Nordmann's Greenshank and Redshank Breeding Ecology Study in the Bay of Schast'e, Sea of Okhotsk, Russia

project report

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Aims of the project:
To find out the features of ecology during the breeding period of Nordmann's Greenshank and Redshank. Develop a method of catching birds. To find out the influence of predators on the success of breeding birds.

Timeframe of the work:
1. Drive from Khabarovsk to Zaliv Schast'ya - May 19-20, 2018;
2. Field work in the western part of Zaliv Schast'ya - May 21-July 16, 2018;
3. Drive from Bay of Schast'e - Khabarovsk - July 16-17, 2018.

Natural conditions of the research area
The winter period 2017/2018 in the area of research was relatively warm and with little snow. The air temperature rarely fell below -30 ° C. The average height of the snow cover in the forest did not exceed 100 cm. In previous years, the height of the snow cover reached 200 cm. In winter, drifts up to 6 meters in height were formed along the shores of the bay as a result of wind activity (Fig. 1,2).
The western part of Bay Schast'e is heavily influenced by the cold air masses of the contiguous water area the Sea of Okhotsk. By the beginning of the third decade of May in Khabarovsk, the leaves on the trees had already blossomed. In the vicinity of the city of Nikolaevsk-na-Amure, the leaves only blossomed on larch. At this period on the coast of the Bay Schast'e, the leaves were not blossoming at all.
On the Sea of Okhotsk, the continuous ice cover was maintained until the middle of June (Fig. 3). In the western part of Bay Schast'e, the first gullies began to form in the middle of May. Travel by motor boat in this part of the bay became possible from May 20. But the main part of the bay was covered with ice.
During our work, moderate or strong northeasterly winds prevailed. In May and the first half of June, daytime air temperatures rarely exceeded + 20° C. The last frost was recorded 9.06.18.
In the second half of June and July, hot, arid and windy weather established. Daytime air temperatures have reached + 30° C.
In May, the height of the last year's grass stands in the coastal meadows reached 10-20 cm, in July the grass grew up to 130 cm.
On May 27, first breeding calls of Far Eastern frogs (*Rana dybowskii*) were recorded.
In the research area there is a complex situation with tides. Much of time, the most part of Bay Schast'ya is in a drained state. During our works, there were two days in May when the water approached the seaside meadow, 12 days – in June, and 7 days – in July. Only on those days the tidal water forced the birds to get close to the shore, so they became available for counting. On other days birds were distributed over a vast area of the tidal zone and were not accessible to the observer.
The research area is a hunting ground. In 2018 spring hunting for waterfowl was conducted in the period from May 12 to May 21. In previous years, from 6 to 15 May.
In the valley of the lower reaches of the River Zimnik there is an extensive lake system. Lakes are small in area, with a depth to 0.5 meters.

Fig. 1. In April 2018, the height of snow cover on the shores the Bay of Schast'e in the snowdrifts reached 6 meters (13 April 2018).

Fig. 2. At the end of May, the snow drifts were up to three meters (22 May, 2018).

Fig. 3. Ice cover on the Sea of Okhotsk (June 9, 2018).

Methodological approaches

In the field work participated Dr. V.V. Pronkevich, V.I. Roslyakov, V.D. Matveenko.

The description of vegetation in the research area was prepared by the botanist, Dr. M.V. Kryukova.

Observations of the movements of birds were carried out from permanent and temporary observation posts (Fig. 4,5). Their coordinates are as follows:

1. 53.470042° 140.914070°
2. 53.469701° 140.915242°
3. 53.468466° 140.908875°
4. 53.469020° 140.899416°
5. 53.470466° 140.912346°
6. 53.476357° 140.915527°

Route counts of birds were conducted along the coast of Zaliv Schast'ya from the village of Vlasyevo to the base of the Petrovskaya spit: (Fig.). The routes covered the seaside meadows, moss bogs and larch forests. The total length of the walking census routes was about 400 km.

The search for Redshank nests was carried out on a control area of about 1 sq.km, shown in the figure 5.

The base camp had the following coordinates: 53.47009 140.91359.

Bird observations were carried out using 12x binoculars and a telescope. Photo, video recording and recording of birds' voices were carried out with a digital camera "Sony DSC-HX 400". Three photo-traps were also used to observe the birds. For this, three Trap Cameras "Ltl Acorn" manufactured in China were used. The cameras set the shooting mode at a frequency of 1 min.

