Long-term changes in wader populations at the Lapland Nature Reserve and its surroundings: 1887 - 1991

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Long-term changes in the status of breeding waders at the Lapland Nature Reserve on the Kola Peninsula (67°60'N, 31°55'E) have been demonstrated by the comparison of published studies in 1887, 1948 and 1991. The number of wader species recorded in the Lapland Nature Reserve has increased during the last 50 years mostly due to the occurence of northern and southern vagrant species. Anthropogenic changes in the environment have resulted in the appearance of Lapwing *Vanellus vanellus* - a southern species. Other vagrant species can also breed irregularly. Golden Plover *Pluvialis apricaria*, Common Snipe *Gallinago gallinago* and Red-necked Phalarope *Phalaropus lobatus* which were rare 50 years ago have increased in numbers and become common. A steady decline in numbers has been observed in Greenshank *Tringa nebularia*, Whimbrel *Numenius phaeopus*, and Bar-tailed Godwit *Limosa lapponica*. This is possibly connected with negative environmental changes on their migration routes and/or wintering grounds. Fluctuations in numbers of some wader species can be related at least partly, with small rodent population cycles.

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Долгосрочные изменения в статусе гнездящихся куликов в Лапландском заповеднике на Кольском полуострове (67°60′ с.ш., 31°55′ в.д.) были продемонстрированы методом сравнения работ, опубликованных в 1887, 1948 и 1991 гг. Число видов куликов, зарегистрированных в Лапландском заповеднике, возросло за последние 50 лет в первую очередь за счет залетов северных и южных видов. Антропогенные изменения в окружающей среде повели к появлению южного вида - чибиса *Vanellus vanellus*. Могут нерегуляно гнездиться и другие залетные виды. Золотистая ржанка *Pluvialis apricaria*, обыкновенный бекас *Gallinago gallinago* и круглоносый плавунчик *Phalaropus lobatus*, бывшие редкими 50 лет назад, возросли в числе и стали обыкновенными. С другой стороны, был отмечен постоянный спад численности большого улита *Tringa nebularia*, среднего кроншнепа *Numenius phaeopus* и малого веретенника *Limosa lapponica*, что, возможно, связано с негативными изменениями в окружающей среде на их путях пролета и/или в местах зимовок. Колебания численности некоторых видов куликов могут быть связаны, по крайней мере частично, с популяционными циклами мелких грызунов.

Introduction

The Lapland Nature Reserve is situated in the western part of the mountain area of the Kola peninsula and occupies an area of 2,784 km^2. Mountain tundra covers 28% of the reserve area, forests - 60%, peat-bogs - 8 % and water bodies - 4% (Figure 1). During the ornithological inventory in the reserve (Semyonov-Tien-Shansky & Gilyazov 1991) noticeable changes in species list, distribution, status, and numbers of waders inhabiting the reserve and its surroundings were recorded in comparison with the situation both 50 years ago (Vladimirskaya 1948) and 110 years ago (Pleske 1887). These historical data were analysed to determine the reasons for the observed changes in status. We were mindful of the fact that these reasons could be either objective or subjective. Thus, Pleske (1887) based his own observations made during the summer of 1880 on the described route "western coast of the White Sea - Kandalaksha - the Imandra lake (eastern shore) - Kola", and also on the numerous published data for the whole of Lapland from the Gulf of Bothnia and the Thorneo river in the south and west, up to the Arctic ocean coast and the White Sea in the north and east. Vladimirskaya

