapenko

25. Udzha River, middle and lower reaches, Yakutia, Russia (71°25'N, 116°21'E)

The amount of snow exceeded the average level in northern forest tundra and southern tundra, consequently snow-free patches were almost absent by 2 June outside settlements. Ice-break happened on 9-11 June, and tundra became 70-90% snow-free only about 16-18 June, which is 5-8 days later than usual. Flood level was close to the highest in the last 30 years. Larch trees started to green on 21-23 June. Ice on large lakes disappeared on 3-5 July. No snowfalls or temperature

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falls occurred during spring and summer. As summer was relatively dry, rivers became very shallow in late July.

Voles were rare in forest tundra and riverine forests, and not found at all in dry watershed tundra. Rough-legged Buzzards nested at low density in areas where larch was still present, even more rare were Merlins *Falco columbarius*, Northern Goshawks *Accipiter gentilis*, Golden Eagles *Aquila chrysaetos*, Lapland Owls *Strix nebulosa*, and Long-tailed Skuas. Gyrfalcons nested. Among gulls Common Gulls were frequent breeders, Herring Gulls - rare. Outside settlements Ravens, Hooded Crows and Carrion Crows (*Corvus corone*) were rare. Arctic Foxes were absent in southern tundra to the north from Udzha River, but were surprisingly common in forest tundra and riverine forests of Udzha River and Anabar River. At least some of them were breeding. Ermines *Mustela erminea* were recorded, Wolves *Canis lupus* were common, Sable *Martes zibellina* - extremely rare. Breeding density of Jack Snipe was relatively high in Udzha floodplain, as well as local density of Ringed Plover, Spotted Redshank, and Temmink's Stint. Locally Wood Sandpiper, Terek Sandpiper, Ruff, and Common Snipe were common, and less so Pintail Snipe. Red-necked and Red phalaropes were very rare. Whimbrel was only breeding in vicinities of Ebelyakh settlement. Waders were not met in dry upland tundra from late June. Breeding density of all wildfowl, and most passerine species was very low. Arctic Foxes and Wolves often destroyed bird clutches, including nests of gulls on islands. Breeding success was low in most waders, and probably average in only Ringed Plover, Spotted Redshank, Ruff, and Jack Snipe.

A.I.Artyukhov, A.V.Astapenko

26. Sagastyr Island, Lena River delta, Yakutia, Russia (73°25'N, 126°38'E)

In the northern and eastern parts of the Lena River delta snow disappeared in usual dates - in the middle of June, ice-break on river channels occurred on 22 June. Unusually high flood in the second decade of June led to submerging of extensive areas of island terraces and mudding of the upper floodplain parts. Air temperatures in spring did not differ from the perennial average, in summer they were a little bit lower than average. Extremal events were not recorded.

Lemmings practically did not breed in spring (juveniles and undersnow nests not recorded), Siberian Lemming had very low density (single records during snowmelt). Arctic Foxes did not breed. Rodent-specialized avian predators were rare and did not breed. Among waders breeding was proved only for Little Stint, Temmink's Stint, and Red Phalarope; other species were not actively displaying, Curlew and Pectoral Sandpipers were probably not breeding at all. Grey Plovers were rare. Nest success was low - not a single brood was met in the end of July.

D.V.Solovieva

27. Lena River delta, southeastern part, Yakutia, Russia (72°25'N, 126°50'E)

Spring was developing somewhat earlier in southern and southeastern parts of Lena delta. Flat tundra was snowfree by 10 June. Daily average air temperature crossed 0°C on 2 June, ice-break started on 7 June which is average for the site. The flood was very high, as snow amount exceeded the average by a factor of 2-2.5. Flooding of wide lowland areas, especially coastal tundra, delayed breeding (up to 2 weeks) of a fraction of Little Stints, Temmink's Stints, Dunlins, Red Phalaropes, and possibly other species, and also caused bird moving to more elevated, sometimes atypical habitats. June and July were generally colder than usual, the second half of June and 8-18 July strong (>10 m/sec) northern and northeastern winds predominated.

Lemmings were not met, but inhabited burrows abounded locally, which indicates a tendency of these rodents' number increase. Among skuas only Long-tailed Skuas were breeding. Rough-legged Buzzards were absent in plain-type part of the delta, and inhabited only permanent nests on the steep slopes along rivers channels in the southern part of delta, where voles were available. Peregrine Falcons nested, Snowy Owls were absent. Wandering adult Arctic Foxes were permanently met, but inhabited dens not found. According to general impression Grey Plovers, Turnstones, Ringed Plovers, Dunlins, Little Stints, Red-necked Stints *Calidris ruficollis*, Temmink's Stints were breeding at a density close to that in previous year. Pacific Golden Plovers outnumbered Grey Plovers at a factor of 10, while in 1997 they were only 2-3 times more abundant. Pectoral Sandpipers were not breeding, while breeding density of Red Phalaropes was low. Basically, the season was unfavourable for waders, reproductive performance hardly exceeded 1997 value.