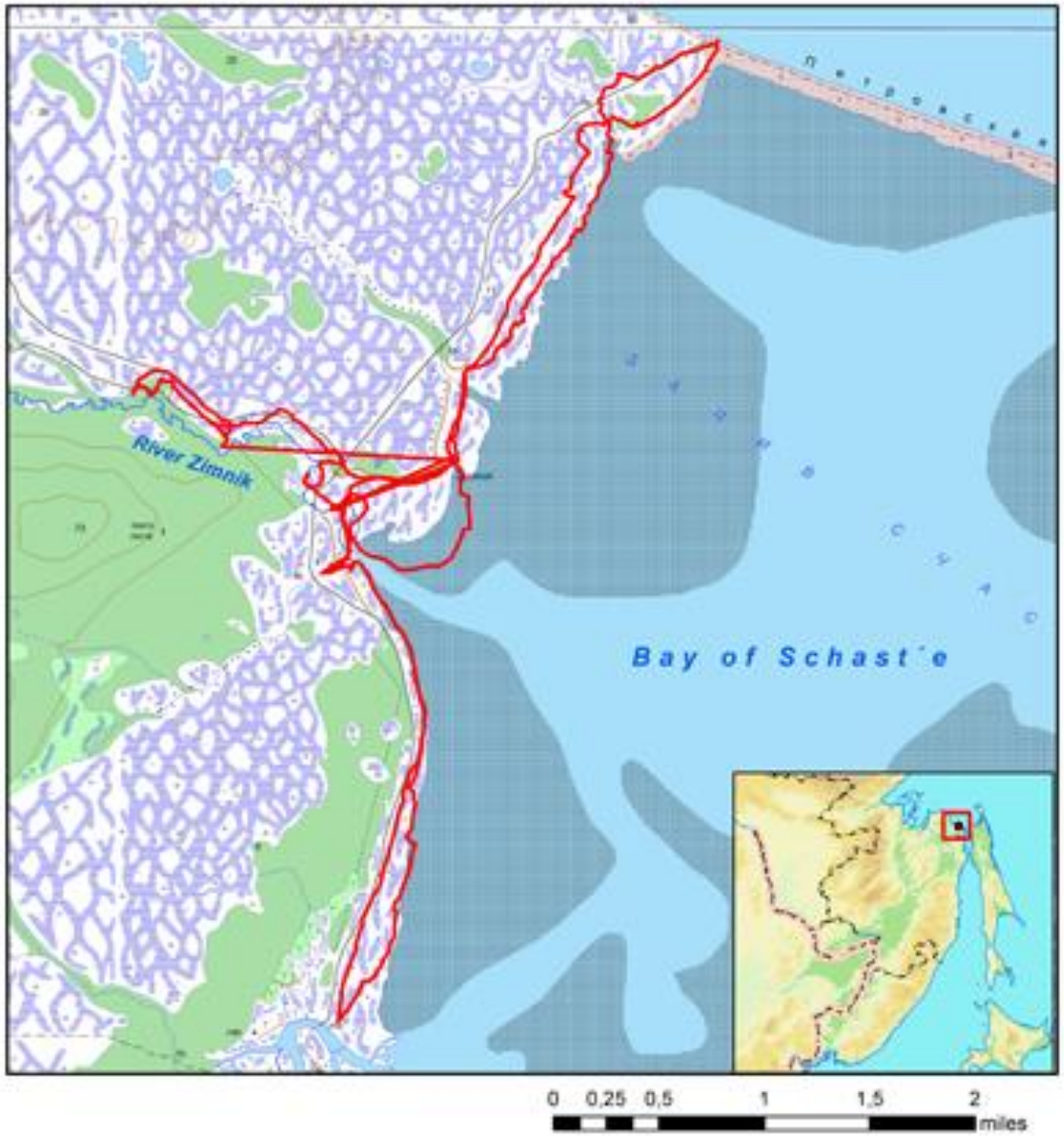

Fig. 4. Scheme of accounting routes (red line) in the western part the Bay of Schast'e in May-July 2018.

