BirdsRussia

Working Group on Shorebirds of Northern Eurasia

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The assessment of hunting pressure on shorebirds in Sakhalin Island, with special focus on the Far-Eastern Curlew

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Prepared by

Matsyna Aleksandr I., Working Group on Shorebirds of Northern Eurasia, OrnithoLab@mail.ru,

Matsyna Ekaterina L., Working Group on Shorebirds of Northern Eurasia, kaira100@mail.ru,

Konstantin B. Klokov, *Saint-Petersburg State University, k.b.klokov@gmail.com,*

Evgeny E. Syroechkovskiy, *Ministry of Natural Resources and Environment of Russian Federation /Birds Russia. ees_jr@yahoo.co.uk* .

With contribution from:

Sergey Kharitonov, Russian Bird Ringing Centre IPEE RAN Russian Academy of Sciences,

Reviakina Zoia V., Working Group on Shorebirds of Northern Eurasia, birds@fauna.ru,

Zykov Vladimir B., Working Group on Shorebirds of Northern Eurasia, birds@fauna.ru,

Photos by authors of the report as well as local residents – hunters, whose names we promise not to mention for the reasons of confidentiality.

CONTENT

INTRODUCTION

Assessment of hunting pressure on shorebirds in the Sakhalin oblast is the second stage of the common project organised by BirdsRussia together with Working Group on Shorebirds of Northern Eurasia (WGW NE) to study hunting pressure on shorebirds of the Far East of Russia as northern part of East-Asian Australasian Flyway (EAAF). Research started at the territory of Kamchatka in 2019 and continued in Sakhalin island in 2020. This stage of the project (2020) was supported by East Asian-Australasian Flyway Partnership (hereafter EAAFP), the Australian Government Department of Agriculture, Water and the Environment and UNEP/CMS, and Manfred-Hermsen-Stiftung.

EAAFP shorebird populations are in a depauperate state. In comparison with other large bird migration regions in the world, shorebird populations on this flyway are the least numerous despite the maximum diversity of species. Hunting in the north-east of Russia (the northernmost part of the EAAF) has a negative impact on the populations of all species of shorebirds, both rare and considered relatively "safe". Apparent stability of even relatively abundant species is very vulnerable and depends on many factors, not least of which is hunting. However, the lack of information until the present moment does not allow to assess how strong the hunting pressure on shorebird populations is (Pearce-Higgins et al., 2017). Our project deals with filling this knowledge gap.

Sakhalin island, located in the south of the Sea of Okhotsk, plays an important role in maintaining the number of the majority waterbirds and shorebirds, nesting and migrating in the north of EAAF in the Far East of Russia. Economic pressure on natural complexes is traditionally high here. Sakhalin island remains a regional leader in hydrocarbon extraction as well as in development of living marine resources. Active human-induced transformation of the environment of the region in the last two hundred years resulted in significant degradation of the natural habitats which can be observed in the majority of land and water ecosystems. In this context, negative impact of hunting can become most significant.

We conducted a special research of hunting pressure on shorebirds, both rare and allowed for hunting, at the territory of the Sakhalin oblast in 2020. For a month ornithologists met with hunters, local residents, officials, conducted surveys, questionnaires and directly observed the hunting process at a model plot. Gathered materials are presented in this report.

1. PROJECT GOAL AND OBJECTIVES

The main goal of the project is to assess shorebird hunting pressure in the northern part of the EAAF in the north-east of Russia. The project is focused on shorebird species prioritised by the EAAFP. Special attention was focused on Far Eastern Curlew, Whimbrel and Spoon-Billed Sandpiper. Whimbrel is a popular species for legal hunting in the Far East of Russia and hunting has a significant impact on the number of this species. Far Eastern Curlew is included in the list of globally threatened species (IUCN Red List) and is critically endangered in Australia. In Russia it is a protected species, included in the Red Data book. Nevertheless, hunters quite frequently harvest Far Eastern Curlew together with Whimbrel due to misidentification and often do it on purpose as for many hunters it is the most wanted game among all the shorebird species because of its large size. Both species are understudied and when the opportunity presents itself we fill the knowledge gaps about them, their conservation and use. Spoon-billed Sandpiper is a critically endangered species, one of the rarest shorebirds in Russia and in the world.

An important goal of the project is to identify modern and historic population trends of different species and ecological groups of shorebirds under hunting pressure (both legal and illegal bird harvest) as well as other factors. Thus, the following objectives had to be attained:

1. Identify main shorebird staging sites during migration where they are subject to intensive hunting pressure.
2. Compare the timing of hunting seasons with the timing of migration and stop-overs of different shorebird species, identify the most vulnerable species.
3. Estimate the number of shorebird hunters in different areas of the island, including hunters on large, medium-sized and small shorebirds.
4. Inspect model settlements (villages and small towns), including surveys and anonymous questionnaires within the project time-frame.
5. Assess the feasibility and attempt to organize online anonymous questionnaire.
6. Process anonymous questionnaires. Compare the results of online questionnaires with the results of surveys and questionnaires in the field.
7. Give an estimate of an average number of shorebirds harvested by one hunter in different parts of Sakhalin island.
8. Calculate an estimate of shorebird harvest in Sakhalin as whole (and in different areas of the island, if possible) using expert assessment and, where possible, extrapolation, in particular to give an approximate estimate for large and small-sized shorebird harvest and for the most important species, if possible.
9. Draw up recommendations for next stages of this research in other regions of the Far East in order to completely cover the northern part of the EAAF in Russia and to monitor hunting in Sakhalin in the future.

   A separate task is to develop and refine the research methods of assessing the hunting pressure on shorebirds in the Far East. This is a pioneer line of research started practically from scratch. Methods are improved every year. The level that we have reached by the third year of research is presented further in the Method section.

2. NATURAL CONDITIONS OF THE REGION

The Sakhalin Oblast is the only region in Russia located exclusively on islands. Coastal marine habitats are of an especially great length here and as a result there is a high number of waterbirds and shorebirds, including shorebirds that not only nest in the area but also visit it during seasonal migrations. Sakhalin island is the largest island in the Russian Federation, washed by the Sea of Okhotsk and the Sea of Japan. The area of the island is 76,6 thousand km², its length is slightly less than 1000 km and the width varies from 26 km to 160 km. The island is divided into 15 administrative districts (fig. 1) including regional centre – the city of Yuzhno-Sakhalinsk. Natural conditions of Sakhalin are very diverse and correspond with latitudinal zonality.

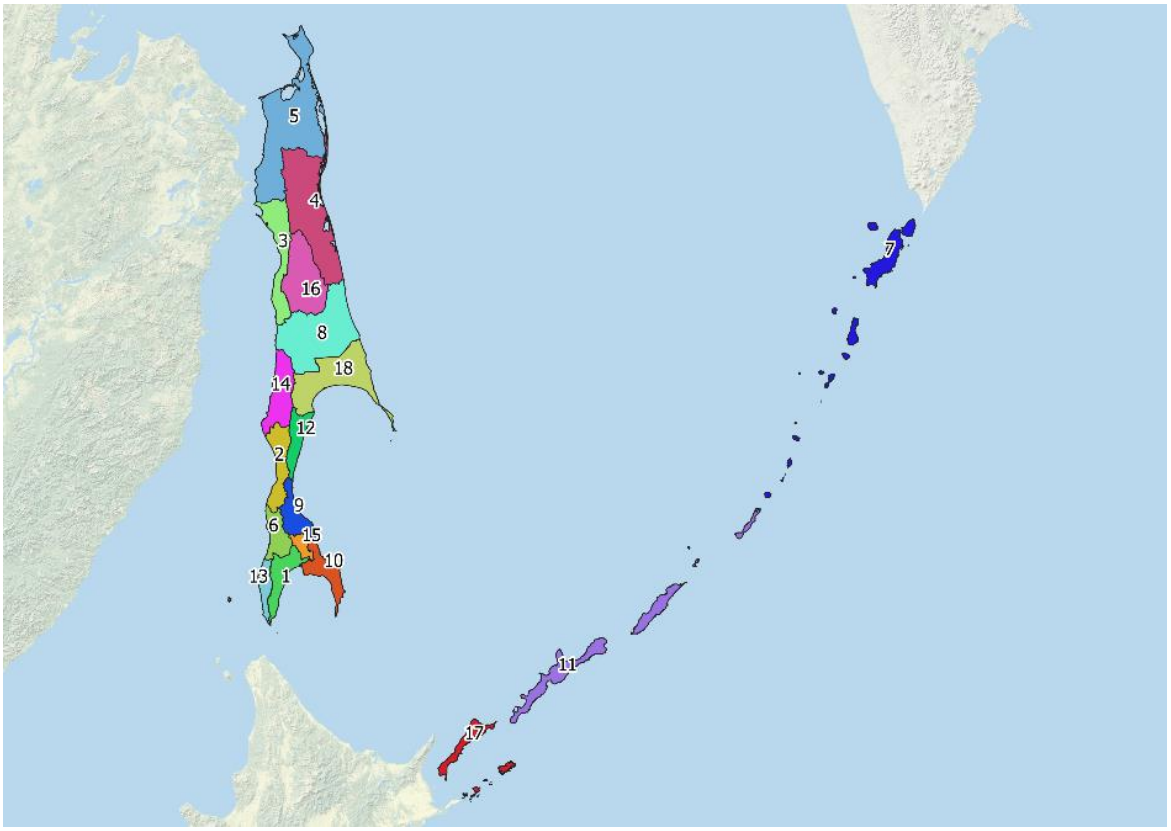

Figure 1. Districts of the Sakhalin Oblast: 1 – Anivsky, 2 – Tomarinsky, 3 – Alexandrovsk-Sakhalinsky, 4 – Nogliksky, 5 – Okhinsky, 6 – Kholmsky, 7 – Severo-Kurilsky, 8 – Smirnykhovsky, 9 – Dolinsky, 10 – Korsakovsky, 11 – Kurilsky, 12 – Makarovsky, 13 – Nevelsky, 14 – Uglegorsky, 15 – the city of Yuzhno-Sakhalinsk, 16 – Tymovsky, 17 – Yuzhno-Kurilsky, 18 – Poronaysky.

The island is separated from the mainland by a narrow Nevelskoy strait, which is shallow due to a large number of deposits carried by the Amur river. These alluvial deposits serve as a geological basis of the whole northern part of Sakhalin, defining its subdued relief. The sandy nature of the northern shore determines there being a system of large lagoon-type bays, which are of great significance for stopping

waterbirds and shorebirds during migration period. The most important ones in the east of the island are the Lunsky, Nabilsky, Nyisky, Dagi, Chayvo, Piltun, Ekhabi, Urkt bays and others (Nechaev, 1991; Tiunov, 2011). The Baikal and Pomr' are in the north-west and the Viakhtu and Tyk bays are in the west of the island.

The unique geographical location of Sakhalin island stretched along the meridian for 1000 km, allows to regard it as a sort of contact zone between subarctic and temperate zones characterized by gradual changes of environmental and temperature conditions from north to south. Northern and eastern shores of Sakhalin island are affected by physiographic conditions of the subarctic zone. Shore formation and evolution are determined by the cold Sea of Okhotsk categorised as a freezing sea of subarctic type. The shores of eastern Sakhalin located in the subarctic zone are characterised by permafrost rock formations, including in the base of lagoon sandbars, development of thermal abrasion and near-shore icing until the middle of July (Vinogradov, 2020).

In meridian direction Sakhalin is divided by two mountain rages, West Sakhalin and East Sakhalin mountains. Transport accessibility is relatively high in the southern, eastern and northern parts of the island, where there is a vast network of roads, including ones with hard-surfaced all-weather pavement. The exception is the most remote areas in the south (the Crillion peninsula) and north (the Schmidt peninsula). The central part of the island, western and north-western coast of Sakhalin in particular, are hard to access as the road network is not developed. The island population is consolidated in the regional centre, district centres and relatively sparse settlements, concentrated along the eastern and south-western coast of the island. As of 2019, the population is 489,000 (https://sakhalin.gov.ru/?id=3). Population density is 6.39/km², which is almost by an order more than in Kamchatka where it is only 0.67/km². The difference in population density along with transport network development plays a key role in the level of human-induced impact on the natural ecosystems of the region, including migratory birds.

An important part of the region is the Kuril islands, where there are three more administrative districts (fig. 1, 2), with mountainous relief, volcanic activity and population density of 1.92/km², which is quite a high number for the region. The Kuril islands form an improvised geographic "corridor", which is traditionally visited by many birds species during seasonal migrations. However, their number here is not high in comparison with main flyways in the region.

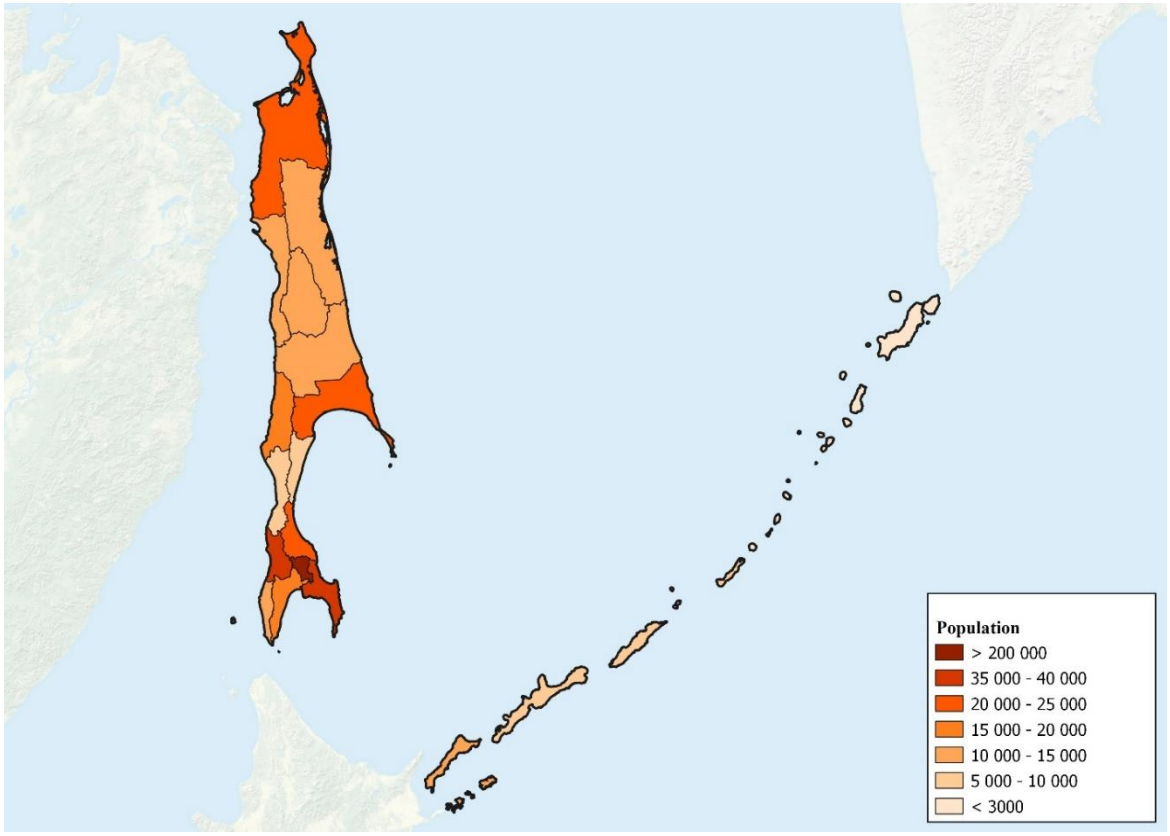

Figure 2. Population in different districts of the Sakhalin oblast

Figure 3. The northern part of the Odoptu bay is a key staging site for migratory shorebirds in Sakhalin (Tiunov, Blokhin, 2011). Photo by V.B. Zykov

Figure 4. View of the Chayvo bay in the Nogliksky district of Sakhalin island, a key habitat of Sakhalin Dunlin Calidris alpina actites

Figure 5. The Baikal bay in the north of the Okhinsky district is an important concentration site for many species of migratory shorebirds

Figure 6. The Ekhabi bay in the Okhinsky district is an important staging site for migratory birds and a site of active hunting on waterbirds and shorebirds

Figure 7. The Piltun bay in the Okhinsky district is the largest lagoon in the Sea of Okhotsk basin, a key staging site for waterbirds and shorebirds

3. METHODS AND MATERIALS

The main methods of material collection included preliminary analysis of literature and information from available official sources (data from the Ministry for Ecology of the Sakhalin oblast, data from the Internet), surveys of the local population (hunters, fishermen, employees of the environmental services), inspection of harvested birds, bird counts at the hunting sites. There was also an analysis of ring recoveries of the Bird Ringing Centre of Russia (see section 4.1.3).