V.I.Pozdnyakov

28. Yana River, lower reaches, Kular settlement, Yakutia, Russia (70°38'N, 134°20'E)

In forest tundra Ruddy Voles had high density. Rough-legged Buzzards were breeding, 3 species of skuas recorded. Red-necked Phalaropes, Ringed Plovers, Wood Sandpipers, Temmink's Stints, and Grey-rumped Tattler were recorded.

N.V.Keremyasov, S.N.Turakhov

29. Yana River, lower reaches, Yakutia, Russia (70°57'N, 137°06'E)

The area became 80% snowfree by 3 June. The weather was very sunny and very warm till 6 June, but between 6-16 June rains and snowfalls occurred; the snow, however, melted quickly.

Ruddy (60%) and Root (30%) voles were dominants among rodents, lemmings were very rare. Ruddy Vole increased compared to 2 previous seasons (S.Grignoriev, pers. comm.). Arctic Fox met only once. Rough-legged Buzzards and Snowy Owls were absent, White-tailed

Sea Eagle nested, and preyed upon Ruffs (remnants found). All 3 skua species were regularly met, but breeding not recorded. In the very beginning of June Red-necked Phalaropes, Ruffs, Wood Sandpipers, Temmink's Stints, Pectoral Sandpipers, Long-billed Dowitchers, Common and Pintail Snipes started breeding, when a fraction of Red-necked Phalaropes and Little Stints still migrated. Red-necked Phalaropes, Ruffs, Temmink's Stints, and Long-billed Dowitchers were abundant breeders, while other species - rare. Little Stint was not found nesting.

N.V.Keremyasov, S.N.Turakhov

30. Chondon Bay, coastal tundra, Yakutia, Russia
(71°14'N, 137°33'E)

Lemming numbers were average, Arctic Foxes not recorded, surveyed dens were uninhabited. Rough-legged Buzzards were abundant breeders, solitary Snowy Owls were observed. Skuas were frequently met, but only Long-tailed Skua was breeding. Red and Red-necked phalaropes, Ruffs, Dunlins, Temmink's Stints, Long-billed Dowitchers, Grey Plovers and Pacific Golden Plovers were found on breeding.

N.V.Keremyasov, S.N.Turakhov

31. Omolon River, lower reaches, Yakutia, Russia
(68°37'N, 158°42'E)

Summer was cold, high flood was not recorded.

Waders arrived earlier than to the coastal regions farther north. First records of Spotted Redshanks, Ruffs, and Broad-billed Sandpipers were made on 24 May, of Pacific Golden Plovers, Common Sandpipers, Pintail Snipes, Bar-tailed Godwits, Green Sandpiper - on 25 May, of Terek Sandpipers - on 29 May, of Common Snipes - on 31 May, of Wood Sandpipers, Grey-rumped Tattlers, and Red-necked Phalaropes - on 2 June. Voles and Wood Lemmings *Myopus schisticolor* had high numbers, but wader reproduction was hardly successful, judging by very low numbers of these birds in August.

S.I.Mochalov

32. Bolshaya Chukochiya River mouth, Yakutia, Russia
(70°05'N, 159°57'E)

The spring was cold and late. Tundra became almost snowfree only by 10 June, although snowfalls occurred even in the end of June. Ice-break on the river took place on 26 June, on lakes - in mid July. Summer was also cold, with frequent snowfalls in August.

Lemmings (mostly Collared Lemming) exhibited density peak, and could be recorded more than 100 times a day. Arctic Foxes were numerous, often met, and bred; in autumn juvenile animals could be often recorded. In the area within 4 km from the hut 7 pairs of Snowy Owls, 4 pairs of Rough-legged Buzzards, and a pair of Short-eared Owls nested. High density of Snowy Owls was first recorded after 1986. Tens of Pomarine Skuas and hundreds of Herring Gulls were feeding primarily on lemmings, Pomarine Skuas, however,

started to pair only at the end of June. Spring arrival of waders was prolonged; first records of Temmink's Stints were made on 30 May, of Bar-tailed Godwits, both phalaropes and Sanderling *Calidris alba* - on 3 June, of Ruffs, Pectoral and Curlew Sandpipers, and Dunlins - on 4 June, of Grey Plovers, Common Snipes, and Long-billed Dowitchers - on 6 June, of Spotted Redshanks - on 9 June, of Little Stints - on 15 June. All species, except for phalaropes and Temmink's Stints had low numbers. Breeding waders were, probably, not apparently affected by predators due to high lemming numbers, however, juvenile birds were rarely met in August, because of the likely influence of unfavourable weather.