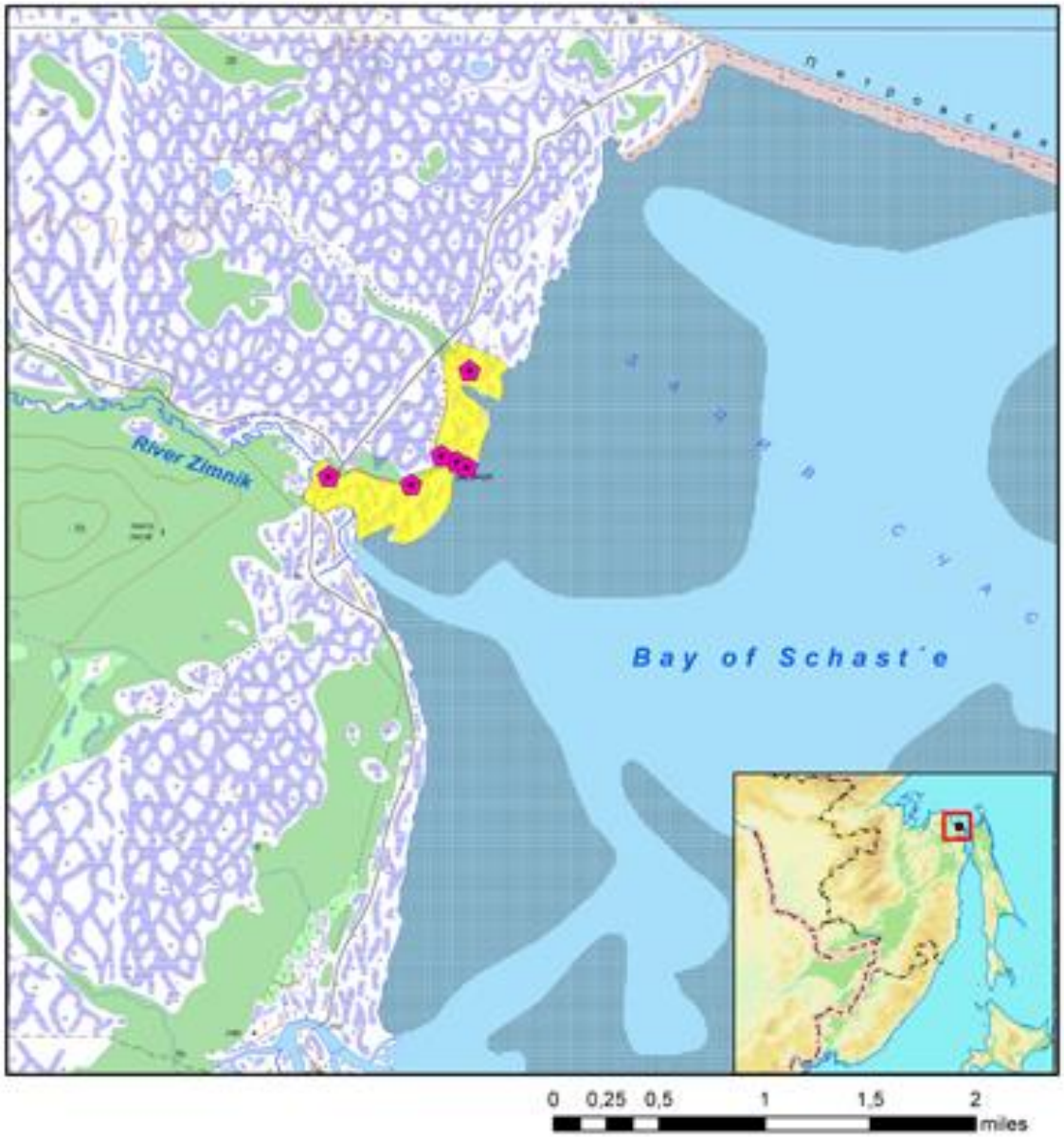

Fig. 5. Scheme of the study area. Yellow color shows the control area on which the search for Redshank nests was carried out, pink dots — observation points.

Dates of the first spring appearance of birds

By the beginning of our field work, a significant number of bird species have already appeared on the coast of Zaliv Schast'ya. The appearance of the first Redshanks and Nordmann's Greenshanks was recorded between 15 and 20 May 2018. This information was obtained from hunters.

Nordmann's Greenshank

It appears that Nordmann's Greenshanks can arrive both in pairs and singles. We observed single birds along with pairs. In the spring period, the maximum size of Nordmann's Greenshank groups was two birds.

Immediately upon arrival at the breeding sites, males begin to display. Both single males and those with females perform the display. Males are able to produce the display calls on the ground and in the air. More often the display calls could be heard from the birds located in the tidal zone, and significantly less often – during a display flight. The display call of Nordmann's Greenshank

can be referred to as "Water Rio-Water Rio-Water Rio". Usually these sounds last only a few seconds, but once we heard this sound continuously for five minutes. In addition, one day we heard a male, crouching over the water, making the sounds of "Rio-Rio-Rio-Rio". We managed to record the display call of Nordmann's Greenshank on the video camera. Since the sound is recorded from a great distance, its quality is not very good. The usual call of a troubled bird sounds like "Vak-Vak-Vak-Vak". These sounds are emitted by the birds taking flight and the birds near the nestlings. In different cases, their intensity changes. It is noteworthy that the breeding calls of Nordmann's Greenshank, described in the book of V.A. Nechaev (Birds of Sakhalin Island, Vladivostok: FEB AS USSR, 1991. 747 p.), are completely different from the sounds that were noted by us. We do not know the reason for this discrepancy. The display flight of a male consists of alternating gentle descends and ascends in the air. During the descent the bird lowers its wings, then quickly flutters the wings gaining the height.