The same methodological approaches were mainly used in Sakhalin as in Kamchatka in 2019. In 2020 they were slightly changed and significantly broadened. They were still based on the method developed by E. E. Syroechkovsky and K. B. Klokov to estimate bird harvest in 22 settlements of Chukotka and northern Yakutia in 1996-2006 (Syroechkovsky, Klokov, 2010), which was adapted to study shorebird hunting at the first stage of the project in 2019. In 2020 the methodological approaches continued to be improved.

Research in Sakhalin was divided into several stages. At the first stage, in preparation for the field survey, we consulted ornithologists working in the region and collected data presented in literature and other sources on geographical distribution and dynamics of shorebird populations in Sakhalin, timing of migration, migration directions, number of shorebirds during migration, concentration sites during migration, breeding ranges, population changes and others. We also learned the details of hunting rules in Sakhalin and location of protected areas there. Moreover, ring recoveries of shorebirds were analysed based on the data of Bird Ringing Centre of Russia.

At this stage, valuable information on the population dynamics of several shorebird species over the years was provided by constantly working in Sakhalin for several decades professional ornithologists V.B. Zykov and Z.V. Revyakina, as well as by A.I. Zdorikov, an expert of the Public Council attached to the Ministry for Forestry and Hunting of the Sakhalin oblast. Since shorebird hunting is also practised by fishermen, we received information on the salmon fish seining at the coast of Sakhalin from D.V. Lisitsyn, head of the non-governmental organisation "Sakhalin Environment Watch".

Based on the information collected at the preliminary stage, we designed a study plan, identified routes and model (key) sites – settlements, where the work will be conducted as well as plots where direct observation of the hunting process will take place. Planning the study, we took into consideration two conditions: first of all, the necessity to visit settlements where according to preliminary data the most number of shorebirds are shot during hunting and, second, their transport accessibility. To visit settlements and hunting sites in each district, we rented a cross-country vehicle in the district centre.

The field survey lasted from August 27 to September 30, 2020. First, in the end of August and early September, during Whimbrel migration, we surveyed the northern part of Sakhalin – Okhinsky and

Nogliksky districts. Apart from the survey of settlements, we conducted a direct observation of the hunting process with visual inspection of the hunters' harvest at the model plot located at the northern spit of the Piltun bay. This allowed to identify species and species ratio of shorebirds and other birds harvested here.

We surveyed settlements and hunting sites in the south of Sakhalin: Anivsky, Kholmsky, Korsakovsky districts in mid-September and in the central part (Dolinsky, Poronaysky, Makarovsky districts) in the end of September (fig. 10). Furthermore, we had meetings with the employees of local administration responsible for issues connected with hunting.

We received the main information on the shorebird hunting through detailed interviews with hunters directly at hunting sites as well as in settlements. Hunters who provided the most valuable information were interviewed in stages at subsequent meetings. In total we conducted in-depth interviews with 50 hunters at the territory of 10 administrative districts of the Sakhalin oblast (fig. 8) as well as in the city of Yuzhno-Sakhalinsk. We conducted interviews on telephone with the employees of the Kuril forest services and hunters at Iturup island (the Kuril district). Based on the conducted surveys, we give general characteristics of shorebird hunting in a number of settlements of the Sakhalin oblast (fig. 9).

The survey of each model settlement included two stages. First, we conducted an in-depth interview with 2-3 experts in order to identify at a qualitative level the general picture of the way how shorebird hunting occurs at this place and how important it is for both local hunters and visitors. As shorebirds are not usually shot in Sakhalin in spring, we focused out attention on the summer-autumn season. Because shorebirds are often not the targeted hunting object, we also identified the general picture of waterfowl hunting when shorebirds could also be shot.

An interview lasted approximately 1.5 hours on average and included a few dozen questions asked in a free form on the following topics:

1. General information about the settlement population, number of hunters, possession of hunting weapon by the settlement residents and transport used for hunting.

2. Whether people from other places visit the settlement for the purpose of hunting, how often and how many.

3. Places where residents of the settlement hunt shorebirds as well as places where they hunt waterfowl birds, harvesting shorebirds intentionally or incidentally.

4. An approximate estimate — from the expert's point of view — of the number of local residents and visitors who take part in such hunting.

5. Ways local hunters usually use to hunt shorebirds.

6. Whether hunting has become more or less intensive in recent years, the number of hunters increased or decreased.

7. To what extent rules and periods of hunting are followed in this area. Whether the hunters know which shorebird species are banned from hunting. Whether local residents possess unregistered firearms. How regularly inspectors and police control compliance with hunting rules.

An interview could be more or less detailed depending on how interesting was the information the hunter could provide. "Snowball" method was used to create a sampling of hunters. The method involves each hunter who answers the questions or completes the questionnaire to give contact information of one or more other hunters. Furthermore, we interviewed hunters that we met at hunting sites.

We also used anonymous questionnaires completed by hunters themselves. That is why the questionnaire was made as short as possible as each extra question increases the possibility that the hunter would think the questionnaire is too complicated and would not want to spent time completing it. As shorebird hunting is not popular everywhere, a special shorebird questionnaire could cause misunderstanding on the part of some hunters and refusal to complete it. That is why it also included questions on waterfowl hunting. The questionnaire contained three groups of questions.

A. Questions on shorebird hunting

1. Did you hunt shorebirds in the last five years? (YES, NO)

2. How many Whimbrels did you harvest last year?

3. How many other shorebirds (apart from Whimbrel) did you hunt in the last year, including the number of large, medium and small-sized shorebirds?

4. If you know, write the names of shorebird species that you harvested (you can give a local name)?

5. How often are shorebirds harvested by other hunters (apart from you) in your district (OFTEN; REGULARLY; INCIDENTALLY WHILE HUNTING OTHER BIRDS; NEVER)?

6. Who hunts them (LOCALS FROM YOUR VILLAGE; VISITORS; BOTH LOCALS AND VISITORS)?

7. Specify the months when shorebirds are hunted in your area.

The last question is aimed to identify whether hunters violate hunting rules.

B. Questions on waterfowl hunting: the hunter was asked to specify the number and species of ducks and geese, harvested in spring and autumn of last year.

C. Questions about hunters themselves: age, hunting experience and districts where they hunted birds in the last five years.

Paper-based anonymous questionnaires were completed when we met hunters during field work. In total we collected 57 anonymous questionnaires in such a way. To distribute them through Hunting Agency and hunting societies, a traditional method which was applied in Kamchatka in 2019, was not possible as starting from this year the hunting permits in the Sakhalin oblast are issued through the system of state Multifunctional Centres1. Thus, there is no direct contact between hunters and employees for the Ministry for Forestry and Hunting. Therefore, they cannot distribute and collect the questionnaires. Distributing the questionnaires through forest services was also impossible as now hunters do not need to go there to receive hunting permits. The situation was made more difficult in part in connection with the requirement to follow isolation restrictions and the reduction of overall contacts between people because of the spread of coronavirus (COVID-19). These were special circumstances of 2020. This reduced our capability to conduct survey.

The tools of the field survey (fig. 11; Annex 1-5) included:

a) a list of questions, completed by the interviewer based on the hunter's answers during an individual interview with him (Annex 1);

b) a form completed for a settlement based on the results of preliminary communication with hunters living there (Annex 2);

c) anonymous questionnaires, distributed during in-person meetings with hunters and posted in the Internet (Annex 3);

d) hand-out materials; postcards and calendars with images of different shorebird species and additional information (Annex 4);

e) coloured table with pictured of shorebirds, for which the most frequently sighted species in Sakhalin were chosen (Annex 5).

Moreover, an anonymous online questionnaire on shorebird hunting was created to be distributed on the Internet. At the same time as we conducted field survey, we posted online questionnaires https://bit.ly/888hunt at the following websites:

[1] Multifunctional Centre is a state service, providing a wide range of municipal and state services to the population.

Official site of the Ministry for Forestry and Hunting of the Sakhalin oblast (https://les2.sakhalin.gov.ru/dejatelnost/okhotniche-khozjaistvo/vnimanie-okhotnikam/)

"Hunting and Fishing in Sakhalin" group in "Vkontakte" social networking site (https://vk.com/club60451242 ; https://vk.com/club12118291)

Website about firearms Guns.ru (https://forum.guns.ru/forummessage/129/206775-251.html)

Online news outlet "SAKHCOM" (https://sakhalin.info/).

The online questionnaire was also distributed through published for this purpose pocket calendars depicting several shorebird species (Annex 4). However, the outcome of posting the online questionnaires in the Internet was extremely low. Only one questionnaire was completed in 2 months. It turned out that hunters actively communicated only in local private social groups in messengers (WhatsApp and others). Rare forums in the Internet, which we managed to find, are not very active. As for the official website of the regional Ministry for Forestry, where our questionnaire was also posted, hunters apparently visit it extremely rarely. Distributing the online questionnaires as souvenir calendars with the images of shorebirds was slightly more effective – the questionnaire was completed by only 9 respondents.

Let us address the differences of methodological approaches, which were used in Kamchatka in 2019 and in Sakhalin in 2020. There was a possibility to distribute and collect a significant number of anonymous questionnaires with the help of employees of the regional Hunting Agency in Kamchatka. It was possible because each year all the hunters of this region obtain hunting permits from the Agency employees, forestry or heads of district hunting societies. Each year they meet with every hunter and have an opportunity to suggest completing the questionnaire. This year, for the first time in Russia as an experiment, a new system was used in Sakhalin, which involved issuing permits through Multifunctional Centres. It might be more convenient for hunters but there is no direct contact between the employees pf the Hunting Agency with hunters. In 2020 Sakhalin was the only region in the Russian Federation where such procedure was used, which might be extended to other regions in the future. This situation was unexpected for the organisers of the survey and did not allow to execute the intended plan of distributing the anonymous questionnaires through the service of Hunting Agency. The method had to be revised during field work.

Focus was put on direct contacts of project participants with hunters at hunting grounds, when interviews were conducted and anonymous questionnaires were distributed and collected. At the same time direct observations of hunters were conducted including visual inspection of bird harvested by them.

This method had its advantages and disadvantages. The main restriction was that the process of receiving each completed questionnaire was time-consuming and as a result there was a significantly lower number of completed forms. Moreover, there was not a possibility to distribute anonymous

questionnaires in settlements which were not visited by the project participants and their local assistants. The exception were a few forms completed on the telephone. The advantage was the possibility to observe the hunting process, conduct a significantly higher number of informal interviews with hunters and visually inspect their harvest, which allowed to identify species of harvested shorebirds, which hunters themselves did not know.

Comparatively low number of completed questionnaires and a significant amount of informal data received during conversation with hunters, observations of the hunting process and visual impression of the sites where shorebird hunting took place made it reasonable (more practical) to abandon formal extrapolation in favour of expert estimate, which takes into account all the local features of shorebird hunting in this region. That is why we used formal extrapolation only to give an estimate of the harvest of the most abundant species (Whimbrel), as well as the total number of harvested birds. The data on the number of harvested shorebirds of rarer species is presented on the basis of our expert estimate.

First of all we calculated the average yearly harvest of shorebird species (groups of species) in 2019 by one hunter, received from questionnaires and surveys. Then, these average values were multiplied by the total number of hunters who received a bird hunting permit. In 2019 there were 7574 such permits. To precise the number of hunters who hunted birds in different districts we use the additional information received during in-person meeting or telephone conversation with forestry employees.

The average yearly harvest of shorebird species whose harvest was not established during survey was estimated by different way. We estimated it in the range of 0.01 to 0.05 harvested birds per one hunter who received a bird harvesting permit taking into account bird's relative population number in nature.

The number of harvested birds was counted separately for:

The most important species: Whimbrel, Far Eastern Curlew, black-tailed and bar-tailed Godwits.

Medium-sized and large shorebirds (excluding Whimbrel, woodcock and Snipes), including Far Eastern Curlew.

Small shorebirds (predominantly Dunlin, Red-necked Stint and others).

Some details on the estimate are presented below in the section on shorebird harvest.