S.I.Mochalov

33. Wrangel Island, western coast, Cape Ptichy Bazar, Russia (71°09'N, 178°47'E)

Weather was favourable for wader breeding. Coastal tundra 2-2.5 km wide became snowfree in late May. Minimal air temperature crossed 0°C on 11 June. Mean minimal and maximal temperatures in June were +0.4°C and +6.8°C, respectively, in July - +1.3°C and +9.4°C, in August - -1.1°C and +3.8°C. The last weak snow fell happened on 13 June, the first one - on 2 August. During fledging of Thick-billed Murre *Uria lomvia* young the seashore was blocked with ice (almost 100%) which caused mass death of fledglings.

Lemmings (mainly Collared Lemmings) had average density: single records were made daily. Arctic Foxes were scarce, their breeding was not proved. Long-tailed and Arctic Skuas were breeding in small numbers. Snowy Owls successfully bred, and were common in inland areas. All typical for the island wader species were breeding: Grey Plover, Turnstone, Knot *Calidris canutus*, Baird's *C.bairdii* and Pectoral sandpipers, and, probably, Ringed Plover. Chicks hatched in all the controlled nests (which were few). Well flying Knot and Baird's Sandpiper young were seen in the end of July.

N.B.Konyukhov

34. Wrangel Island, Neizvestnaya River, upper reaches, Russia (71°17'N, 179°39'W)

In the centre of Wrangel Island the spring was late: flood on Neizvestnaya river started on 6 June, intensive snowmelt started on 7 June, and tundra became basically snowfree on 18 June. Negative temperature at nights retained till 12 June. On 21-22 June a storm of wet snow occurred at a temperature of -3-4°C. The warm weather established from the second 10-day period of July and endured till early August. August was wet and cool, with frequent precipitation and night frosts in the second half of the month.

Birds arrived in spring in usual dates. Lemmings had low density in central, western, and northern parts of the island, but could reach average numbers locally. Such local patches were used for breeding by Pomarine Skuas, but they failed due to shortage of food. An average number of lemming undersnow nests was 8.7

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per 1 km of transect, their distribution was very patchy. On average 0.5 lemming body was censused in Snowy Owl nests. The ratio of Collared to Siberian lemmings in surveys was 1:0.6, while in owl nests - 5:1. Snowy Owls were breeding everywhere, except for the northern plain. Their density on the 46 sq.km study plot was 0.26 nest/sq.km. The plot was also populated with 5 breeding and one non-breeding pair of Arctic Foxes, 2 pairs of Pomarine and 13 of Long-tailed skuas. The latter density is, however, higher than in other areas. Shortage of food restricted breeding performance of rodent-specialised predators: 0-3 chicks per owl nest, 2-5 cubs per fox den. Young fledged only in 3 broods of Long-tailed Skuas, other suffered from cool weather, lack of food, predation. All predators actively fed on tundra birds. Remnants of Common Eider (adults, chicks and eggs), Turnstone (adult and chicks), Snow Bunting *Plectrophenax nivalis* (adult and fledglings), chicks of Long-tailed Skua and Snow Goose *Anser caerulescens* were found in Snowy Owl nests. Dunlin chicks were taken by a Glaucous Gull. Wader reproduction can be considered unsuccessful, due to bad weather in the beginning of the season and predation. Wader broods or alarming birds were very rarely recorded from late July in floodplains of rivers and creeks (about 500 km of transects). Lemming number will supposedly increase to average in 1999.

I.Menyushina

35. Ioni Lake area, Chukchi Peninsula, Russia (65°48'N, 173°22'W)

Spring was late and cold in the inner parts of the Chukchi Peninsula, which caused a delay in plant vegetation phenology of nearly 3 weeks compared to 1997. Vast snow-patches retained in some depressions till mid August, which is very unusual according to reports of local people. July (from 7th onwards) was warmer and drier than average (mean temperature was +11.7°C, precipitation amount 3 mm). First half of August, to the contrary, was cold, windy, and rainy (+5.6°C and 55 mm, respectively).