The first display flight in 2018 was recorded on May 28.

Males of Nordmann's Greenshank actively guard their females from single males and also from Redshanks, driving them away. In addition, the protection of fodder territory from a Redshank was noted. Sometimes the partners from a pair can be in the tidal zone at a distance of up to 100m from each other. Despite this, the male constantly watches the female.

Once it was possible to observe the chasing of one bird by another in the air. After landing in the tidal zone, the birds were grabbing each other by the beak. One of the birds made the breeding calls. But whether it was a pair or two single males we did not find out.

Sometimes a feeding Nordmann's Greenshank flattens against the surface of the substrate even when another Nordmann's Greenshank flies over it.

In 2018, the breeding activity of Nordmann's Greenshanks was observed on May 28. Constantly we could watch the chases of birds one after another.

Breeding calls reach their maximal activity in the morning. The birds actively display also in cloudy weather. In hot, sunny days, their activity is sharply reduced.

In 2018, we have noted the beginning of the proper nesting territory’s survey by birds since May 27. A pair of birds has landed on the trees and on the uninhabited nest of Steller's Sea Eagle.

The first pair with chicks on the seaside meadow was observed in the evening of 28.06.18. Pair of adult birds showed strong concern in a certain area of the meadow. Our attempts to find chicks were unsuccessful. The height of the grass stand in the nestling habitat was about 50 cm. In addition, the site was clogged with old algae, under which the chicks could successfully hide. Adult birds near the chicks let the man 5-10 m. the second pair of the Nordmann's Greenshanks brought the chicks to the seaside meadows 29.06.18. We made a video shooting of adult birds worrying near the chicks and recorded the voices of parents. 1.07.18 adult birds of the Nordmann's Greenshanks became more calm, but let people only 15-20 m. The reduction reaction in relation to the person noted at the same time, two pairs of birds. In the first days after the release of the Nordmann's Greenshanks on the meadows, both pairs of adult birds jointly protected broods from humans. With 1.07.18 joint protection ceased. Birds of the second pair almost did not react to presence of the person near the first pair. By this time, the current flights had completely stopped, but the current voice of the males could be heard in birds near the chicks. With regular human anxiety brood adult birds lead the brood to other areas of the coastal meadow. Sometimes tens or hundreds of meters.

10.07.18 near broods began to observe only one adult bird. Probably, the second birds attachment to the chicks weakened, and they left the broods.

13.07.18 in binoculars marked by the release of three young approximately two weeks of age on tidal casting area. The chicks came out two hours before dark. At the same time, the chicks periodically hid in the thickets of coastal grass. One adult bird was constantly near the chicks.

Just in 2018, we managed to briefly observe the chicks from two pairs. One pair has three chicks and the other one has one chick. Met the chicks were fed in the thickets of seaweed washed up by the sea.

In the initial period of arrival noted food of the Nordmann's Greenshank only fish. Marked nutrition two kinds of fish: *Pungitius pungitius* and *Hypomesus japonicus*. Fish poultry produce in silt or washed up by the sea the seaweed at the junction of tidal wetland and coastal grasslands. At the same time, they completely immerse the beak in water, sometimes to the eyes. It is noteworthy that after catching fish, birds do not immediately swallow them. They are long "play" with the fish, crumple it, rinse in water. Maybe that's the way they kill fish. They swallow fish with difficulty. In one hour, observed of the Nordmann's Greenshank was able to catch and eat three fish. An unsuccessful attempt of the Staty-backed Gull to take the fish from the of the Nordmann's Greenshank was noted. At the same time Nordmann's Greenshank flew away with the fish. Second Nordmann's Greenshank in five minutes, and followed his partner.

July 15, 2018 in the excrement of Nordmann's Greenshank, left him on an artificial table, found undigested caviar of fish. The size of yellow eggs reached 2-3 mm (Fig. 6-9). Fish species could not be identified.

During the initial period of arrival of rhte Nordmann's Greenshank couples and single birds stay on the tidal zone and small saucer-like lakes. These lakes are very rich *Pungitius pungitius*. Therefore, the Nordmann's Greenshank has no problems with its production. Another species fish *Hypomesus japonicus* the Nordmann"s Greenshank catch in estuaries. Getting fish from the algae that remained after the tide.

Later, five days after arrival, the birds are fed with smaller objects, probably shellfish, which the bird extracts from the silt, in shallow waters, immersing the beak 2-3 cm in the substrate. On the coastal meadows and small lake adult birds are held only during the transitionthe broods at the seaside meadows and the intertidal zone. On these lakes they do not stay long, despite the abundance of fish in these waters.