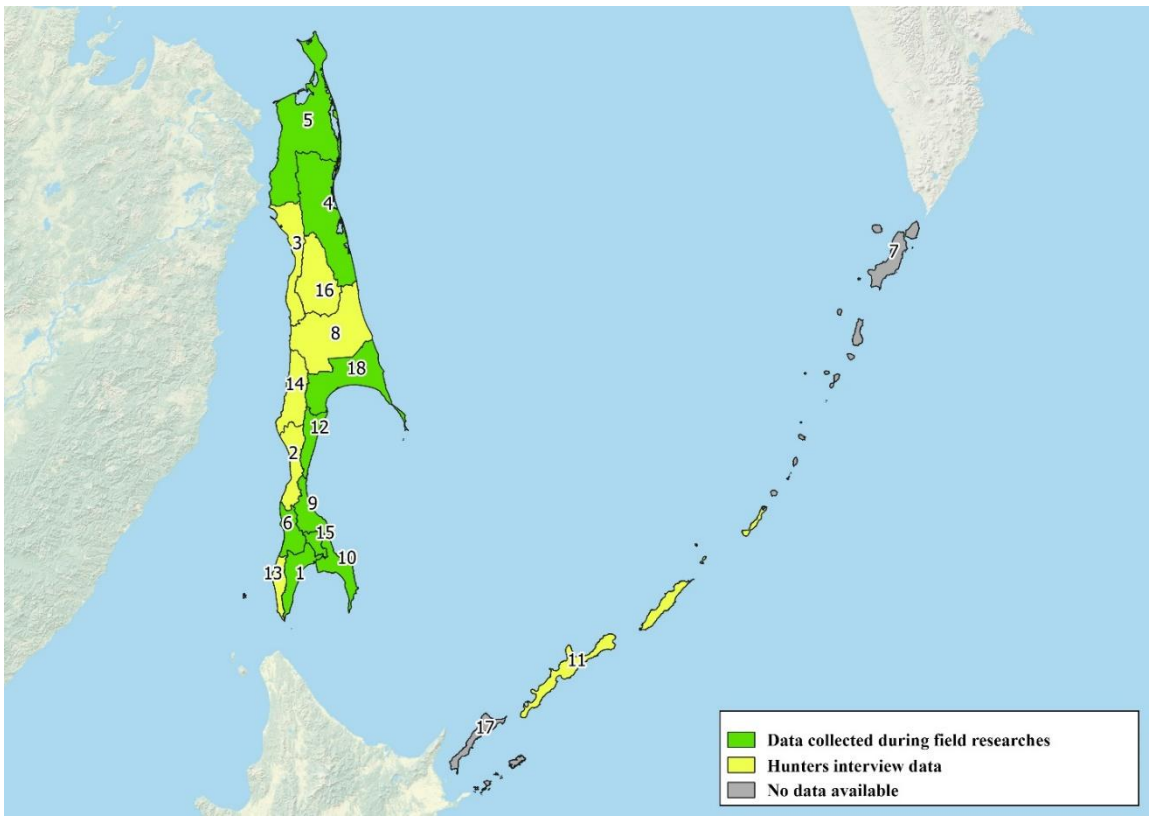

Figure 8. Districts where the data on shorebird hunting was collected in the Sakhalin oblast

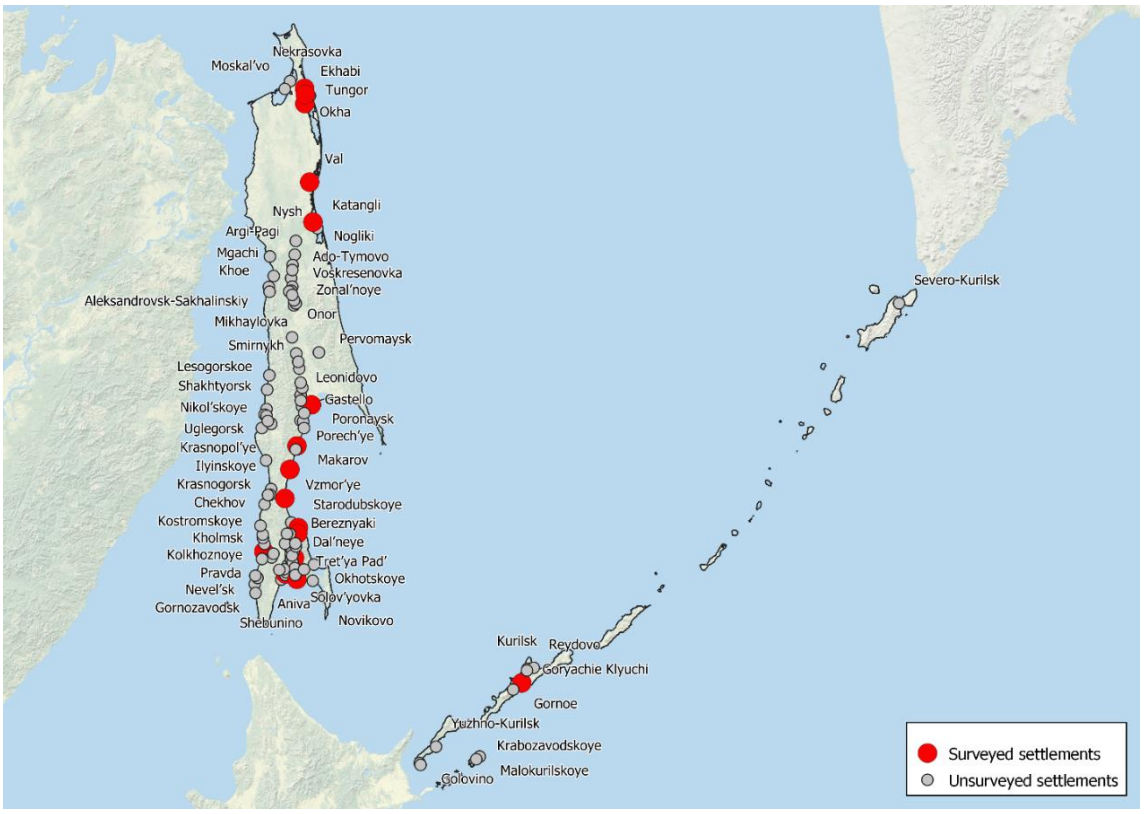

Figure 9. Location of settlements of the Sakhalin oblast for which shorebird hunting data was collected

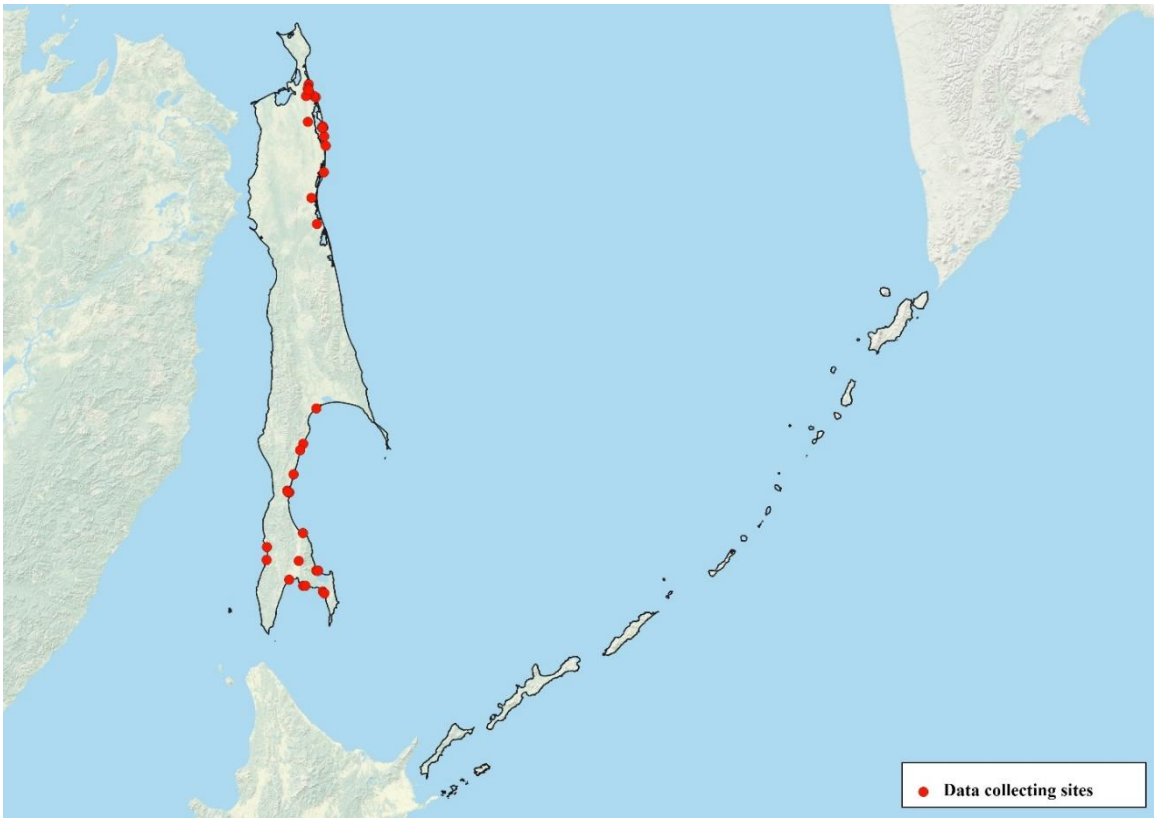

Figure 10. Shorebird hunting information collection points in the Sakhalin oblast

Figure 11. Hand-out materials for questionnaires and surveys of hunters

Figure 12. Survey of hunters in Val settlement in the Nogliksky district of the Sakhalin oblast

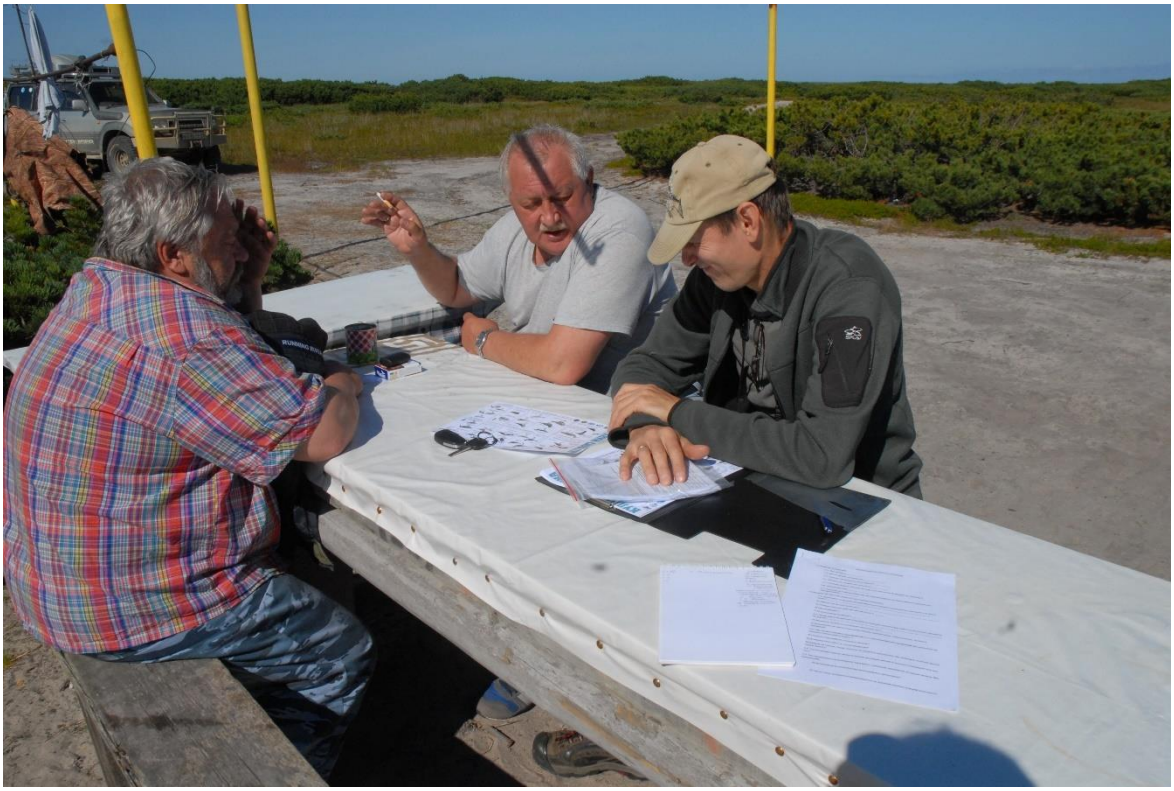

Figure 13. Conversation with hunters at the Piltun bay in the Okhinsky district, the Sakhalin oblast at the hunting grounds. Some hunters are eager to establish contact

Figure 14. Harvest inspection at the model plot at the Piltun bay.

Figure 15. Harvest inspection at the Piltun bay. A rack specially prepared to hang harvest. They can fit hundreds of birds

Figure 16. Interview with a hunter at the Piltun bay in the Okhinsky district, Sakhalin oblast. A good four-by-four vehicle and an equipped hunting base in the background

Figure 17. Conversation with an employee of the Forest service of the Okhinsky district in the Sakhalin oblast. Precision of hunting sites on the map

Figure 18. Survey of a hunter in the Vostochnoye settlement in the Okhinsky district

Figure 19. Interview with hunters and harvest inspection at the hunting sites at the Ekhabi bay in the Okhinsky district

Figure 20. An interview with a hunter at the Piltun bay — conversation is interrupted to attract a flock of Whimbrel: the hunt is on

Figure 21. A hunter demonstrates a call to attract Whimbrel. Many hunters own such calls in Sakhalin, at the same time many of them often use simple whistling and succeed

Figure 22. Survey of fishermen who are also hunters. Fishing and hunting are closely connected and widespread activities of the male population in Sakhalin

Figure 23. Shorebird counts at the Piltun bay together with ornithologists, constantly working in Sakhalin – V.B. Zykov and Z.V. Revyakina

Figure 24. Different all-terrain vehicles are used in hunting in Sakhalin. Most of them, such as this one, can go on water, equipped with a system of autonomous heating, could be used for sleeping or waiting for bad weather to pass during hunting or even to hunt. Hunters are self-sustainable for many days or weeks

4. MAIN PROJECT RESULTS

4.1. Information on shorebirds in the Sakhalin oblast

4.1.1. Number, concentration sites, migrations

Data on number and distribution of shorebirds during seasonal migrations in the Sakhalin oblast were obtained through the review of available sources (Bergman, 1931; Gizenko, 1955; Nechaev, 1991; Zykov, Revyakina, 1996; Blokhin, Kokorin, 2002; Tiunov, Blokhin, 2011). Moreover, we used the material obtained during our own observations in 2006-2011 and in 2020.

Currently, the main accounts of birds of the Sakhalin oblast are works by V.A. Nechaev such as Birds of Sakhalin island (1991), Birds of the Southern Kuril islands (Nechaev, 1969) and Birds of the Southern Kuril islands (Kunashir, Iturup, Shikotan, Khabomai) (Nechaev, Fujimaki, 1994). In 2011, a book was published on waterbirds of the Northern Sakhalin (Tiunov, Blokhin, 2011). Works in the region continue and new papers occasionally appear (Revyakina, Zykov, 2014; Valchuk et al., 2019; Matveeva, Kozlovsky, 2019; Hansen et al., 2020 and others).

Today, 62 shorebird species are recorded in the Sakhalin oblast (table 1). 34 of them only migrate through the island and are considered rare vagrant species (Nechaev, 1998). 38 species are encountered on the Southern Kuril islands (Nechaev, Fujimaki, 1994). 21 shorebird species are included in the Red Data Book of the Sakhalin oblast and 8 species are included in the Red Data Book of Russia (table 1).