Very few records of lemmings were made. Density of voles can be evaluated as average. Arctic Ground Squirrels *Citellus parryi* were numerous in hot spring valley, but rare in open tundra. Arctic Foxes were seen twice, Red Foxes were more common. A Brown Bear *Ursus arctos* was observed. Local people reported increase of number of bears and Wolves, while domesticated reindeers *Rangifer tarandus* showed decrease in the recent years. Snowy Owls and Pomarine Skuas were absent; a pair of Long-tailed Skuas was seen only once. Two local pairs of Rough-legged Buzzards were not breeding. A pair of Merlins nested in the rocky area. Waders were not found in the hot spring valley where tall sedge and bushes predominated; gravel flats along Gilminlinei River were populated with Ringed Plovers only (1 pair/1.5 km). Tussocky tundra of mountain foothills near the Ioni Lake had very low density of waders: 1 Grey Plover and 1 Pectoral Sandpiper were observed on 90 km of transects. Low

bird breeding success in June and young mortality due to cold spells and rains in August were possible.

D.V.Karelin, D.G.Zamolodchikov

36. Lavrentia Bay, coastal area to the north, Chukchi Peninsula, Russia (65°43'N, 171°06'W)

Local people evidenced that the spring was extremely late, ice disappearance from the bay was as late, as before in late 70s only. In the first 10-day period of July there still was a lot of ice in the sea and snow on tundra. Snowmelt happened between 11 and 25 July. In August wind and current often brought ice, but vast ice-fields appeared only by the end of the month. The weather in August was extremely rainy and stormy. In the last decade of August night frosts have started, and hill tops were covered by non-melting snow.

Lemmings, Arctic Foxes, and Snowy Owls were not recorded, although the latter had not been rare in previous seasons. Wader broods were not found, only few broods of Common Eider were seen.

A.B.Savinetski

37. Turquoise Lake, Alaska, USA (60°48'N, 153°59'W)

Storm winds occurred periodically during May. Long-lasting heavy rains were going in early July.

Stormy winds in May caused a delay of Surfbird *Aphriza virgata* reproduction, and led to decrease in numbers of certain species (Semipalmated Plover *Charadrius semipalmatus*, Least Sandpiper *Calidris minutilla*, and Baird's Sandpiper). Long-lasting strong rains in early July caused death of almost all of Surfbirds' chicks, but American Golden Plovers *Pluvialis dominica* continued to alarm near broods.

P.S.Tomkovich, M.N.Dementiev

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

Given the natural variability of weather in this area, no exceptional events in 1998. No snowfalls occurred from early June onwards.

With regard to weather, no special remark (average breeding dates). Patterns of breeding success were typical of a so called "lemming year": breeding of Snowy Owls and skuas. Breeding success "mediated" by abundance of lemmings in prey birds, but also species like King Eiders *Somateria spectabilis*. Delay in response of Stoats.

B.Sittler

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

Rainy in July - August.

A good breeding season, also for Long-tailed Skuas. Very many lemmings, but only one breeding den of Arctic Fox.

H.Meltofte

Additional information on conditions at Zackenberg is cited below from Rasch (1999):

The first part of the 1998 field season was generally colder and more dry than the same period in 1997. July and August were however warmer and much more wet than in 1997. The total precipitation in the period June and August exceeded 100 mm w.e. Heavy rain in mid August caused extremely high water discharge in Zackenbergelven.

The snow cover in early spring was more extensive than in 1997, and the amounts of snow accumulated in river beds and on lakes and ponds etc. were significantly larger. Hence, the start of running water in the rivers and formation of open water in lakes and ponds and on the fjord was somewhat delayed, although the average disappearance of snow and ice was rather similar to the previous years. The effect of this on the biological processes was that flowering on average occurred a little later than in 1997, and that a few species of birds bred a little later than in previous years. Total amounts of flowering was extremely low in several species, and a number of arthropod genera had a poor season, but the breeding birds generally performed well, and the lemming population peaked. Muskoxen occurred in somewhat reduced numbers, and the percentage of new born calves was the lowest recorded since 1995.

Reference:

Rasch, M.(ed.) 1999: Zackenberg Ecological Research Operations, 4th Annual Report, 1998. Danish Polar Center, Ministry of Research and Information Technology, Copenhagen.

Information provided by respondents was edited and translated in English (if necessary) by project coordinators. If not otherwise stated this information should be referred as personal communication.

BIRD BREEDING CONDITIONS IN THE RUSSIAN TUNDRA IN 1998.

Data points in 1998 summer season had more uniform geographic distribution than in some of the previous seasons. However, information was completely absent from Kanin Peninsula, Bolshezemel'skaya tundra, Gydan Peninsula, area north from Byrranga Mountains at Taimyr, rivers Olenyok and Indigirka, largest part of Chukotski Peninsula, and from most Arctic islands and archipelagos.