Fig. 6. Feed of the Nordmann's Greenshank - *Hypomesus japonicus*

Fig. 7. Feed of the Nordmann's Greenshank - *Pungitius pungitius.*

Fig. 8. No digested eggs fish in the excrements of the Nordmann"s Greenshank.

Fig. 9. Nordmann's Greenshank with caught fish (23.05.2018)/

Number and distribution of the Nordmann's Greenshank broods

In the period from 1 to 15 July in 2009 and 2018 on 10 km stretch of coast we recorded the stay of 7 broods of the Nordmann's Greenshank (Fig. 10, 11). Probably, in recent years the number of breeding birds has not changed.

Fig. 10. Location of the broods Nordmann's Greenshank in early July 2009.

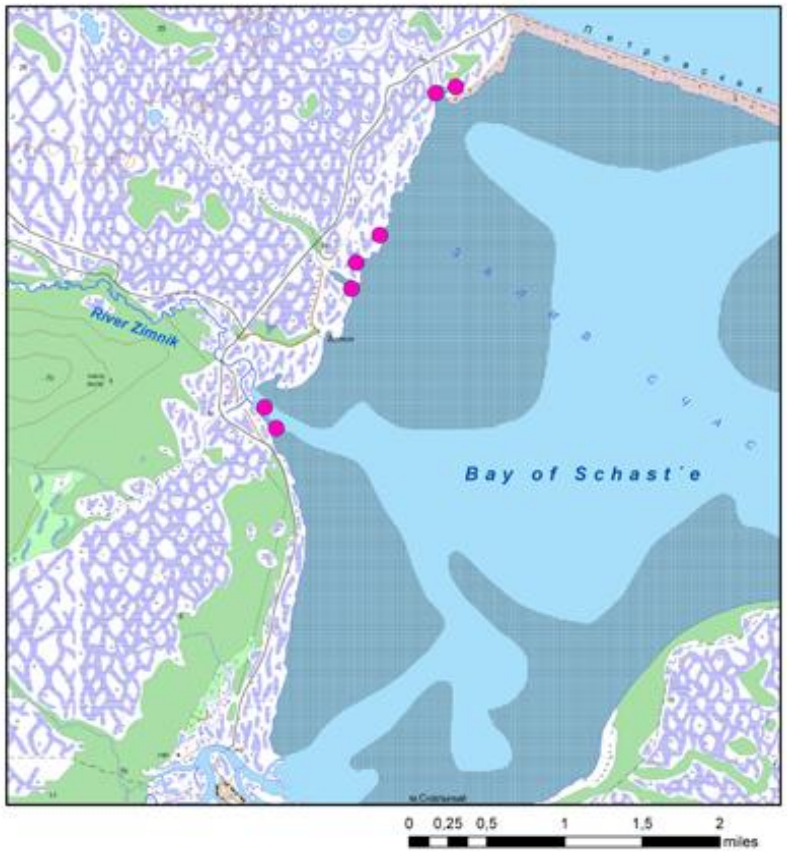

Fig. 11. Location of the broods Nordmann's Greenshank in early July 2018.

Nordmann's Greenshank and Redshank capture methods

For catching of the Nordmann's Greenshank near broods, we tried to use the noose and the nets. But these methods were useless (Fig. 12, 13). In recent days of field work we have found a promising way to catching the Nordmann's Greenshank and Redshank. To do this, we began to use an artificial table with a trap. The Norman's Greenshank and Redshank love to sit on stakes and driftwood (Fig. 14). It takes a few days for Norman's Greenshank and Redshank to be able to sit on a table with a trap (Fig. 15). In 2018, we couldn't catch Norman's Greenshank and Redshank in a new way because we didn't have enough time. We had to finish our field work. But we are confident that this method will be successful in the future.

14.07.18 at 19 o'clock was caught chick about two weeks of age. This chick was from another couple. The bird was captured by hand in the intertidal zone. He quickly ran away from the man, but were driven back from the thickets of grass. Later this chick was tagged and released (Fig. 16, table 1).

Fig. 12.The noose for catching of the Nordmann's Greenshank

Fig. 13. Net for catching birds.

Fig. 14. The Normann's Greenshank and Redshank love to sit on stakes and driftwood.

Fig. 15. Artificial table with trap for catching the Nordmann's Greenshank.

Fig. 16. Chick of the Nordmann's Greenshank marked with red plastic and metal rings.