There is conflicting data on the number of shorebirds encountered in the Sea of Okhotsk region, including Sakhalin island. For example, according to the data of Yu.N. Gerasimov, more than one million shorebirds annually fly through the Sea of Okhotsk region from May to November (2011), while I.M. Tiunov and A.Yu. Blokhin (2011) gave an estimate of the total number of shorebirds, annually migrating through the Northern Sakhalin and adjoining aquatories of the Sea of Okhotsk and the northern part of the Tatar Strait, at 300-500 thousand during spring migration in 2005-2011 and at 3.5-5 million birds during summer-autumn migration. We believe that the number of birds given in this study is most likely overestimated. The article published by these authors in the Stilt journal in 2010 gives preliminary data of the counts of flocks at the migratory stop-over sites in the Odoptu bay. In some cases, the count is carried out several days in a row and the number of birds is summed up. It is evident that this counting method allows for a strong possibility that the same birds are summed up as it is impossible to state with any confidence that only newly arrived birds are counted each day. Data on the total number of migratory shorebirds in the Sea of Okhotsk region is distributed unevenly. On the Kamchatka peninsula, Yu.N. Gerasimov and N.N. Gerasimov conducted systematic migratory birds counts using specific counting methods for many years (Report for the EAAFP, Australian Government and CMS, 2019). That is why with a degree of certainty we can give an estimate of abundance of a given species. As for the Sakhalin oblast,

the particularity of the shorebird migration research is that most studies of at least the last two decades were conducted as part of the monitoring of the island human-induced transformation because of oil and gas extraction and linked predominantly to the northern part of Sakhalin island (Blokhin, Kokorin, 2002; Blokhin, Tiuniv, 2004; Revyakina, Zykov, 2014; Valchuk et al., 2019). And even though this part of the island is the most attractive for migratory waterbirds (due to the abundance here of bays with vast mudflats) and is characterised by high concentration of migrants, the inconsistency of tasks, count methods and data processing does not allow to get an overview of the total number of bird species migrating through the region. It is evident that to obtain more detailed information on the number of migratory shorebirds in the Sakhalin oblast, it is necessary to conduct special large counts using relevant methods (Lappo et al., 2012).

Table 1. List of the Sakhalin oblast shorebirds

No	Species	Red Data Book of Sakh. Oblast	Red Data Book of Russia	List	Number Category	Status		
				IUCN		N	Tr	3
1	Greater Painted-Snipe *Rostratula benghalensis*			LC				+
2	Grey Plover *Pluvialis squatarola*			LC	C		+	
3	Pacific Golden Plover *Pluvialis fulva*			LC	C		+	
4	Common Ringed Plover *Charadrius hiaticula*			LC	P		+	
5	Little Ringed Plover *Charadrius dubius*			LC	U	+	+	
6	Long-billed Plover *Charadrius placidus*			LC				+
7	Mongolian Plover *Charadrius mongolus*			LC	A		+	
8	Kentish Plover *Charadrius alexandrinus*	+		LC	P	+		
9	Eurasian Dotterel *Eudromias morinellus*			LC	P		+	
10	Northern Lapwing *Vanellus vanellus*			NT	P		+	
11	Grey-headed Lapwing *Vanellus cinereus*			LC				
12	Turnstone *Arenaria interpres oahuensis*			LC	U		+	
13	Black-winged Stilt *Himantopus himantopus himantopus*	+		LC				+
14	Black Oystercatcher *Haematopus bachmani*			LC				
15	Oystercatcher *Haematopus ostralegus osculans*	+		NT	P		+	
16	Green Sandpiper *Tringa ochropus*	+		LC	P	+	+	
17	Wood Sandpiper *Tringa glareola*			LC	U	+	+	
18	Common Greenshank *Tringa nebularia*	+		LC	P	+	+	
19	Nordmann's Greenshank *Tringa guttifer*	+	+	EN	P	+	+	
20	Redshank*Tringa totanus*			LC	U	+	+	
21	Spotted Redshank *Tringa erythropus*			LC	U		+	
22	Marsh Sandpiper *Tringa stagnatilis*	+		LC				
23	Grey-tailed Tattler *Heteroscelus brevipes*			NT	C		+	
24	Wandering Tattler *Heteroscelus incanus*			LC				+
25	Common Sandpiper *Actitis hypoleucos*			LC	C	+	+	

26	Terek Sandpiper *Xenus cinereus*			LC	U		+	
27	Grey Phalarope *Phalaropus fulicarius*			LC	P		+	
28	Red-necked Phalarope *Phalaropus lobatus*	+		LC	P		+	
29	Ruff *Philomachus pugnax*	+		LC	P	+	+	
30	Spoon-Billed Sandpiper *Eurynorhynchus pygmeus*	+	+	CR	P		+	
31	Little Stint *Calidris minuta*			LC	P		+	
32	Red-necked Stint *Calidris ruficollis*			NT	A		+	
33	Long-toed Stint *Calidris subminuta*	+		LC	P	+	+	
34	Temminck's Stint *Calidris temminckii*			LC	P		+	
35	Baird's Sandpiper *Calidris bairdii*	+		LC				
36	Curlew Sandpiper *Calidris ferruginea*	+		NT	P		+	
37	Sakhalin Dunlin *Calidris alpina actites*	+	+		U	+		
38	Dunlin - *Calidris alpina*			LC	U		+	
39	Rock Sandpiper*Calidris ptilocnemis*	+	+	LC				
40	Sharp-tailed Sandpiper*Calidris acuminata*	+		LC	P		+	
41	Pectoral Sandpiper *Calidris melanotos*			LC	P		+	
42	Great Knot *Calidris tenuirostris*		+	EN	A		+	
43	Red Knot *Calidris canutus*			NT	U		+	
44	Western Sandpiper *Calidris mauri*			LC				
45	Sanderling *Calidris alba*			LC	C		+	
46	Buff-breasted Sandpiper *Tryngites subruficollis*	+	+	NT				
47	Broad-billed Sandpiper *Limicola falcinellus*	+		LC	P		+	
48	Jack Snipe *Limnocryptes minimus*			LC				
49	Common Snipe *Gallinago gallinago*			LC	U	+	+	
50	Latham's Snipe *Gallinago hardwickii*	+	+	LC	C	+	+	
51	Swinhoe's Snipe *Gallinago megala*			LC				
52	Pin-tailed Snipe *Gallinago stenura*			LC	P		+	
53	Solitary Snipe *Gallinago solitaria*	+		LC	P		+	
54	Eurasian Woodcock *Scolopax rusticola*			LC	C		+	
55	Little Curlew *Numenius minutus*	+		LC	P		+	
56	Eurasian Curlew *Numenius arquata*			NT				
57	Far Eastern Curlew *Numenius madagascariensis*	+	+	EN	A		+	
58	Whimbrel *Numenius phaeopus*			LC	A		+	
59	Black-tailed Godwit *Limosa limosa*	+		NT	A		+	
60	Bar-tailed Godwit *Limosa lapponica*			NT	C		+	
61	Long-billed Dowitcher *Limnodromus scolopaceus*			LC				+
62	Oriental Pratincole *Glareola maldivarum*			LC				+

Abbreviations: A – abundant, C – common, U – uncommon, R – rare; N – nesting, Tr – transient, Acc – accidental.

According to some data, Mongolian Plover, Red-necked Stint, Dunlin, Great Knot, Whimbrel and Black-tailed Godwit are abundant during seasonal migrations in the Northern Sakhalin (Table 2) (Blokhin, Kokorin, 2002; Tiunov, Blokhin, 2011).

Table 2. The maximum recorded number of birds of the most common shorebird species in 2005-2010 in the north of Sakhalin (according to Tiunov, Blokhin, 2011)

Species	The maximum number of counted birds per season in 2005-2010	
	spring	autumn
Grey Plover	100	100
Pacific Golden Plover	100	1200
Mongolian Plover	650	≥5100
Turnstone	50	65
Wood Sandpiper	250	>4100
Common Greenshank	200	>300
Spotted Redshank	4	170
Grey-tailed Tattler	10	100
Common Sandpiper	20	50
Terek Sandpiper	30	100
Red-necked Phalarope	5000	1700
Red-necked Stint	4200	>52000
Long-toed Stint		617
Sakhalin Dunlin		600-1000
Kamchatka Dunlin	3700	180000
Great Knot	750	53000
Red Knot	16	4300
Sanderling	3000	2000
Whimbrel	130	6400
Black-tailed Godwit	90	43000
Bar-tailed Godwit	150	>1000

According to the data obtained by other researchers (Revyakina, Zykov, 1996) in the Lunsky bay, also located on the north-eastern coast of the island, the truly abundant species are only Red-necked Stint and Dunlin (Kamchatka subspecies) (Table 3). The numbers of Mongolian Plover, Whimbrel and Black-tailed Godwit are much lower.

Table 3. Species composition and number of shorebirds at the Lunsky bay in 1989-1991 (Zykov, Revyakina, 1996)

	Month							Total
	V	VI	VII	VIII	IX	X	XI	
Тулес - Grey Plover *Pluvialis squatarola*	8	-	5	-	16	7	-	36
Бурокрылая ржанка - Pacific Golden Plover *Pluvialis fulva*	56	35	1	21	-	-	-	113
Малый зуек - Little Ringed Plover *Charadrius dubius*	26	3	4	2	-	-	-	35
Монгольский зуек - Mongolian Plover *Charadrius mongolus*	265	516	1084	153	450	-	-	129
Камнешарка - Ruddy Turnstone *Arenaria interpres*	2		87	36	4	-	-	129
Ходулочни - Black-winged stilt *Himantopus himantopus*	1	-	-	-	-	-	-	1
Кулик-сорока - Oystercatcher *Haematopus ostralegus*	2	-	60	-	-	-	-	62
Фифи - Wood Sandpiper *Tringa glareola*	121	-	244	67	8	-	-	440
Большой улит - Common Greenshank *Tringa nebularia*	78	-	60	135	87	-	-	360
Охотский улит - Nordmann's Greenshank *Tringa guttifer*	1	1	-	1	-	-	'-	3
Травник - Redshank *Tringa totanus*	25	101	35	1	2	-	-	164
Щеголь - Spotted Redshank *Tringa erythropus*	3	-	-	-	30	-	-	33
Сибирский пепельный улит - Grey-tailed Tattler *Heteroscelus brevipes*	20	57	161	58	61	-	-	357
Перевозчик - Common Sandpiper *Actitis hypoleucos*	31	12	10	9	-	-	-	62
Мородунка - Terek Sandpiper *Xenus cinereus*	6	6	578	88	2	-	-	680
Плавунчик плосконосый - Grey Phalarope *Phalaropus fulicarius*	-	-	-	-	1	-	-	1
Плавунчик круглоносый - Red-necked Phalarope *Phalaropus lobatus*	152	63	12	-	108	-	-	335
Лопатень - Spoon-billed Sandpiper *Eurynorhynchus pygmeus*	-	-	-	8	2	-	-	10
Песочник - красношейка - Red-necked Stint *Calidris ruficollis*	1744	3730	7894	1961	571	-	-	15900
Длиннопалый песочник - Long-toed Stint *Calidris subminuta*	89	8	74	8	-	-	-	179
Белохвостый песочник - Temminck's Stint *Calidris temminckii*	3	-	-	-	-	-	-	3
Краснозобик - Curlew Sandpiper *Calidris ferruginea*	-	2	-	2	-	-	-	4
Чернозобик - Dunlin *Calidris alpina*	2629	65	2809	1576	651	283	12	8025
Большой песочник - Great Knot *Calidris tenuirostris*	2	-	66	101	56	-	-	225
Исландский песочник - Red Knot *Calidris canutus*	-	-	1	41	80	-	-	122
Песчанка - Sanderling *Calidris alba*	2	-	-	-	-	-	-	2
Бекас - Common Snipe *Gallinago gallinago*	9	4	2	2	5	-	-	22
Японский бекас - Latham's Snipe *Gallinago hardwickii*	1	-	-	-	-	-	-	1
Дальневосточный кроншнеп - Far Eastern Curlew *Numenius madagascariensis*	-	-	12	19	1	-	-	32
Средний кроншнеп - Whimbrel *Numenius phaeopus*	106	5	95	434	1	1	-	642
Большой веретенник - Black-tailed Godwit *Limosa limosa*	81	2	459	127	2	-	-	671
Малый веретенник - Bar-tailed Godwit *Limosa lapponica*	1	-	-	48	74	-	-	123
Total	5464	4610	13703	4900	2272	291	12	31252

Dash represents the absence of recorded birds

Current information on the total number of migratory shorebirds in the Sakhalin oblast is insufficient. The total number of shorebirds available for hunting is also unknown. As a rule, these are birds of medium and large size which are not as abundant as some small species. None of the researchers estimate their population status higher than "common species" (Table 5). There is information on isolated sightings and on flock sizes for the majority of species (Voronov, Voronov, 1980; Nechaev, 1991; Nechaev, 1998). The existing data on the number of the species and population dynamics is limited to certain areas in different seasons but does not cover the region as a whole.

The main concentration sites of shorebirds during migration are shallow, awash at low tide parts of the shore of the Aniva bay, the gulf of Terpenia, lagoon bays at the north-eastern coast of the island from the Lunsky bay to the Kuegda bay at the Schmidt peninsula, the Pomr' and Baikal bays at the western coast of Sakhalin (Fig. 3-7; (Nechaev, 1978; Tiunov, Blokhin, 2011)).

The largest gatherings of birds can be observed at the north-eastern coast of the island. Non-nesting birds and birds that lost their eggs start to gather here at the end of June. Their number constantly

increases, reaching the maximum in the second half of July (Nechaev, 1978; Zykov, Revyakina, 1996; Tiunov, 2010).