A late spring and cold conditions prevailed once again over most of the tundra regions of Russia. However,

several reports, mainly from north-central Siberia (Malozemel'skaya tundra, southeastern Taimyr, Yana and Indigirka river deltas) indicated average or early dates for phenological events. Extensive spring flooding, which was recorded on the southern Yamal and western Taimyr rivers as well as Anabar and Lena rivers, undoubtedly influenced distribution, numbers and time of bird breeding on these floodplains.

Cool and dry summer weather followed, except sites in Malozemel'skaya tundra, on Yamal, Taimyr, Anabar River and Wrangel Island where the summer was warm. Abundant rains around Taimyr lake caused water rise in rivers and death of clutches of Ringed Plover, along with probably other waders.

Peak lemming numbers were recorded in two sites: on Yugorsky Peninsula, NE European Russia, Siberian Lemming, and close to the Kolyma Delta, Yakutia, Collared Lemming. Moderate lemming numbers were found at the coastal Yana Delta. A small increase in numbers took place near the Pechora Delta, and possibly in the southern part of the Lena Delta and certainly on Wrangel Island. In all other monitored sites lemmings were either rare or not seen at all, but voles were numerous in seven southern sites.

Arctic Foxes and Snowy Owls actively bred only near the Kolyma Delta and on Wrangel Island. All over the rest of the Russian tundra area Arctic Foxes were found breeding only occasionally. High winter mortality of Arctic Foxes was recorded on Taimyr, and unexpected breeding observed in the forest tundra of the Anabar river basin. Pomarine Skua nested only on Yugorsky, on Wrangel and possibly near the Kolyma, the latter locality also used for nesting by Short-eared Owl. Rough-legged Buzzards were breeding in mass only at Yugorsky Peninsula, coastal strip of the Yana river delta and were common at Yamal, but had low reproductive success there. In other areas buzzards were rare or absent.

Almost unanimously, correspondents considered wader breeding results as being good in areas west from the Yenisey. Further east breeding output was scored mostly as "low"; however, some data indicate rather good breeding at the Anabar, coastal Yana Delta, near the Kolyma Delta and on the western part of Wrangel. The situation on the mainland eastward from the Kolyma is not clear, but it has always been patchy.

Some increase in lemming numbers can be expected on the Kola, Yamal and Taimyr Peninsulas and the Lena Delta, with peak numbers on Wrangel and possibly on NW Taimyr in 1999. Locally high numbers can be reached in certain places at the European north of Russia. Lemming numbers depression can be expected on Yugorsky Peninsula, Anabar river, and the Kolyma river delta. As a result, quite high wader breeding output can be predicted for West and Central Siberia as well as for Wrangel. High predation rates will possibly result in few young being raised by birds in eastern Yakutia. Possible migration of Arctic Foxes to 'lemming' regions from some of the 'no-lemming' regions (e.g., Yugorsky

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Peninsula) may allow for gradual decrease of bird breeding performance in the latter. Consequently high (but not maximal) numbers of young Arctic waders can be expected in the end of season at the East Atlantic and Central Asian flyways, and moderate numbers at East Asian - Australasian and West American flyways.

Pavel Tomkovich

translated from: INFORMATION MATERIALS OF THE WORKING GROUP ON WADERS, No.12, 1999, p.36-37. Moscow. (in Russian).

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Surfbird breeding biology study

DISCUSSION AREA

EVALUATION OF LEMMING NUMBERS FOR THE PURPOSE OF ORNITHOLOGICAL RESEARCH - CALL FOR DISCUSSION.

Following debates at the Willem Barents Memorial Arctic Conservation Symposium in Moscow in March 1998, two articles have been published in the INFORMATION MATERIALS of the Russian Working Group on Waders (No.12, 1999), dedicated to different techniques of small rodents' numbers evaluation for the purposes of ornithological research in tundra. It was generally recognised that such a technique at one hand should be simple, quick, does not require specific instruments, but at another hand should provide indices of rodent numbers comparable among different seasons in one site (a must) and among different Arctic localities (preferably).

In the first of the articles Irina Menyushina¹ suggested counting of winter nests of lemmings in summer on tundra surface as an universal approach to rodent numbers evaluation in cause of ornithological studies. This method is based on the fact that the summer abundance of lemmings to a large extent is a function of their spring undersnow breeding. The following regulations need to be fulfilled for successful application of this technique:

- counting is carried out after complete disappearance of snow;
- nests are counted on transects 10 m wide, their length in different habitats should be proportional to ratio of areas occupied by respective habitats in a region;
- the nests of spherical shape, 15-30 sm. large and with open entrance are considered; smaller nests belong to non-breeding animals are counted separately.