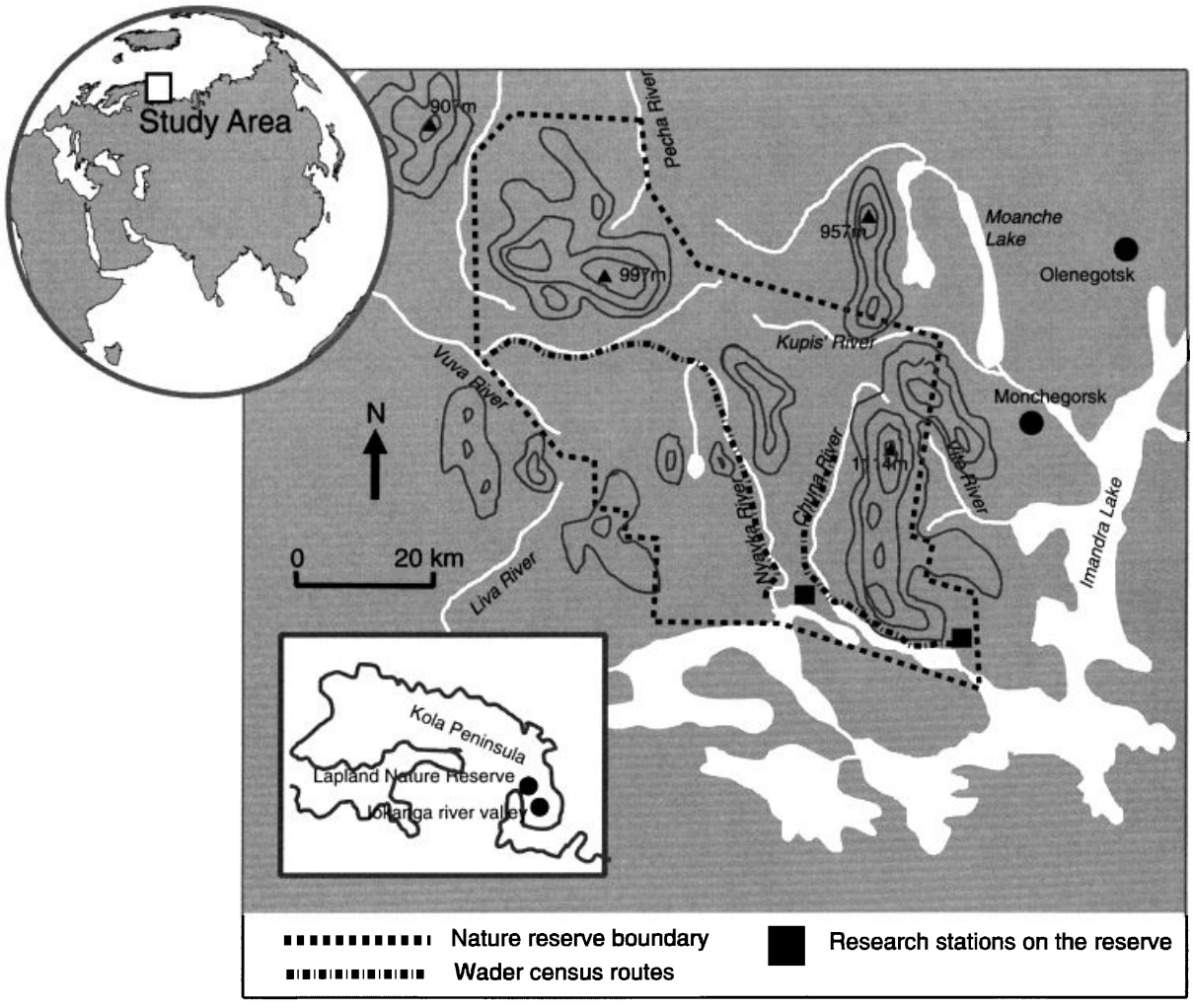

Figure 1. Schematic map of the study area.

(1948) used data collected between 1930-1939 only in the reserve and on adjacent areas in the central part of the Kola peninsula. No data on the birds of lowland tundras and the marine coasts of the peninsula were given in the latter publication, nor ours of 1991. Therefore, the species list given by Pleske (1887) is longer due to its coverage of a larger geographical area with a greater habitat diversity.

Our observations in the Lapland Nature Reserve and its surroundings (not more than 20 km from the reserve boundaries) were undertaken between 1976-1992. Studies were carried out from May to September in four areas located in different parts of the reserve: at the Vite river, the Chuna river and the Konya river valleys and at the Chuna lake. As wader numbers were rather low, mostly transect census methods were used. Constant transects were up to 20 km long in the mountain tundras, 130 km - in the river valleys. Waders were counted on 200 m band transects. Additional single route censuses were made to estimate more precisely the distribution and numbers of rare and sporadically occurring waders. Materials from *Nature Chronicle* and a card-index database maintained on the reserve since the 1930s were also analysed, together with data used for the latest monograph (Semyonov-Tien-Shansky & Gilyazov 1991), the wader section of which was written by the late O.I. Semyonov-Tien-Shansky. Studies on bird populations in the lowland tundras were conducted in June 1990 in the eastern part of the Kola peninsula (200 km to the east from the reserve); these data were used for comparison with bird populations at the reserve. The list of waders and their status from publications in 1887, 1948 and 1991 is given in Table 1. Below we discuss only those species for which there were changes in status, numbers and distribution.