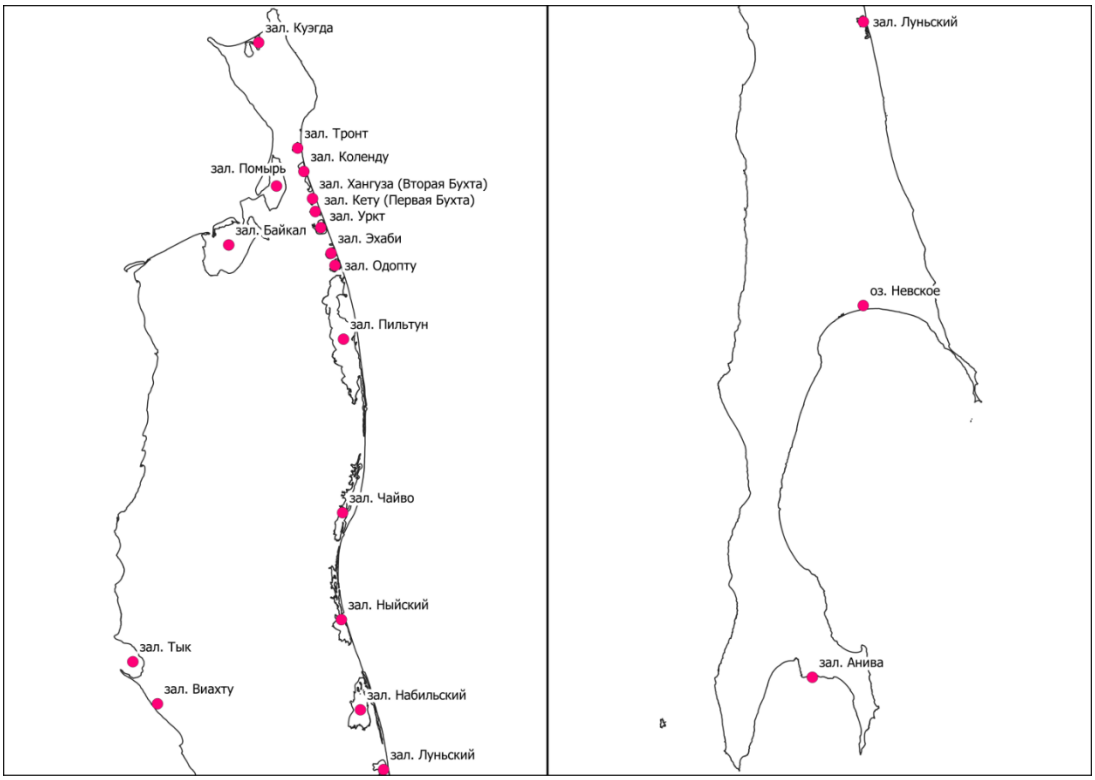

Figure 25. The bays of Sakhalin island are concentration sites of migratory shorebirds

The timing and intensity of shorebird spring migration in Sakhalin and the Kuril islands depend on their resident status in the area. Nesting species arrive early, unnoticeably and immediately settle in the nesting sites. The earliest arrivals of shorebirds are recorded in the south of Sakhalin in the early and mid-April (Voronov, Voronov, 1980). Spring migration in the south of Sakhalin in the Aniva bay and the gulf of Terpenia starts in the early May and finishes in the early June. Peak migration takes place in the end of May. In the north-eastern coast of Sakhalin the most intensive migration is also in the end of May – early June (Nechaev, 1978). The majority of birds pass rapidly within a short time frame of 2-3 days. Small shorebirds fly in large dense flocks (100-500 birds). Large shorebirds such as Whimbrels were seen in flocks of 30-150 birds in 1975 and 1978 (Voronov, Voronov, 1980). V. A. Nechaev (1991) recorded flocks of 50-200-300 birds in the Piltun, Nabilsky and even Aniva bay in the 70s – early 80s of the last century. Far Eastern Curlew flocks of 50-200 birds were common in the Aniva bay in the spring in the 1970s (Voronov, Voronov, 1980; Nechaev, 1991). Recent publications do not mention the sightings of large flocks of Far Eastern Curlew in Sakhalin. Individual birds were encountered during spring migration and individual birds or small groups of up to 10 birds were seen during summer-autumn migration (Tiunov, Blokhin, 2011).

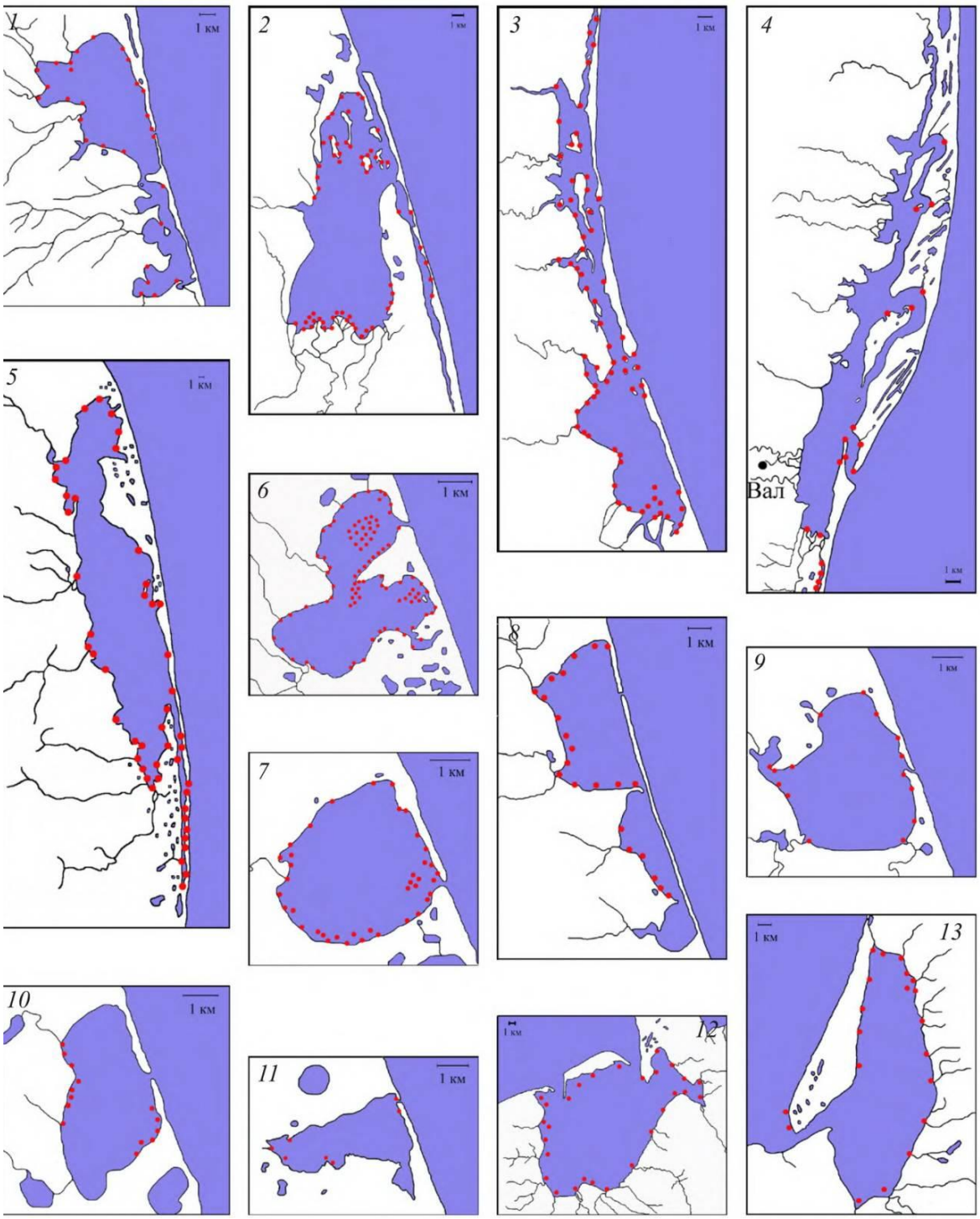

Figure 26. Concentration sites of shorebirds during summer-autumn migration in the bays of the northern Sakhalin: Lunsky (1), Nabilsky (2), Nyisky (3), Chayvo (4), Piltun (5), Odoptu (6), Ekhabi (7), Kolendo (8), Urkt (9), Khanguza (10), Ketu (11), Baikal (12), Pomr' (13) (Tiunov, Blokhin, 2011)

In Sakhalin shorebirds mostly fly along the western coast in spring and mostly along the Sea of Okhotsk side in autumn (Voronov, Voronov, 1980). Significant number of shorebirds transit over the sea, mostly at night time. Migration of birds in the north-west of Sakhalin happens earlier than in the north-

east. Shorebird gatherings are recorded mostly on the sea shore, in the mouths of bays, rivers and creeks as the bays are still covered with ice at the time (Tiunov, Blokhin, 2011).

Nechaev (1978) identified three main flyways of spring migration:

- The first (northern) - from Hokkaido island to the Tonino-Anivsky peninsula, the Aniva bay and further along the eastern coast of Sakhalin. First stop-overs for migrants are in the Aniva bay and on the shore of the Mordinov bay. The main part of shorebirds (all Calidris species, Phalaropes, Plovers, most Greenshanks and others) go from these sites along the coast of the Sea of Okhotsk or fly straight north-east through the gulf of Terpenia to the eastern coast of the island. The minority (Plovers, Common Sandpipers, Wood Sandpipers, Common Snipes and others) fly from the Aniva bay through central parts of Sakhalin along the Susunai valley to the gulf of Terpenia, and then through the Tym-Poronai valley to the north-eastern coast of the island, where they mix with the group of birds flying along the coast. Migration of shorebirds along the western coast is feebly marked.

- The second flyway is along the coast of the Primorsky krai to Lazarev cape, then through the Nevelskoy strait to Sakhalin and then either northwards or even southwards to the western and eastern shores. The majority of migratory shorebirds follows this flyway.

- The third flyway (eastern) is along the Amur valley to its mouth, then through the Amur estuary to Sakhalin, after that to western or eastern coast, then northwards or even southwards to the Lunsky bay. The main part of Redshanks, apparently Ruffs and the whole population of Nordmann's Greenshanks follow this flyway to Sakhalin. Thus, three flyways join together in the Northern Sakhalin and migratory shorebirds reach large numbers (Nechaev, 1978).

Summer-autumn migrations of adult birds take place in the second half of July and in August, of young ones – in August-September; several flocks of some species fly in October and even early in November (Nechaev, 1978).

Autumn migration of shorebirds over the Kuril islands is not very intensive. Only 625 shorebirds of 11 species were recorded on Iturup island during the period of counts from August 15 to September 3, 2009. Red-necked Stint (50,7%) and Whimbrel (22,7%) prevailed on the western shore of the island, Grey-tailed Tattler (50,7%) and Red-necked Stint (24,1%) were the most numerous on the eastern shore (Matsyna et al., 2010).

Unfortunately, data on the autumn migration of shorebirds in Sakhalin is insufficient. In particular, there is severe lack of reliable count data on the number of different shorebird species in key areas of the region, collected with a uniform method as a part of specialized rather than occasional counts. There is a significant information gap as shorebird hunting in Sakhalin takes place almost exclusively in autumn. The lack of data on autumn number of shorebirds and its dynamic over the years do not allow to form a clear view of the bird flyways in the Sakhalin oblast. Currently we can use only general outlines and assumptions as reference.

4.1.2 Shorebird protection

21 shorebird species included in the regional Red Data Book are considered protected at the territory of the Sakhalin oblast (table 4). In accordance with the current legislation of the Russian Federation (Order of the Ministry of Natural Resources of 28 April 2008 approving «Guidelines for calculating the monetary value of damage to animal species listed in the Russian Red Data Book and to other animal species not subject to hunting or fishing and their habitats») heavy fines are imposed for the illegal harvest of several shorebird species:

Species	Roubles	USD
Oystercatcher	10 000	150
Nordmann's Greenshank	10 000	15
Spoon-billes Sandpiper	75 000	1 100
Sakhalin Dunlin	25 000	350
Latham's Snipe	10 000	150
Far Eastern Curlew	25 000	350

Unfortunately, both hunters and officials of controlling public services are not aware of this information. We do not have information on any charges for the harvest of protected shorebird species in the Sakhalin oblast. On the contrary, information about a similar fine (25 000 roubles) and criminal liability for the harvest of Bewick's Swan is widely spread among hunters. Far Eastern Curlew is the only shorebird species whose protected status is known to at least 15% hunters interviewed and to the majority of protection officials. Unfortunately, the training level of inspectors does not allow to identify these birds in the hunters' bag. There is an analogous situation with other similar shorebird species such as Black-tailed Godwit and Bar-tailed Godwit, Common Greenshank and Nordmann's Greenshank and others. The example of the Sakhalin Dunlin is emblematic as it is impossible to identify it in the hunters' bag among other subspecies without special skills. Nevertheless, current Hunting Regulations could provide an opportunity to increase the level of hunters responsibility for harvesting bird species that are hard to identify or unknown to them. It is necessary to give hunters more information on the rare species and penalties for their harvest (in annual orders on the opening of the hunting season and by other means).

The system of protected areas of the Sakhalin oblast (fig. 27) includes the Poronaysky Nature Reserve (under the federal control), "Moneron Island" Natural Park, 11 state nature sanctuaries and 41 natural monuments (Nechaev, 1998). Important Bird Areas (IBAs), significant for both nesting and migratory shorebirds, are also identified in the Sakhalin oblast (http://datazone.birdlife.org/site/results?thrlev1=&thrlev2=&kw=&reg=2&cty=242&snm=&fam=0&gen=0&spc=&cmn=). In particular, they include IBA North-east Sakhalin lagoons, RU3163, IBA Criteria A1, A4i, A4ii; IBA Nevskoye Lake, RU3163, IBA Criteria A1, A2, A4i, A4iii; IBA Aniva bay, RU3167, IBA Criteria A1,

A4i, A4iii; IBA Kuril islands (between Urup and Paramushir), RU3168, IBA Criteria A1, A4i, A4ii, A4iii. However, the IBAs are not marked in the field, not listed in the documents, the locals and even state officials, who should protect birds by virtue of their position, are not aware of their existence.

A number of natural sites, important for shorebird protection, are recommended to be included in the List of wetlands protected by the Ramsar Convention. However, this does not give them any protected status (table 4).

Table 4. Wetlands included in the Perspective list of the Ramsar Convention ("Shadow" list of wetlands of international importance, http://www.fesk.ru/regions/61.html)

No	Name	Type	Parameter
1	North-east Sakhalin lagoons	J	1, 3, 5, 6, 8
2	Swamped plain from the Viakhtu bay to the Tenga river valley in the north-western shore of Sakhalin	Ts, O, P	1, 2, 3, 5
3	Nevskoye Lake with the nearby plain	O, L, U, Ts	1, 2, 3, 5, 8
4	The Salmon bay in the Aniva bay	A, B, G, H, F	1, 3, 5, 8

The Poronaysky Nature Reserve is located in the central part of Sakhalin island and plays an important role for shorebirds stopping there during migration. This is the only protected area in Sakhalin where constant control is organized and the necessary level of bird protection is maintained. The most important shorebird concentration site is the Nevskoye lake and its surroundings as well as the shore of the gulf of Terpenia. Unfortunately, the reserve does not have an ornithologist at the moment but its territory is still the most perspective for conducting long-term shorebird species population monitoring. The reserve administration is the only organisation in the region possessing necessary material and technical resources to organize such research.

Major work on identifying prospective sites for bird population, including shorebirds, was accomplished in the Sakhalin oblast. Further efforts should be concentrated on formalizing the official protected area status of the mentioned Important Areas for Birds and wetlands (fig. 28). In addition to the already mentioned areas of interest for bird protection, we suggest conducting additional inspection and prepare justification for the creation of IBAs in the Pomr' and Baikal bay (the Okhinsky district). These bays are visited by a large number of birds during summer-autumn migrations. Ush island in the Baikal bay is known as a local concentration site for shorebirds of rare and protected species, among which are Great Knot, Bar-tailed Godwit and others. The human-induced impact in these areas is currently decreasing due to the out migration of the local population but formalizing the official protected area status of these territories is still relevant.