Table 1

The size and weight of the chick Nordmann's Greenshank and its marking scheme

№	date	sex	bill (mm)	wing (mm)	tail (mm)	metatarsus (mm)	weight (gr)	Tagging scheme		
								Upper Left	Upper Right	Lower Right
1	14.07	?	32,1	102	20	49,2	101,1	R	-	M HS 012393

Redshank

The first attempt to mating Redshank marked 27.05.18. Mating began after a very warm previous day. The female stands in the water and squats a little. The male, fluttering wings, jumps on his back and squats.

Sometimes the male chases the female like a thread after a needle. In this case, both birds are pressed to the ground. The female makes jerks from side to side.

The marriage flight of the male Redshank as well as the Nordmann's Greenshank consists of alternating gentle descents and ascents in the air. During the descent, the bird lowers its wings. Then quickly flutters its wings and the ascent height. In this case, the male makes a mating cry " Tui-Tui-Tui "turning into sounds "Vrio-Vrio-Vrio». The sounds are accelerated from the beginning to the end of the "song". Sometimes you could hear the sounds of "Tip-Tip-Tip "turning into" Rio-Rio-Rio "or in the learning sounds of "Flin-Flin-Flin" merge into a trill.

Active marriage flights theRedshank observed to 9.06.18, and later they became rare. Birds rarely showed mating ritual on earth. The number of mating attempts declined sharply.

In the pre-breeding period, Redshank stay on the coastal meadows, on small shallow lakes and on the tidal zone. The Redshank diet probably does not contain fish. We've never been able to see Redshank fishing. Despite the fact that it is a lot on small lakes. It is possible that even small fish is too large for the Redshank. Birds gather food from the surface of the substrate or from the silt, buried beak 2-3 sm. On 50 shots Redshank have 6 food objects. Later, the pecking of fodder objects from the water surface was noted. In the stomach of the murdered 11.06.18 Redshank was tiny particles of shells of shellfish and brown mass.

The conditions for accurate accounting of the Redshank on the Bay coast largely depend on the height of the tide. During low tide birds are scattered over a large area of the tidal zone and it is impossible to calculate them. In addition, depending on the stage of tide, feeding birds are constantly redistributed along the coast.

In 2018 on the site of the west coast the Bay of Schast'e from the village Vlasevo before the foundation of Petrovskaya sea spit (10 km), we took into account up to 136 individuals of Redshank. On our control plot (1 km^2), where a search was conducted of the nests was inhabited by 14 pairs the Redshank.

From 1.07.18 there was an increase in the number of Redshank in meadows, probably due to the approach of birds from moss bogs. At the same time, the beginning of unification of birds into groups was noted. The maximum size of this group was 5 individuals. Probably, these groups consist of birds that have lost eggs or chicks. In such a group was the male who lost clutch.

Fig. 17. The location nests of the Redshank.

A total of eight Redshank were caught. All birds were marked with light geolocators, red and yellow flags and two individual colored rings and a metal ring.
In addition, we took the size of one bird killed by a hunter.
In total, we found seven nests of Redshank (Fig. 17, table 2), but only four of them were with eggs. The other three were looted by crows before we found them. Later, from four nests with eggs, two nests of Redshank forsaken, the other two nests were destroyed by crows.
Two birds were marked on the nests. Six birds that lost their nests were caught with the help of nets and marked (Table 3).

Table 2

Sizes, weight of the Redshank eggs (mm, gr)

№ clutch	date	big diameter	small diameter	weight	the degree of development of the embryo	the location of the nest	history of the nest
1	25.06.18	41,5	30,4	18,3	high degree of embryo development	the nest is located on a small lake on the peninsula	forsaken
		43,7	30,1	17,8			
		43,6	30,1	18,0			
		42,3	30,1	18,1			
2	26.06.18	43,1	30,6	18,6	high degree of embryo development	the nest is located on a hillock at an all-terrain trace	forsaken
		43,0	30,8	18,5			
		42,4	30,7	18,1			
		44,9	30,7	18,5			
3	26.06.18	43,8	30,9	20,7	embryos are poorly developed	the nest is located on a hillock at an all-terrain trace	destroyed by crow
		44,7	30,0	19,8			
		43,4	29,8	19,1			
		45,2	29,9	20,2			
4	16.07.18	44,8	30.3	18,7	the beginning of the hatching chicks	the nest is located on a hillock at an all-terrain trace	unknown
		44,8	31,1	18,6			
		43,4	31,1	17,6			
		43,7	30,7	17,8			
5	25.06.18	-	-	-	the nest was found after the devastation of the crow	the nest is located on a hillock at an all-terrain trace	destroyed by crow
6	25.06.18	-	-	-	the nest was found after the devastation of the crow	the nest is located on a hillock at an all-terrain trace	destroyed by crow
7	25.06.18	-	-	-	the nest was found after the devastation of the crow	the nest is located on a hillock at an all-terrain trace	destroyed by crow