Species Account

Golden Plover *Pluvialis apricaria*

Only twice in the 1930s have Golden Plover been recorded in the nature reserve: on 28 June 1936 and 27 August 1937 at the El-Nyun Mount; at that time it was not breeeding there (Vladimirskaya 1948). Since the 1960s it became a rather common breeding species at the mountain tundra habitats, elfin birch woodlands on mountain slopes, and on the vast tussocky peat-bogs with a prevalence of Cloudberries *Rubus chamaemorus* and Crowberries *Empetrum nigrum* among sparse stunted pine forests. Comparative data on the species relative abundance based on all observations since the 1930s are shown in Tables 2 and 3.

Table 1. Long-term changes in wader population at the Lapland Nature Reserve and its surroundings, with dates of the first records of new species (V - vagrant, NB - non-breeding, B - breeding).

Species	Status in the [illegible]	Status in the [illegible]	Date of [illegible]
Pluvialis squatarola	V	V	
Pluvialis apricarius	NB	B	
Charadrius hiaticula	B	B	
Charadrius vociferus#	-	V	4 August 1970
Charadrius morinellus	B	B	
Vanellus vanellus	-	B	1 August 1959
Haematopus ostralegus	-	V	31 May 1969
Tringa glareola	B	B	
Tringa ochropus	-	B	6 May 1977
Tringa nebularia	B	B	
Tringa totanus	-	B?	6 June 1979
Tringa erythropus	B	B	
Actitis hypoleucos	B	B	
Xenus cinereus	-	V	22 July 1962
Phalaropus lobatus	V	B	
Arenaria interpres	-	B?	July 1977 #
Philomachus pugnax	B	B	
Calidris temminckii	B	V	
Calidris minuta	-	V	7 August 1960
Calidris maritima	-	V	27 September 1958
Calidris ferruginea	V	V	
Calidris alpina	-	B	27 May 1965
Limicola falcinellus	-	B	18 July 1964
Lymnocryptes minimus	B	B	
Gallinago gallinago	NB	B	
Scolopax rusticola	V	V	
Numenius phaeopus	B	B	
Numenius arquata	-	V	18 May 1975
Limosa lapponica	B	V	

- record is doubtful and not proven

Analysis of 1981-1992 census data revealed rather regular numerical fluctuations from 0.7 ind./km² up to 5.0 ind./km², which repeated in every 4-5 years and coincided with population cycles of small rodents. This was obviously a secondary connection, as a consequence of predation on Golden Plovers clutches. Density of Golden Plovers in the upper reaches of the Iokanga river was on average 3.2 ind./km² in June 1990. In general no changes have been found in numbers and distribution since 1976: for example, up to five pairs were regularly breeding since 1976 on the El-Nyun Mount of the reserve.

Lapwing *Vanellus vanellus*

For the first time four Lapwings were recorded in the nature reserve on 1 August 1959 at the Okht-Ozero lake, since then birds have been recorded regularly - mostly in April-May. Lapwings have been found also in other places in the Kola peninsula: at the Aynovy Isles (Tatarinkova & Chemyakin 1965), at the Kitsa river in 1978 (A.B. Bragin pers. comm.), and on 13 July 1990 near the Lovozero setlement. Breeding has been observed on the fields around Apatity and Monchegorsk towns and at the Kitsa river.

Green Sandpiper *Tringa ochropus*

The first record of this species was on 6 May 1977 at the Severnyy creek, and the same year we managed to find two unfledged chicks (with an adult) among sedges surrounding a small lake in the Chuna river valley. Later Green Sandpipers were regularly observed in various parts of the nature reserve (in the valleys of the Chuna, Konya, and Ulynch-Yavr rivers), and several times broods were also found. The species prefers the taiga parts of river valleys. No birds were found during our studies at the Iokanga river valley.