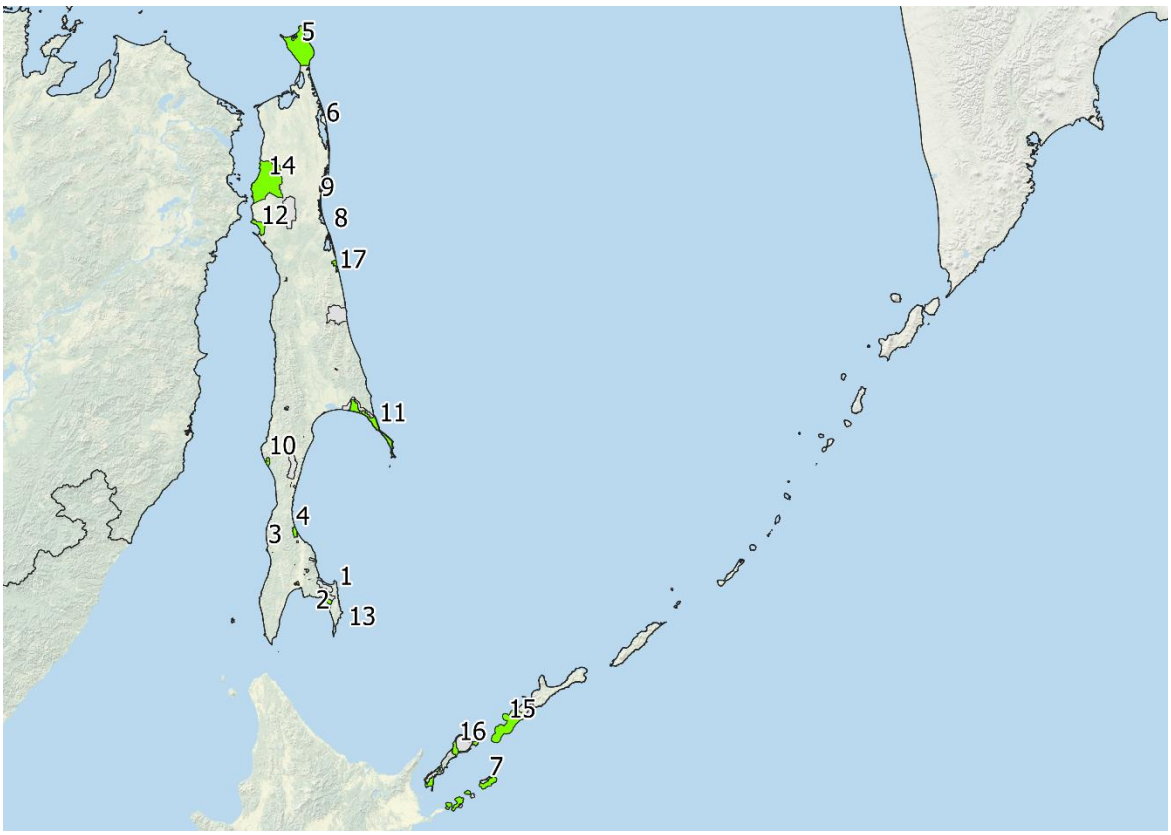

Figure 27. Existing protected areas of the Sakhalin oblast, important for shorebird conservation (NM - natural monument):

1	NM Cape Giant	9	NM Lyarvo Island
2	NM Busse Lagoon	10	Krasnogorsk Reserve
3	NM Cape Slepikovsky	11	Poronaysky State Nature Reserve
4	Dolinsky Reserve	12	Aleksandrovsky Reserve
5	Northern Reserve	13	NM Seagull Bay
6	NM Wrangel Islands	14	Tundra Reserve
7	Lesser Kurils	15	Island Reserve
8	NM Chaika island	16	Kuril State Nature Reserve Protected Area
		17	NM Lunsky Bay

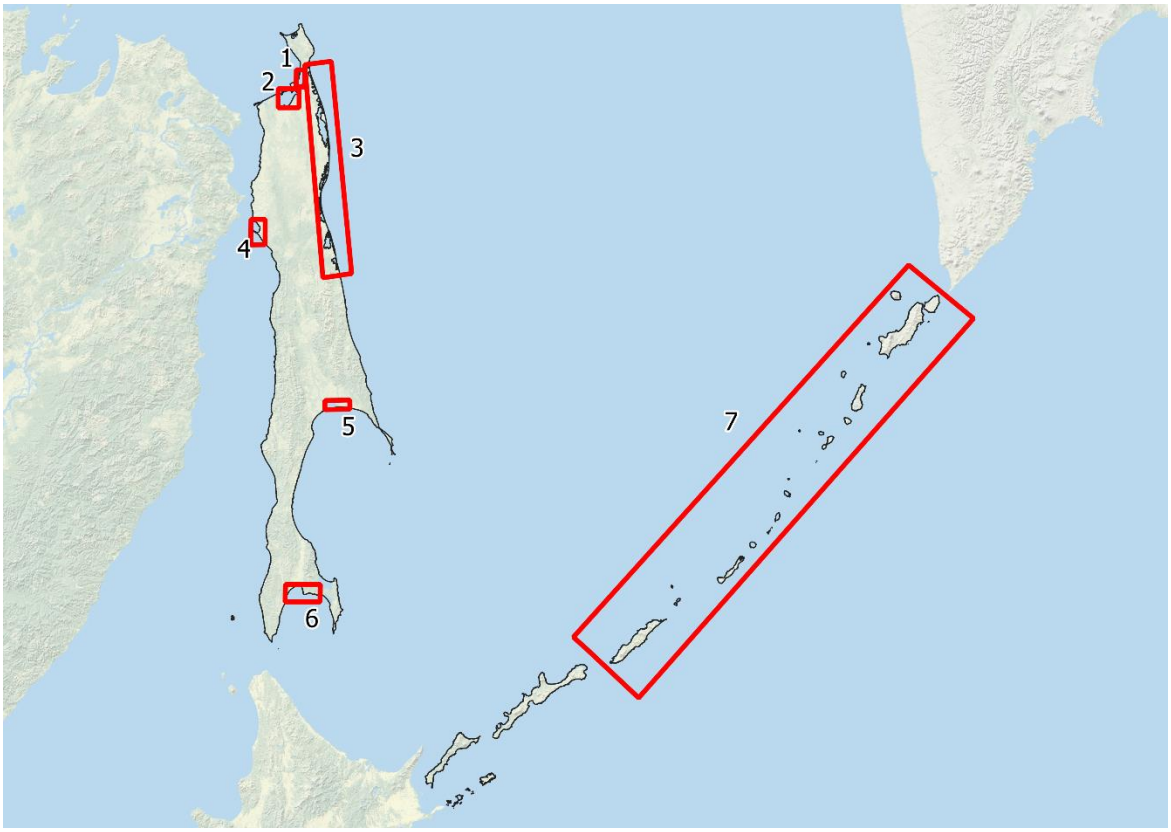

Figure 28. Recommended protected areas of the Sakhalin oblast, important for the shorebird conservation:

1	Pomr' Bay
2	Baikal Bay, Ush island
3	IBA of international importance North-east Sakhalin lagoons
4	IBA of international importance North-west coast of Sakhalin island
5	IBA Nevskoye Lake
6	IBA Aniva Bay
7	IBA Kuril islands (between Urup and Paramushir)

4.1.3. Analysis of the data of the Bird Ringing Centre of Russia

The Bird Ringing Centre of Russia has information on ring recoveries from 78 shorebirds of 15 species from Sakhalin. All of them were either shot or hurt due to hunting. 28 birds of 6 species were harvested by ornithologists during targeted shooting of shorebirds with colourful bands in order to learn their origin (Tiunov, Blokhin, 2011). These birds were excluded from the proportion analysis of individual shorebird species in the hunters' bag as they were harvested separately.

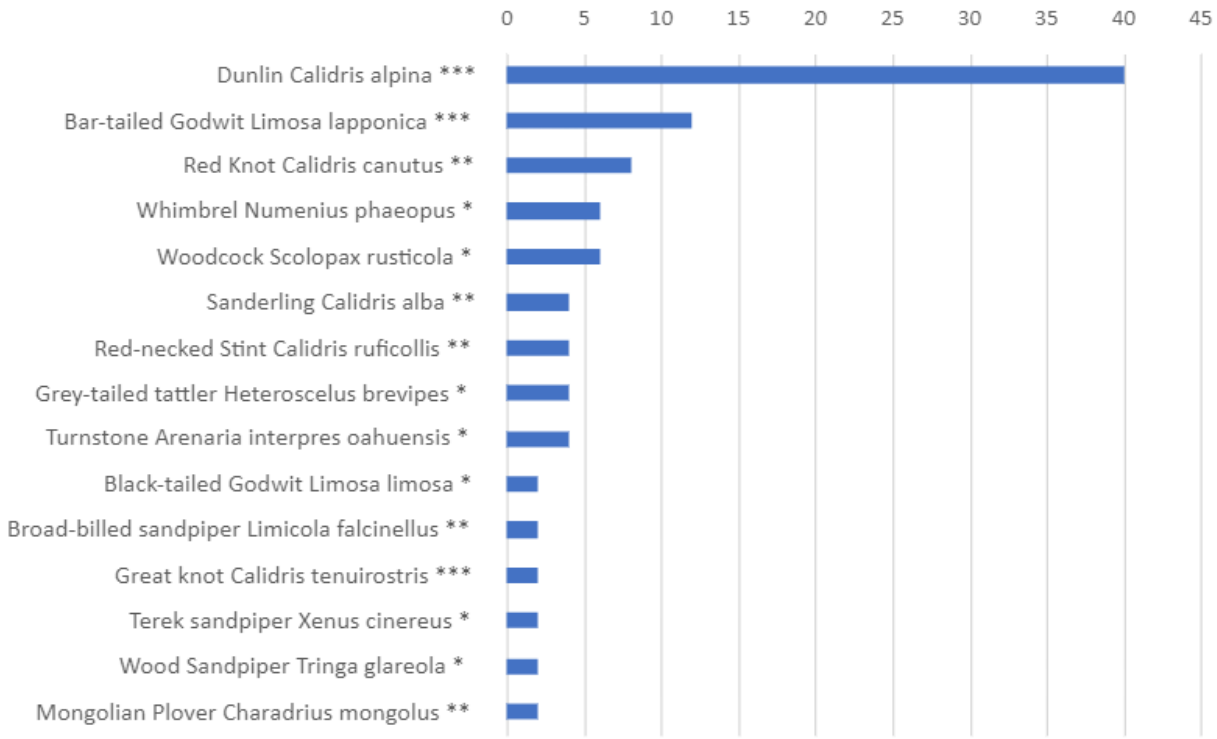

Figure 29. List and proportion of different shorebird species with recovery from Sakhalin island. * - species allowed for hunting; ** - species not allowed for hunting; *** - protected species, hunting prohibited.

Among banded birds harvested by hunters only 7 species are allowed for hunting in the Sakhalin oblast (fig. 29). The rest are either not included in the list of species officially allowed for hunting (5 species) or strictly prohibited to be harvested (3 species) due to protected status. Shorebirds prohibited to be hunted also prevail in number as they compose 74% of the total number of harvested banded birds (n=37).

The most numerous among the harvested banded birds were Dunlins, which coincides with the volume of banding in the region. Thus, 6 birds were banded in Russia: two in Kamchatka and 4 in Sakhalin, two of which were banded young when they were unable to fly in the Chayvo bay and therefore without a doubt were of protected Sakhalin Dunlin species *Calidris alpina actites*, included in the Red Data Book of Russia and the Sakhalin oblast. 7 more Dunlins were banded in Japan, 5 in China and Taiwan, 3 birds

were banded in Barrow, Alaska. The timing of the Dunlin harvest is of interest: one bird was harvested in May, July and August each; 5 in September and the most amount of 12 (60%) were shot in October. This is the period of active waterfowl migration and the peak of hunting season but small shorebirds are still harvested despite there being larger game. This fact also confirms selectiveness of hunters in relation to the harvest of smaller birds, which remain attractive game for hunters in spite of their insignificant size and weight. This distinguishes Sakhalin from many areas of Kamchatka and Chukotka where selectiveness for hunting small shorebirds is non-existent or low.

Analysis of the timing of banded birds harvest shows that 40,8% of them were harvested in May-July when shorebird hunting is prohibited in the Sakhalin oblast. Only Woodcock is allowed to be harvested in May. Among banded Woodcocks only two birds were harvested in May. They were excluded from the breakdown shown in figure 30.

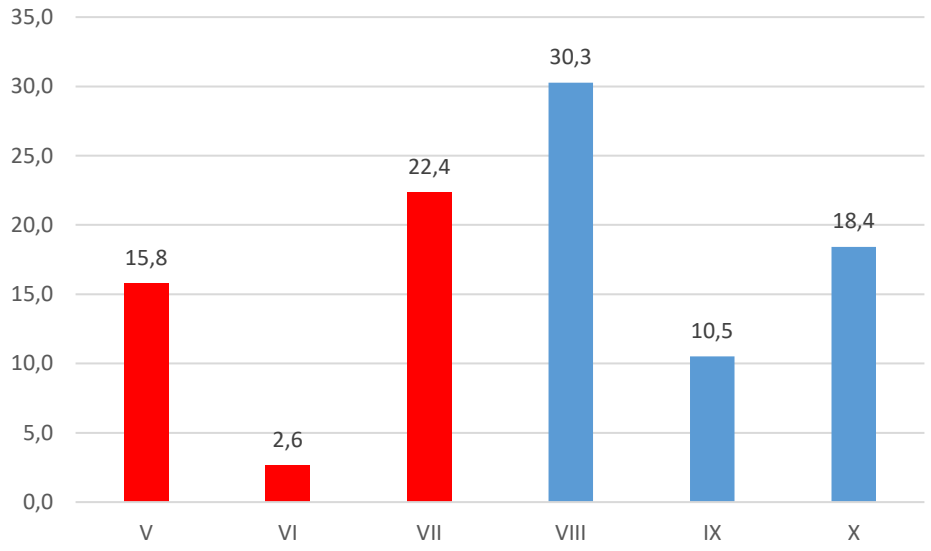

Figure 30. Distribution of the banded shorebirds harvest (n=76) over the months, %. The months when shorebird hunting in the Sakhalin oblast is prohibited are in red

The second most harvested bird with bands was Bar-tailed Godwit, a protected species included in the latest edition of the Red Data Book of Russia. Half of the birds were harvested in May. One more bird was harvested on July 1, 1992, also outside the hunting season. And only two birds were harvested in August and October when autumn hunting season is open. Hunters harvest Godwits because of their large size. However, those who shoot Bar-tailed Godwits are not aware of the fact that this is a protected species prohibited to be hunted.

Shorebirds with individual bands and tags have been harvested in Sakhalin from 1966 to the present moment. On average, 1-2 banded birds are harvested per year (fig. 31). The exception is the years, during

which banded birds were intentionally harvested by ornithologists (currently, this method of studying bird migrations is not practised).