Table 3

The size, weight of the Redshank and the scheme of their marking

№	date	sex	bill (mm)	wing (mm)	tail (mm)	metatarsus (mm)	weight (gr)	Tagging scheme			Note
								Upper Left	Upper Right	Lower Right	
0	11.06	♂	37,3	152	55	51,3	110,5	-	-	-	bird killed by a hunter
1	27.06	♂	41,5	145	67	52,0	107,7	Yflag Rflag with Geolocator № 006	R, DG	M IS 007481	caught on the nest
2	7.07	?	40,5	160	56	52,0	115,8	Yflag Rflag with Geolocator № 015	LB, O	M HS 012400	caught in the net
3	9.07	?	39,4	153	62	51,6	116,8	Yflag Rflag with Geolocator № 005	LB, R	M HS 012397	caught in the net
4	9.07	?	41,4	153	57	53,0	115,2	Yflag Rflag with Geolocator № 016	LB, Y	M HS 012399	caught in the net
5	9.07	?	40,7	148	56	51,6	111,8	Yflag Rflag with Geolocator № 013	LB, DG	M HS 012396	caught in the net
6	9.07	?	44,0	152	62	55,6	115,6	Yflag Rflag with Geolocator № 019	Y, O	M HS 012395	caught in the net
7	11.07	?	40,5	154	62	59,0	106,7	Yflag Rflag with Geolocator № 002	Y, R	M HS 012394	caught in the net
8	16.07	?	40,4	156	60	53,8	112,0	Yflag Rflag with Geolocator № 012	O, R	M HS 012392	caught on the nest

Note:

Yflag - Yellow flag; Rflag - Red flag; R - Red ring; DG - Dark green ring; LB - Light blue ring; O - Orange ring; Y - Yellow ring; M - Stainless ring.

Influence of predators on the number and success breeding of the Redshank and Nordmann's Greenshank

In the study area, the following species of animals were identified as a potential threat to the studied waders:

1. *Tamias (Eutamias) sibiricus* - Asian Chipmunk;
2. *Vulpes vulpes* - Fox;
3. *Ursus arctos* - Brown Bear;
4. *Martes zibellina* - Sable;
5. *M. (Kolonokus) sibirica* - Kolinsky;
6. *Neovison vison* Schreber - American Mink
7. *Ixobrychus eurhythmus* - Schrenck's Bittern;
8. *Ardea cinerea* - Gray Heron;
9. *Milvus migrans* - Black Kite;
10. *Accipiter gentilis* - Northern Goshawk;
11. *Haliaeetus albicilla* - White-tailed Sea Eagle;
12. *Haliaeetus pelagicus* - Steller's Sea Eagle;
13. *Falco subbuteo* - Eurasian Hobby;
14. *Rallus aquaticus* - Water Rail;
15. *Larus ridibundus* - Black-headed Gull;
16. *Larus schistisagus* - Staty-backed Gull;
17. *Asio flammeus* - Short-eared Owl;
18. *Strix uralensis* - Ural Owl;
19. *Pica pica* - Common Magpie;
20. *Corvus macrorhynchos* - Large-billed Crow;
21. *Corvus (corone) orientalis* - Oriental Carrion Crow;
22. *Corvus corax* - Common Raven.

Most of them have low numbers, so their impact on waders is probably negligible. Here we will focus only on the most important species in the life of waders.

Fox constantly lived in the coastal meadows. In recent years hunters stopped extract this kind of. This is probably why the number of foxes in the region has increased greatly. Fox began to come on base and take food from the hands of the people. During the entire period of work, we regularly observed a Fox, which combed the coastal meadows in search of food. Herbalists actively protected the territory from this predator, sometimes a group of up to 15 birds. 1.07.2018 g. marked capture chick near our base, but the bird species could not be established.

Brown Bear. During the whole period of our work the number of brown bears increased from the end of may to the middle of July. At the end of may, bears met mainly on the outskirts of forests. In June and July, as the herbage developed, bears increasingly began to go to the coastal meadows, where they ate mostly grass. In the meadows they grazed like domestic cows. Sometimes in the day you had to mark up to 5 of bears. We examined 9 samples of droppings of bears contain only plant remains. There were no remains of bones, feathers and eggs of birds in the samples. However, this does not exclude eating eggs and Chicks brown bear. During the entire period of work in the area of our work was noted 16 individuals of brown bear of different ages.