Application of this method at Wrangel Island revealed significant correlation of number of counted nests with the number of lemming corpses in Snowy Owl nests, density of fresh burrows, average brood size

in Snowy Owls, and number of successfully fledged Snowy Owl nests. In the central part of Wrangel Island mean number of winter nests per 1 km was 5-6.4 at low density, 9.3 - at average, 20.2 - at the peak, and 15.4 - in the year of decreasing after peak numbers.

Yakov Kokorev² advocated another approach for small rodent numbers estimation in tundra - the use of traditional snap traps as relatively reliable and the least labour-consuming. From 25 to 100 traps should be put in line at a distance 5 m on lemming routes, and then checked twice a day. No lemmings during 5 days per 100 traps correspond to very low number, up to 3 specimens per 100 trap-days - to low number, 4-10 lemmings per 100 trap-days - to average number, 11-30 animals per 100 trap-days - to high, an up to 80 animals per 100 trap-days - to a very high number. Alternatively, lemming numbers can be evaluated visually based on a frequency of records on a 5 km long transect. Lemmings have low number if not recorded on a transect, average - when single records are made, and high - if not less than 10 animals are recorded.

We did not aim to provide here a comprehensive review of *pros* and *contras* of each technique, but would rather like to highlight some of their limitations which have become the most apparent from standpoint of our own ornithological experience in the Arctic.

Counting of winter nests does not seem to work efficiently in the low Arctic, where these nests are often attracted to depressions filled with snow water, and having relatively well developed concealing vegetation.

Using snap traps violates an 'assumption of no specific instruments', and also is subject to bias due to a very small area which can be surveyed with 100 traps, while larger catching effort becomes hardly compatible with intensive bird studies.

Both methods can tell little about intraseasonal dynamics of lemming numbers, which is often of critical importance for bird breeding performance (hardly any ornithologist can allow himself to catch lemmings with snap traps during his whole stay in the field).

In this respect, we are tempted to attract additional attention to a simple counting of all animals met by an observer on excursions during her/his stay in tundra that has the following important advantages:

- it is the least labour intensive approach, unless lemming numbers are so high that registering them requires a lot of time;
- it allows to control for changes in rodent availability (although not numbers) during the whole period of expedition;
- the data are collected exactly for an area in which ornithological studies are carried out.

This method is subjective and makes clear emphasis on availability rather than number, but this may even be a benefit given the manifested bias towards ornithological demands, in which scope rodents are primarily regarded as prey that should not only be

abundant, but what is more important - available (in some of Arctic bird studies rodents were considered as competitors of geese for food, or predators rather than prey, but these are clear exceptions). Of course, approximation of lemming availability even to avian predators by what is seen by a human is very conditional, but perhaps no more biased than approximation of availability (not number!) by number of winter nests or specimens captured in snap traps.

We hope that above restricted review can stimulate further constructive thinking on the topic, and encourage Arctic researchers to share their experience of evaluation of rodent numbers for the purposes of ornithological research. Such exchange of opinions and ideas may end up if not with working out of a 'best' universal technique, but at least with better understanding of how results of these different methods compare to each other. Provided opinions and suggestions will immediately be placed in a discussion area of the project WEB site (<http://soil.msu.ru/~soloviev/arctic/>), while extensive review, discussion and (possibly) recommendations will appear in the next issue of the Newsletter.

Mikhail Soloviev and Pavel Tomkovich

References:

1. Menyushina I.E. 1999. Recommendations on techniques of lemming abundance estimation during ornithological studies. INFORMATION MATERIALS OF THE WORKING GROUP ON WADERS, No. 12: 39-41. (in Russian).
2. Kokorev Ya.I. 1999. Estimation of small rodent numbers in tundra in the summer. INFORMATION MATERIALS OF THE WORKING GROUP ON WADERS, No. 12: 41-44. (in Russian).

MAP COLLECTION

A set of 4 maps below is provided to highlight various aspects of bird breeding conditions in the Arctic in 1998. Figures 2 and 3 illustrate bird breeding success and rodent abundance basically as these were reported by respondents. In rare cases when respondents did not explicitly qualified breeding success or rodent abundance, but these were rather obvious from the other information supplied, the site was assigned to a respective category based on the judgement of compilers.

Each of the figures 4 and 5 represent overlay of the map layers reflecting two different kinds of information. The first one is the deviation of mean June/July temperature in 1998 from mean June/July temperature averaged for the period 1994-1998. This deviation indicates whether respective month in 1998 was warmer (positive value) or colder (negative value) than average. Colour of the points at study sites reflects subjective evaluation by respondents of the spring as being early, average, or late (fig. 4), and the summer as warm, average or cold (fig. 5). Please note, that also referring to roughly same period during the summer, the two kind 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>). Grid map was constructed using inverse distance interpolation in MapInfo Professional version 5.5 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 overlay of Arctic boundaries, as defined by CAFF and AMAP, plus additional 100-km buffer around.