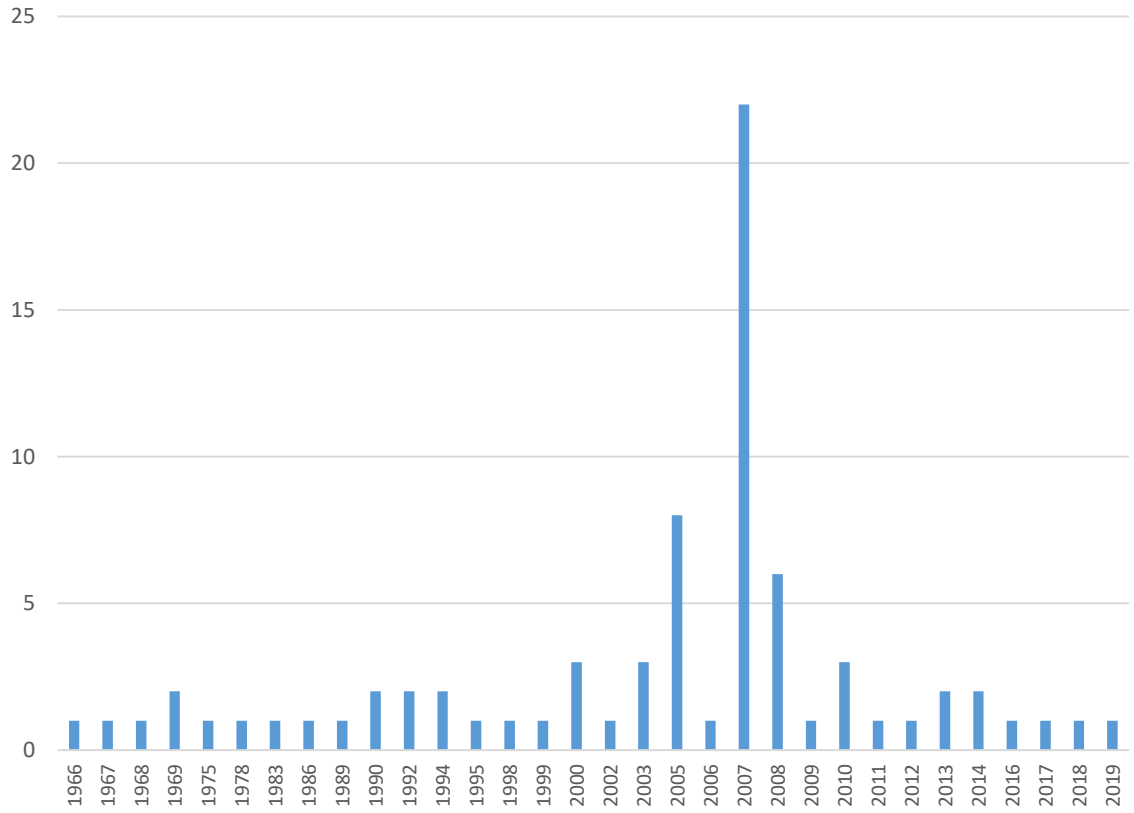

Figure 31. Harvest of banded birds in Sakhalin in different years. Intentional shooting of banded birds by ornithologists took place in 2002, 2005, 2007, 2008 and 2010.

Banded shorebirds hunting sites mainly coincide with the information on the areas of main shorebird hunting obtained during our research (fig. 32). They are predominantly concentrated in the northern and eastern part of Sakhalin island. Some birds were harvested in the south of the island, its most populated area.

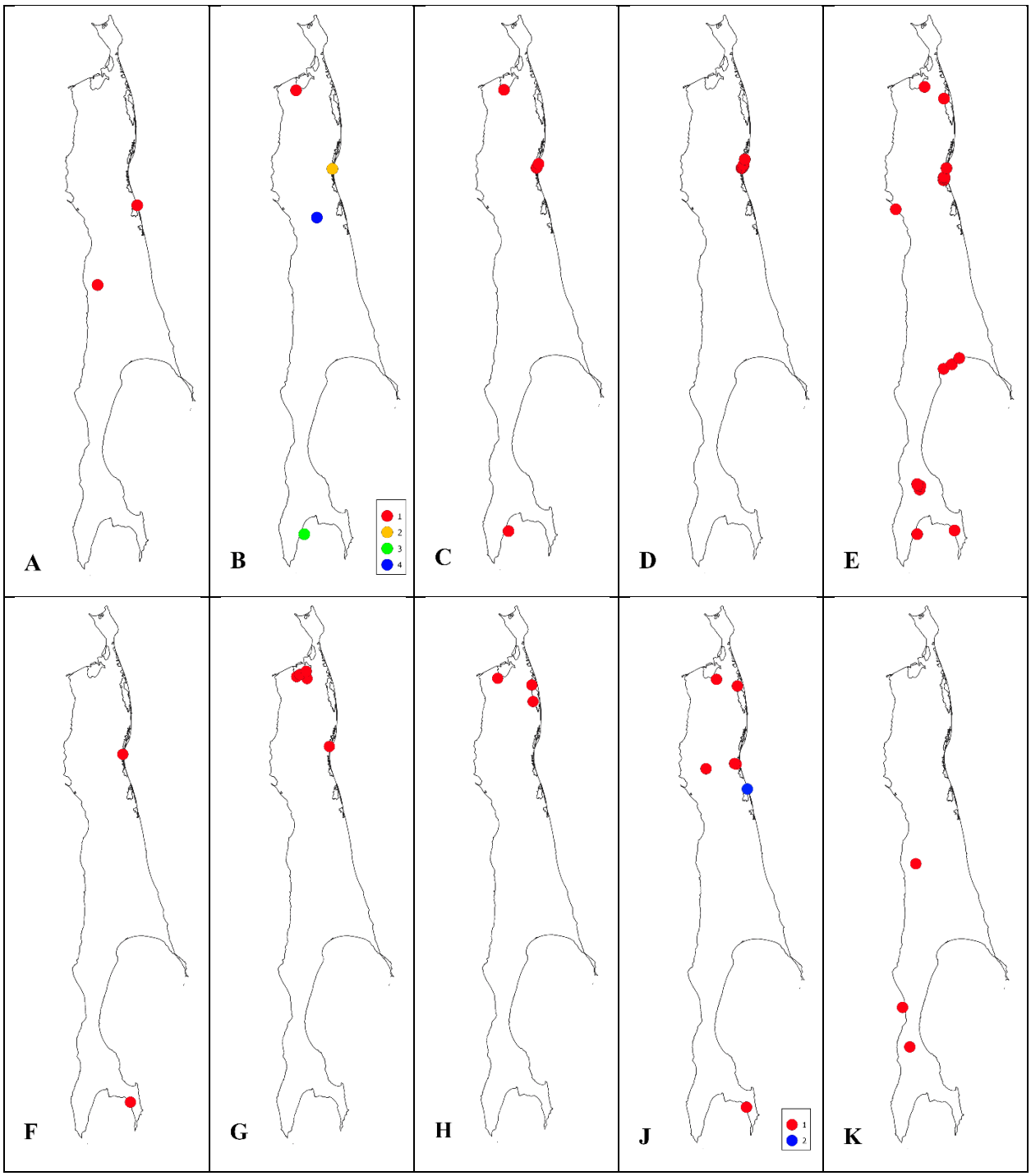

Figure 32. Sites where banded birds were harvested in the Sakhalin oblast: A – Grey-tailed Tattler; B: 1 – Broad-billed Sandpiper, 2 – Mongolian Plover, 3 – Terek Sandpiper, 4 – Wood Sandpiper; C – Red-necked Stint; D – Sanderling; E – Dunlin; F – Great Knot; G – Red Knot; H – Whimbrel; J: 1 – Bar-tailed Godwit, 2 – Black-tailed Godwit; K – Woodcock.

4.2. General information on organisation of shorebird hunting in the Sakhalin oblast

In accordance with the legislation of the Russian Federation, marsh-meadow game includes Double Snipe, Common Snipe, Jack Snipe, Ruff, Redshank, lapwing, grey Plover, Greenshanks, Godwits, Curlews, Terek Sandpiper, Turnstone, Corncrake, Rail, Spotted Crake. Thus, apart from 21 shorebird species included in the regional Red Data Book, 17 shorebird species are considered hunting object in the Sakhalin oblast, including Eurasian Curlew, a rare visitor in Sakhalin (table 5).

Table 5. List of shorebird species allowed for hunting (not prohibited) at the territory of the Sakhalin oblast

Species	**Abundance, status**			
	abundant	**common**	**uncommon**	**rare**
Grey Plover *Pluvialis squatarola*		V		
Northern Lapwing *Vanellus vanellus*			V	
Turnstone *Arenaria interpres*			V	
Wood Sandpiper *Tringa glareola*		V		
Common Greenshank *Tringa nebularia*				V
Redshank *Tringa totanus*			V	
Spotted Redshank *Tringa erythropus*			V	
Terek Sandpiper *Xenus cinereus*			V	
Jack Snipe *Limnocryptes minimus*				V
Common Snipe *Gallinago gallinago*		V		
Swinhoe's Snipe *Gallinago megala*				V
Pin-tailed Snipe *Gallinago stenura*				V
Woodcock *Scolopax rusticola*		V		
Eurasian Curlew *Numenius arquata*				V
Whimbrel *Numenius phaeopus*		V		
Black-tailed Godwit *Limosa limosa*				
Long-billed Dowitcher *Limnodromus scolopaceus*				V

As we can see, this list does not include many shorebird species, including abundant ones. Only 5 of them can be considered relatively common. The remaining species are uncommon or rare. However, in reality hunters in Sakhalin shot practically all species of shorebirds. In certain conditions any shorebird species could be harvested, including rare and protected ones. As the vast majority of hunters do not know specific names of shorebirds, cannot identify them, and do not identify prohibited species, Nordmann's Greenshank, Spoon-Billed Sandpiper, Sakhalin Dunlin, Bar-tailed Godwit can get accidentally shot along with other species. Far Eastern Curlew is harvested intentionally as this bird is in a certain sense a trophy for local hunters.

Far Eastern Curlew harvest sites are presented in the section 4.5.2., fig. 45. The main shorebird hunting strategy in Sakhalin and in the Russian Far East in general is flock shooting. Most hunters prefer to maintain a balance between used cartridges and the number (total weight, size) of harvested birds. That is why large shorebirds can be shot out of flock whereas small and medium-sized shorebirds (Stints, Greenshanks) are normally shot in dense flocks permitting to harvest many birds at a time with one or few shots. As a result of this hunting strategy, the number of wounded birds can exceed the number of harvested and retrieved ones as many wounded birds die later having flown some distance away. Most certainly, shooting shorebird flocks that often consist of several species leads to the harvest of rare species, indistinguishable in dense flocks.

Thus, 28.3% of the hunters we surveyed claimed to know prohibited species of shorebirds, but only 15.2% of the respondents could name certain species of shorebirds prohibited from hunting. None of the hunters know the full list of prohibited species, of course, except those who are experts in the field of wildlife conservation and ornithology. According to our data, the majority of Sakhalin hunters (84.7%) do not know which species are allowed and which are prohibited from hunting. Even worse is the case with practical skills to identify species of shorebirds in nature. When we tried to identify the hunted birds together with the hunters, using field guides and color images, the hunters were not even able to determine the size group or identify the approximate taxon of the bird species. Local hunters are only good at identifying Whimbrel, referring to it as "kronshpil" (variation of pronouncing "kronshnep", scientific name in Russian) and not considering it as a shorebird, and Snipes without ability to identify them to species level. Woodcock is well known among hunters in the southern areas of the island.

Hunting shorebirds as well as other birds in the Sakhalin oblast gained in popularity in the second half of the 20th century as the human population grew manifold after the Second World War (from 150 thousand to 600 thousand people and more). V.G. Voronov (1980) states that «In recent years (authors' note: the 1970s) shorebird hunting became more intensive in the Sakhalin oblast. Many "amateurs" make silhouette profiles (decoys) with sheet metal or aluminum plates, paint them to resemble Great Knot, Common Greenshank, Grey-tailed Tattler and Godwits, set them up in sites preferred by these species and do hides. Every hunter harvests up to 20-30 shorebirds a day on average». There is almost no information on the regular shorebird hunting in Sakhalin before this period. Thus, hunting pressure here increased at the same time as shorebirds started to face growing problems at wintering sites because of population growth and intensification of economic development in Asia.

Nowadays the situation has somewhat changed and massive specialized hunting of small and medium-sized shorebirds described above as a rule does not more occur. One of the possible reasons is connected with general decrease in the population of all shorebird species, including abundant ones. According to older hunters, shorebird population, of Whimbrel in particular, has decreased manifold in the last 25-30 years. Some hunters pointed out this fact as the reason why they stopped hunting

shorebirds. Nowadays hunters as a rule do not have cartridges with small shot necessary for the harvest of small birds. Hunters usually shoot shorebirds with the same shot used for duck hunting.

Hunting periods. Spring hunting in all districts of the Sakhalin oblast (except for the Okhinsky district) takes place on May 1-10. In the north of Sakhalin island (Okhinsky district) it is on May 15-24. Feather game hunting in spring period is allowed exclusively for geese (it is allowed to get 2 birds a day for one hunter) and for drakes and male Woodcocks (up to 5 birds a day for one hunter). Official spring hunting lasts for 10 days but uncontrollable harvest often starts after the waterfowl arrival and finishes at the beginning of June when ducks of local populations sit on nests (Blokhin et al., 2002).

In the summer-autumn period bird hunting takes place within the following time frames:

- marsh-meadow fowl - from the third Saturday of August to November 30;

- upland fowl - from September 15 to December 31;

- waterfowl and field fowl - from the first Saturday of September to November 30.

Hunting with hunting dogs:

- marsh-meadow fowl hunting with hunting dogs (pointers, spaniels, retrievers) - from the first Saturday of August to November 15.

Seasonal permit to harvest birds is required to hunt shorebirds in the Sakhalin oblast (fig. 33). Permits are issued through state administration Multifunctional Centers located in the regional and district centres of the Sakhalin oblast. After the hunting season is over in the end of December permits must be returned to the Multifunctional Centers within 20 days. 7500 individual permits for hunting in the current season were issued in the end of August 2020. At least a third of them were issued in the regional centre. These numbers show that the majority of hunters obtain the permits in advance and are potentially ready to participate in hunting from the first days of the season opening. In comparison, 7574 permits were issued in total in 2019, 7418 were issued in 2018. It also follows that only 30% of hunters registered in the region obtain an official permit to harvest birds in the summer-autumn period. However, during surveys we noted cases when several hunters who joined together to go to the hunting grounds used only one permit while two or more people could hunt. As a rule, permits are not obtained by underage hunters participating in hunting with their parents. It can be expected that many hunters living in remote areas can hunt without a permit. Thus, the total number of registered hunters hunting birds (with or without a permit) must be greater than the number of issued permits.