Schrenck's Bittern, Water Rail. In the nest of Eurasian Skylark which is under our supervision from July 5 to July 15 initially there was a laying consisting of three eggs. Later, the eggs periodically began to disappear one by one. By July 15, the masonry was completely destroyed. We assume that the gradual disappearance of the eggs is related to the activities of the Schrenck's Bittern, or Water Rail, which are constantly lived in the control area.

Steller's Sea Eagle. Despite the relatively high number (7 pairs propagated in the area of work) of Steller's Sea Eagle, we have not noted any attempts of its attack on adult birds and chicks.

Eurasian Hobby. One couple had a nest 150 m to the West of our camp. We regularly had to watch the hunting of Hobbies for birds. There were cases of killing Lesser Sand Plover (twice), Redshank and Brown Shrike (Fig. 18).
Large-billed Crow, Oriental Carrion Crow. In the area of our research, these two species of birds are the main threat to the eggs in the nest and chicks of the Redshank and the Nordmann's Greenshank. In the initial period of work at the control site rarely recorded only a pair of Common Raven. Large-billed Crow, Oriental Carrion Crow began to appear in meadows from 8.06.18. Later their number continued to increase.
9.06.18 we found an egg of the Northern Lapwing destroyed by a crow.
C 20.06.18 on our control area constantly patrolling 7 individuals Oriental Carrion Crow.
21.06.18. on the all-terrain road found 7 eggs Redshank and 1 egg of the Water Rail pecked crow. All the eggs were laid by crows on the all-terrain road.
23.06.18 we found 2 eggs of the Water Rail destroyed by Oriental Carrion Crow.
Of the seven nests we found in the control area, four were destroyed by crows.

Fig. 18. Leftovers from the lunch Crows and Eurasian Hobby.

Activation, calibration and mounting of light geolocators
Loggers were attached to the red plastic ring flag type, which we installed on the leg of the Redshank. The inner diameter of the flag was 5 mm. For the marked of common species of waders on the Khabarovsk territory in 2018, two colors were allocated: yellow and red.
The red color of the rings was highlighted for Nordmann's Greenshank tagging.
The dates, times and places of activation and calibration of the loggers are shown in the table 4

Table 4

Dates, time and place of activation and calibration of the loggers installed on the Redshank in the western part the Bay of Schast'e, Sea of Okhotsk in the summer 2018

Activation was carried out in Khabarovsk. Calibration was carried out in the western part of the Bay of Schast'e (N 53.469952° E 140.91434°).

№ logger	ACTIVATION		CALIBRATION			
			Beginning		Completion	
	Date (GMT)	Time (GMT)	Date (GMT+10)	Time (GMT+10)	Date (GMT+10)	Time (GMT+10)
015	14.05.18	09:19:00	29.05.18	17:00	11.06.18	07:48
012	14.05.18	09:23:00	29.05.18	17:00	11.06.18	07:48
005	14.05.18	09:35:00	29.05.18	17:00	11.06.18	07:48
016	14.05.18	09:36:00	29.05.18	17:00	11.06.18	07:48
002	14.05.18	09:41:00	29.05.18	17:00	11.06.18	07:48
013	14.05.18	09:42:30	29.05.18	17:00	11.06.18	07:48
006	14.05.18	09:46:30	29.05.18	17:00	11.06.18	07:48
019	14.05.18	09:47:30	29.05.18	17:00	11.06.18	07:48

Blood samples and selection of shoulder feathers

For genetic analysis, we selected blood samples from eight Redshank and samples of shoulder feathers from nine Redshank. These samples have already been handed over to Malaysia and the Netherlands. The purpose of this analysis is to inventory Redshank subspecies and determine the sex of captured birds. In addition, one blood sample was taken from the chick of the Nordmann's Greenshank. Blood samples were taken from the subclavian vein on filter paper.

Prospects for further research

1. If we have opportunities for next year, we will be able to catch at least part of the Redshank marked with geolocators with a high probability.
Information will be obtained on the migration characteristics of this species.

2. To date, we have received only General incomplete information about the breeding biology of Redshank. The obtained information will allow to obtain more correct information about the nesting ecology of the species next year.

3. In 2018, we found a new way to catch Nordmann's Greenshank and Redshank. Next year it will undoubtedly allow to carry out mass tagging of both types. Get information about the condition of adult individuals. This allows you to create groups of tagged birds to determine population demographics. This, in turn, provides opportunities for the development of a strategy for monitoring and protection of species.

4. For the study of ecology Nordmann's Greenshank need to attract a greater number of birdwatchers. The low density of pairs (on average 1 pair per 1.5 km of coastline) was did not allow us to find nest in 2018.

5. To record the marriage voice of Nordmann's Greenshank of good quality, it is necessary to have a special technique.

6. By the next field season, it is necessary to create a team of ornithologists and technical staff in advance to ensure safety from bears.