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

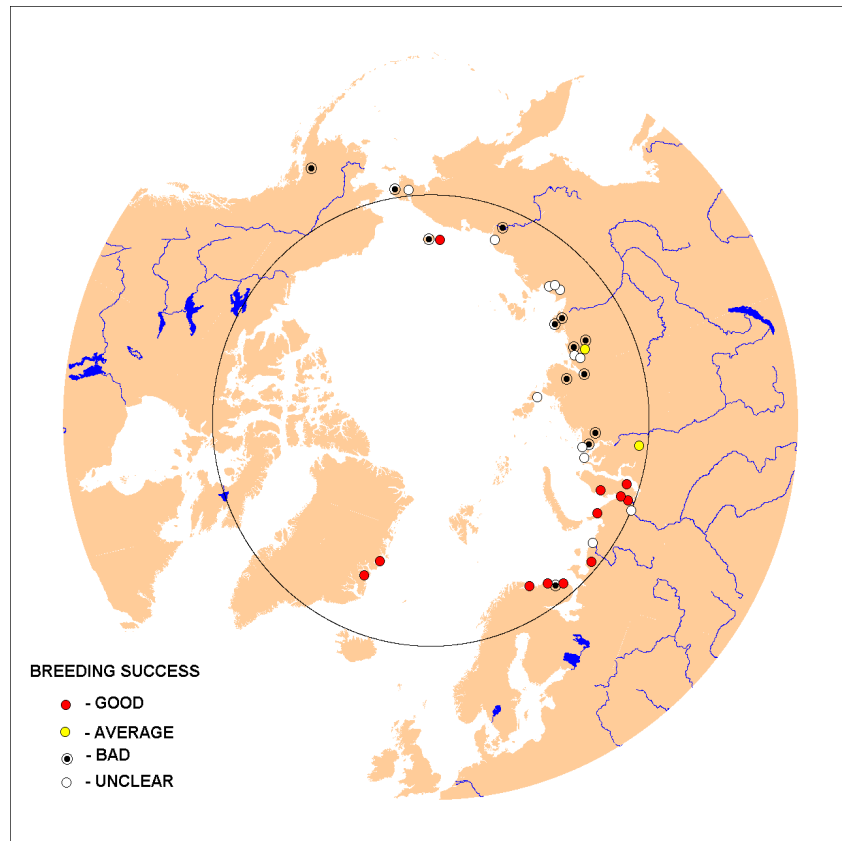


Figure 2. Bird breeding success in the Arctic in 1998

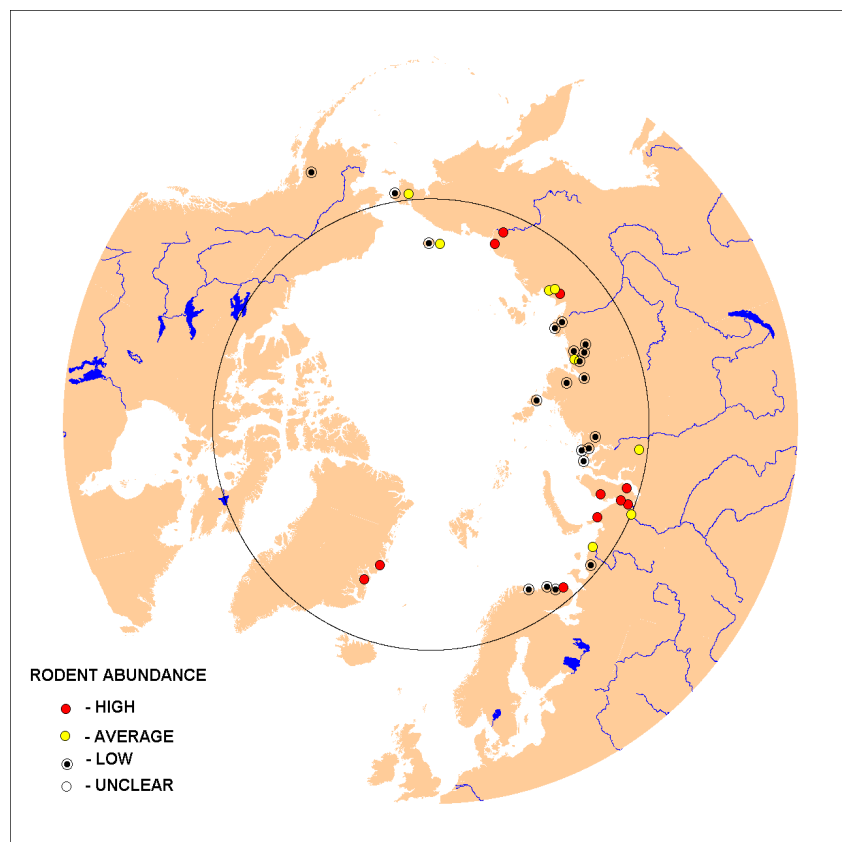


Figure 3. Rodent abundance in the Arctic in 1998

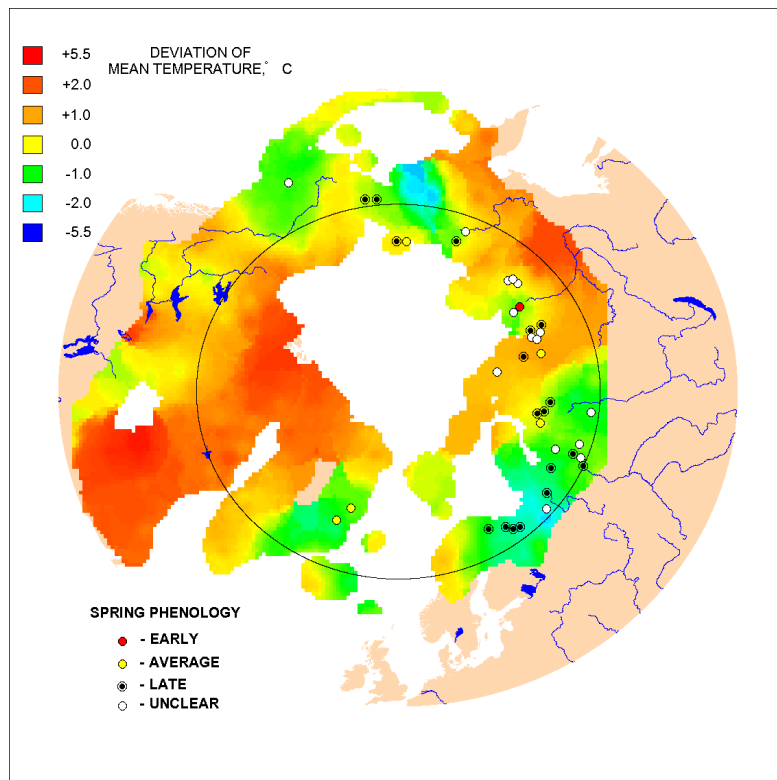