Redshank *Tringa totanus*

Redshanks were recorded for the first time on 6 June 1979 at the Okht-Ozero lake, later also in the same area at the Ulynch-Yavr and Nyavka lakes and the Chuna river. When we visited these areas in following years they were usually observed there again. We supposed these birds were breeding on the basis of their behaviour. A nest, on which a female was incubating three eggs, was found on 16 June 1990 in the Iokanga river valley.

Table 2. Long-term changes in numbers of Golden Plover.

Years	1930s	1940s	1950s	1960s	1970s	1980s	1990-1992
Total number of birds recorded	2	0	0	164	276	206	79
Number of birds per year per observer	0.2	0.0	0.0	9.8	7.5	6.2	7.2

Greenshank *Tringa nebularia*

This species was "among the commonest waders" in the 1930s (Vladimirskaya 1948, p. 205). Only one or two pairs per 10 km were recorded at the Chuna river and less than 1 pair/10 km² at the Vuva river in 1976-1990 - *i.e.* recently it cannot be called abundant. Numbers of Greenshanks were on average 5 birds/year/per observer in 1959-1967, increasing to 10.5 birds/year/per observer between 1968-1975 and, since 1976 declining to 5 ind./year/observer (Table 3). This twofold decline between 1976-1992 is observed also from transect census data. Simultaneously slight numerical fluctuations in each 4-5 year period were noticed, which were probably connected with small mammal changes. Similar parallel fluctuations (with peaks in 1958, 1964, 1969, 1974, 1978, 1982, 1988, 1991) were observed also for Spotted Redshank *Tringa erythropus*, Common Sandpiper *Actitis hypoleucos*, and Common Snipe *Gallinago gallinago* (Table 3). During the studies in the Iokanga river valley no Greenshanks were found.

Common Snipe *Gallinago gallinago*

At the end of 19th century the species was rather rare and did not breed (Pleske 1887, p. 432). In the 1930s it was already common in the nature reserve, but breeding was not confirmed (Vladimirskaya 1948, p. 206). Currently the Common Snipe is one of the commonest waders, its nests and broods are regularly recorded. The species is widespread and occurs also in the lowland tundras of Iokanga river, where numbers do not exceed 0.5-1 pair/km².

Whimbrel *Numenius phaeopus*

Whimbrel was common in the 1930s, however, since that time the index of records has fallen by a factor of 2-4. Its density in the reserve was on average 2.5 pairs/100 km² in 1970-1980s, at the Iokanga river valley about 20 pairs/100 km² in June 1990. Irregular fluctuations by a factor of up to four are observed and are connected with weather conditions: in late and cold springs migrating Whimbrels obviously remain in more southerly areas, whilst in early and warm springs they move futher north.

Bar-tailed Godwit *Limosa lapponica*

Pleske (1887) observed Bar-tailed Godwits in 1880 near Zasheyek, at the Kolozero lake, and in the lower Tuloma river and mentioned that they were found in nine more places in Lapland. According to the data collected in 1932-1938, Bar-tailed Godwits bred in small numbers (Vladimirskaya 1948, p. 203-204). Later, even if we take into account observations made by young naturalists in July 1969 (Semyonov-Tien-Shansky & Gilyazov 1991), it is clear that the species has almost disappeared from the reserve during the last 50 years. At the same time, it is one of the commonest waders at the Iokanga river valley as its numbers in June 1990 were about 2.5 pairs/km².