Figure 4. Temperature and phenological characteristics of early summer in the Arctic in 1998. See text above for extended legend.

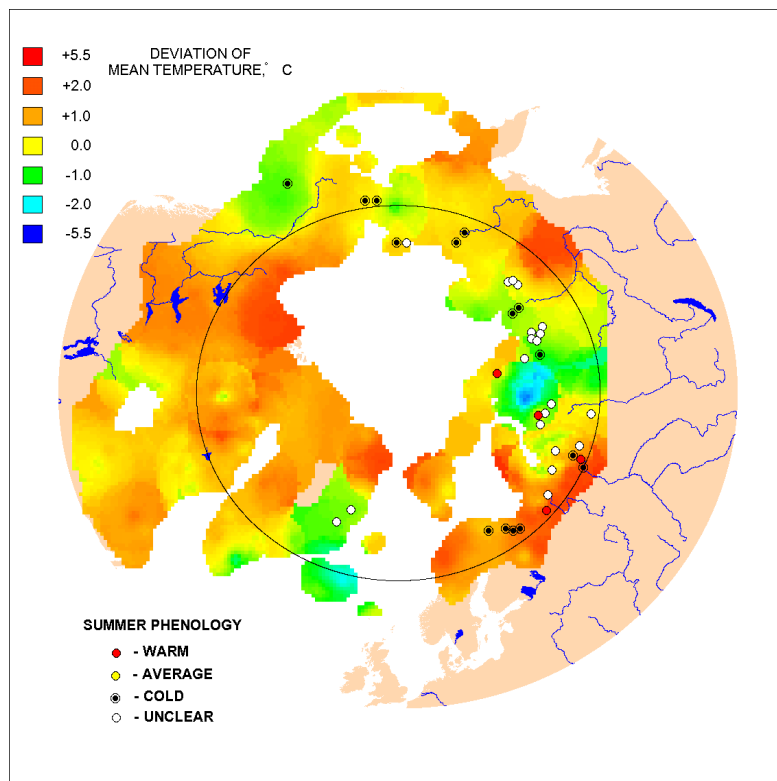


Figure 5. Temperature and phenological characteristics of mid summer in the Arctic in 1998. See text above for extended legend.