Discussion

Twelve more species have been added to the list of waders of the reserve and its surroundings during the last 50 years. Seven of them migrate across the reserve to the coasts and tundras: Turnstone *Arenaria interpres*, Broad-billed Sandpiper *Limicola falcinellus*, Dunlin *Calidris alpina*, Little Stint *C. minuta*, Purple Sandpiper *C. ferruginea*, Redshank *Tringa totanus* and Oystercatcher *Haematopus ostralegus*. Five species are either vagrants or have spread to Lapland either from the south or south-west: Lapwing, Green Sandpiper, Terek Sandpiper *Xenus cinereus*, Curlew *Numenius arquata*, and Killdeer Plover *Charadrius vociferus*. Dunlin and Broad-billed Sandpiper breed irregularly, Redshank and Turnstone presumably breed also. Among southern species Lapwing and Green Sandpiper are now breeding regularly, Lapwings prefer to breed in anthropogenic landscapes (arable lands and pastures). There is no doubt, that the increase in the numbers of waders, with 12 new species, has been a real change and not the result of greater intensity of recording. Some doubts exist only as to the status of Green Sandpiper: since the first record the species has been seen commonly and found regularly. As it could be confused sometimes with Wood Sandpiper *Tringa glareola* and as its numbers at that time were rather low, it probably hadnt been recorded earlier for rather a long period.

Another group is formed by the widespread common breeding species, which were considered earlier to be non-breeders: Golden Plover, Common Snipe and Red-necked Phalarope. The latter species is not very common and its numbers fluctuate sharply as the major part of its breeding range is either to the north or to the east of the nature reserve. At the same time, analysis of its recent status in the reserve shows that breeding occurs every one or two years. Common Snipe and Golden Plover are much more widespread and probably have increased their numbers in the last 50 -100

Table 3. Numbers of waders (number of records per observer per year) and small mammals (ind. per 100 traps per day) between 1960-1991.

Years / Species	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
Pluvialis apricaria	7	1	6	14	25	8	9	14	11	4	5	2	8	12	6	12
Tringa glareola	15	?	?	23	30	17	17	9	21	25	22	26	14	9	31	21
Tringa nebularia	5	?	3	8	8	3	3	5	8	12	10	10	12	11	9	12
Tringa erythropus	1	?	?	3	11	4	2	3	2	2	4	4	3	7	2	3
Actitis hypoleucos	23	21	30	88	57	57	28	41	43	64	35	19	35	50	51	36
Gallinago gallinago	10	2	4	?	19	16	8	11	15	20	12	13	8	11	23	11
Numenius phaeopus	8	1	1	2	4	5	2	6	8	7	2	2	1	5	3	0
Small mammals (*Microtus* spp., *Lemmus* spp., *Clethrionomys* spp., *Sorex* spp.)	0.2	2.2	40.2	39.1	38.5	3.8	4.6	10.8	12.2	19.7	25.8	8.6	16.8	48.1	40.1	5.0

Table 3. (continued)

Years / Species	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991
Pluvialis apricaria	5	14	6	5	5	7	7	2	1	9	4	15	8	4	6	8
Tringa glareola	13	22	22	26	20	16	59	32	33	42	21	18	58	34	23	42
Tringa nebularia	2	3	6	5	4	4	10	3	4	9	6	5	6	7	3	6
Tringa erythropus	2	2	8	9	7	5	12	5	11	4	5	4	11	1	2	5
Actitis hypoleucos	41	43	43	30	40	50	46	62	33	38	39	35	46	35	62	41
Gallinago gallinago	10	15	17	21	10	12	20	21	18	21	10	25	18	11	13	17
Numenius phaeopus	2	2	7	7	4	2	8	2	4	5	6	8	5	8	5	7
Small mammals (*Microtus* spp., *Lemmus* spp., *Clethrionomys* spp., *Sorex* spp.)	12.0	44.6	28.5	1.4	8.6	28.3	43.8	16.0	2.2	8.8	23.4	63.2	34.9	0.4	5.8	32.6

years,as although they were rare in the 1930s they are now common.

A number of other waders have shown a steady decline in numbers over the last decades: Greenshank, Whimbrel, Bar-tailed Godwit. All these waders are rather large and thus attract the attention of game-hunters. As the environment of the nature reserve has not changed, the reasons for the decline in these species should be sought elsewhere.

Where cyclic fluctuations in numbers occur, these cannot be considered to be stable long-term trends, though they are noticed only during long-term observations. This is shown also by the fact that such fluctuations are found only in the most common species for which plenty of data are available (Table 3). The duration of such population cycles varies and does not coincide in different species; this indicates that they are not only influenced by small mammal population cycles. This phenomenon undoubtedly deserves futher study.

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