In the last decades the amount of unregistered fire arms seized from the local people has decreased significantly, which points to the decrease in number of such arms. According to the personnel of the regional Ministry for Forestry and Hunting, less than 10 unregistered firearms are seized a year whereas

this number used to be by several hundreds. This implies the reduction of poaching by unlicensed hunters. The majority of interviewed hunters noted that acquiring firearms has become more difficult while the procedure of getting a hunting license has considerably simplified as it requires only a medical certificate and paying a small state due, not passing an exam on the knowledge of hunting rules and skills to identify species allowed for hunting in the field (so called “Hunting minimum”), submitting recommendations, having experience as a beginner hunter, etc. The actual level of hunting rules knowledge is not checked when the hunting license is issued. As a result, the majority of beginner hunters cannot identify and name species allowed or prohibited for hunting.

ЛЮБИТЕЛЬСКАЯ И СПОРТИВНАЯ ОХОТА

РАЗРЕШЕНИЕ
на добычу птиц

Серия А-65 № 072210

ООО "РПЦ Офорт" г. Москва, 2017 г.

Сахалинская область

наименование органа исполнительной власти субъекта Российской Федерации, юридического лица, индивидуального предпринимателя или природоохранного учреждения

КОРЕШОК
к разрешению на добычу птиц

Разрешение получил: _____ ФИО охотника

Охотничий билет: серия _____ № _____

выдан: «____» _____ 20____ г.

Места охоты: _____ наименование охотничьих угодий

_____ подпись охотника

Дата выдачи разрешения: «____» _____ 20____ г.

Разрешение выдал: _____ ФИО уполномоченного лица

_____ М.П. Подпись уполномоченного лица

А-65 № 072210

СВЕДЕНИЯ
о добываемых охотничьих ресурсах, их количестве и сроках осуществления охоты

Таблица № 1

Вид охотничьих ресурсов	Сроки осуществления охоты: с дд/мм/гг	по дд/мм/гг	Нормы добычи (особей): за день	за сезон
плавающая:	05.09.20	30.11.20		
си			2	
ки			5	
вая	05.09.20	30.11.20	5	
-лугов.	15.08.20	30.11.20	10	
вая:	15.09.20	31.12.20		
бчик			5	
льдинеп			5	
пая и тундряная куропатки			5	
оны	15.08.20	31.12.20	*	

ограничений

Серия А-65 № 072210

СВЕДЕНИЯ
о добываемых охотничьих ресурсах, их количестве и сроках осуществления охоты

Таблица № 2

№ п/п	Вид охотничьих ресурсов	Сроки осуществления охоты: с дд/мм/гг	по дд/мм/гг	Нормы добычи (особей): за день	за сезон
1.	1.Водоплавающая:	05.09.20	30.11.20		
	1.1. гуси			2	
	1.2. утки			5	
2.	2.Полевая	05.09.20	30.11.20	5	
3.	3.Бол.-лугов.	15.08.20	30.11.20	10	
4.	4.Боровая:	15.09.20	31.12.20		
	4.1.рябчик			5	
	4.2.вальдшнеп			5	
	4.3.белая и тундряная куропатки			5	
5.	5.Вороны	15.08.20	31.12.20	*	

Внесение изменений, дополнений и правок в выданное и заполненное разрешение не допускается

* - без ограничений

Figure 33. Seasonal permit for bird harvest in the Sakhalin oblast

4.3 Number and distribution of hunters in the Sakhalin oblast

According to the data of the Ministry for Forestry of the Sakhalin oblast, the total number of hunters in the region amounted to 22965 people at the end of 2021. A quarter of them live in the regional centre, the city of Yuzhno-Sakhalinsk. At the same time, relative distribution density of hunters in different districts visibly increases with the distance from the regional centre (table 6). The highest proportion of hunters is among the population of the Kuril islands and remote districts of central and north-western part of Sakhalin. In general, there is a visible correlation – the less the total population of the district is, the higher the proportion of hunters there. As a rule, it is connected with poor development of commercial network in remote districts, which leads to certain limit in the food supply. Moreover, proximity and accessibility of hunting grounds, abundance of game on the periphery, and in some cases lack of control from the authorities allow greater number of people to take part in hunting.

Table 6. Distribution of registered hunters in districts of the Sakhalin oblast (data provided by the Department for Hunting of the Ministry for Forestry of the Sakhalin oblast)

Administrative district	**Number of registered hunters**	**%**	**Number of hunters per 100 district residents**
City of Yuzhno-Sakhalinsk	5992	26.1	2.9
Korsakovsky city district	1203	5.2	2.9
Kholmsky city district	1197	5.2	3.3
Dolinsky city district	1114	4.9	4.6
Okhinsky city district	1394	6.1	6.4
Poronaysky city district	1204	5.2	5.6
Anivsky city district	930	4.0	4.8
Uglegorsky city district	801	3.5	4.7
Nevelsky city district	840	3.7	5.7
Tymovsky city district	1316	5.7	9.4
Nogliksky city district	1421	6.2	11.9
Yuzhno-Kurilsky city district	836	3.6	7.0
Smirnykhovsky city district	897	3.9	7.7
Alexandrovsk-Sakhalinsky district	913	4.0	8.6
Tomarinsky city district	748	3.3	9.5
Makarovsky city district	792	3.4	10.4
Kurilsky city district	899	3.9	13.9
Severo-Kurilsky city district	468	2.0	18.0
Total in the Sakhalin oblast	22965	100.0	4.7

As it was noted, approximately a third of all registered hunters in the Sakhalin oblast take part in bird hunting in the summer-autumn period. However, during hunting period the majority of city dwellers

go to different districts of the island, giving preference to the northern ones. Thus, the number of hunters is considerably redistributed in accordance with their possibilities, most notably financial, transport and time-wise. Roads on Sakhalin allow to travel from the populated south to north without any effort. Okhinsky and Noglinsky districts are considered to be the most attractive shorebird (and waterfowl) hunting sites as the largest shallow lagoons – Nabil, Lunsky, Chayvo, Piltun, Baikal, Pomr and many others – are located at their territory. Nevskoye lake and its vicinity in the Poronaisky district remains the site of active hunting with participation of non-residents. Due to the proximity of the regional centre, there is a high number of hunters in Izmenchivoye Lake and in vicinity of Tunaicha Lake in the Korsakovsky district. Important staging sites for waterfowl are lakes Busse and B. Vavayskoye, also located here.

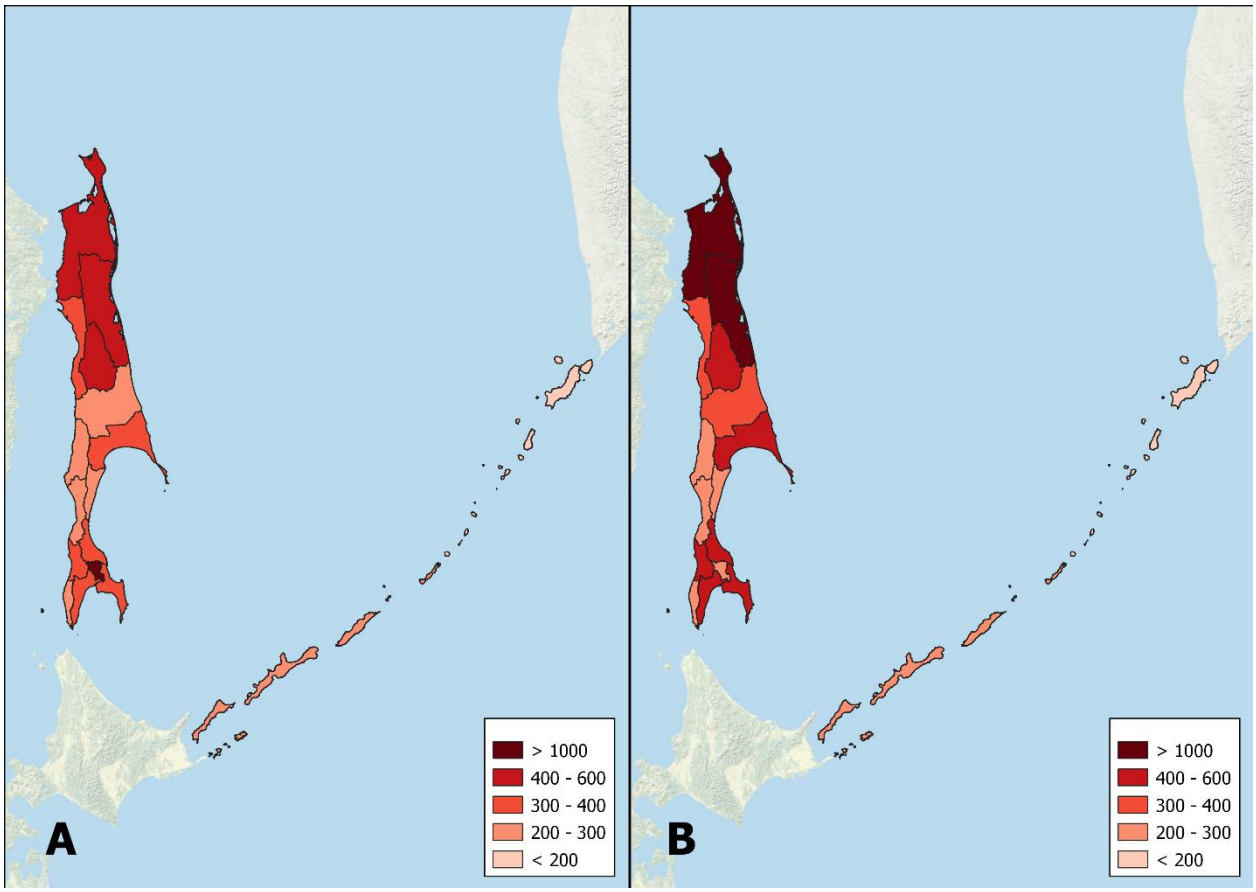

Figure 34. Distribution of hunters (n=7574) that received bird hunting permits in the summer-autumn period in 2019: A – districts where hunters reside and receive permits; B – hunting districts

Analysis of age composition of the interviewed hunters shows that more than a half of those are at the age from 21 to 40 years old (table 7). Moreover, younger hunters (up to 40 years old) compose a quarter of the surveyed group of 89 people. It is necessary to take into account that survey was conducted predominantly among hunters who currently participate in hunting. It is evident that there are ones who do not go hunting because of older age but keep the hunting license and are included in the total number of hunters in the region. But they are not many.

Table 7. Age composition and hunting experience of hunters in the Sakhalin oblast based on the results of surveys

Age, years	%		Hunting experience, years	%
< 20	2.1		< 5	4.4
21-40	22.9		5-10	8.9
41-60	54.2		11-20	11.1
> 60	20.8		> 20	75.6

In the last 50 years the number of hunters in the Sakhalin oblast has increased by two thirds, from 15 000 to 23 000. This fact stands in sharp contrast to the overall population dynamics in the region (fig. 35) and suggests that the proportion of hunters among the population of the Sakhalin oblast continues to be on the rise. This trend is opposite to many developed and populated western regions of Russia and to the majority of countries with longstanding hunting traditions in Europe and Northern America.

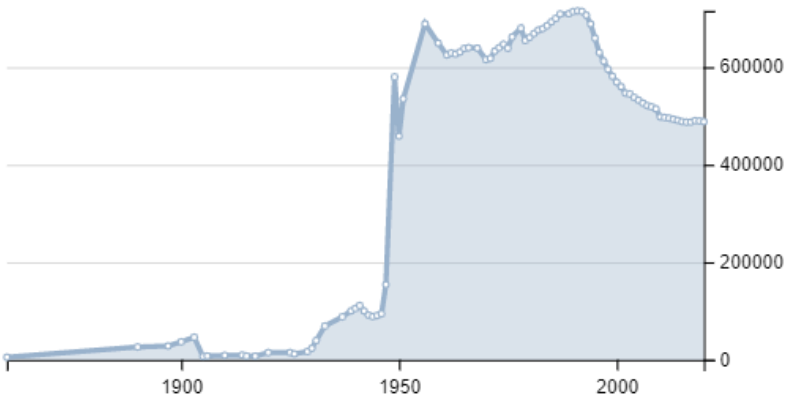

Figure 35. Population dynamics in the Sakhalin oblast

More than 75% of the respondents have more than 20 years of hunting experience, less experienced hunters are distributed equally among other groups. Many hunters from an older age group started hunting at 8-12 years old, being teenagers. As a rule, their main hunting objects were small Stints, most trusting and accessible. Many older hunters keep vivid childhood memories of the harvest of these small birds using slingshots and makeshift fire arms. Today taking up hunting at such a young age is more of an exception than a rule. Beginner hunters are usually at least 20 years old.

4.4. Hunting organisation, control and game management

Monitoring functions in the field of hunting are performed by inspectors of district forestries as well as inspectors from among protection operation group of the Department for Hunting of the Ministry for Forestry and Hunting of the Sakhalin oblast. As a rule, priority areas for inspection are protected areas as well as districts with high hunting pressure and as a rule good transport accessibility. Protection events remain clearly underfunded and that is why equipment of protection services in most cases is significantly inferior to that of hunters and poachers. There are very few professional game managers in the region, qualification and training level of forestry employees are also low. A competent and experienced game manager who has the necessary level of awareness can be found not in many districts. We received the most valuable information for the most part from ex-employees of the Department for Hunting who are currently retired.

In the last years there has been a visible trend of more organisational disconnection of hunters. Few hunting societies remain in the region, including Sakhalin OO (Public Society) "Hunters and fishermen society", Military-hunting OOSO (All-Russia Sports Public Organisation) of Yuzhno-Sakhalinsk military garrison and a small number of commercial hunting grounds (game husbandries) which hardly contribute to the rise of the theoretical training level of hunters. As it was noted, there is actually no state-level monitoring of hunters training. As hunting societies lost the function of the body that manages the issue of hunting licenses, the only mechanism ensuring control of the hunters' competence has disappeared. As a counterbalance, consolidation of hunters towards the increase of effectiveness of natural resources harvest is constantly on the rise. It is ensured by high accessibility of modern hunting technologies, growing wellbeing of the population and their technical provision. This resulted in wide occurrence of forbidden but used on a massive scale electronic game calls, lighting for night bird hunting, multishot weapons and different ammunitions as well as rapidly developing bait industry (different kinds of decoys, silhouette profiles and others).

New hunting rules adopted in 2020 impose a number of new features highly dangerous for shorebirds of Russia, including the Far East. In particular, the total period of spring waterfowl hunting was significantly lengthened – up to 30 days without interruption from March 1 to June 16. Moreover, additional timings for spring hunting for Scoters (Common and White-winged) were introduced in the period from May 29 to June 4 (but not more than 4 days). In the conditions of the Sakhalin oblast, this seriously aggravates the situation for migratory shorebirds, which will get shot in this period.

4.5. Shorebird harvest in the Sakhalin oblast

Official information on the harvest of shorebirds and other bird species in the Sakhalin oblast received from official sources does not reflect the real picture. Thus, according to official data, total annual harvest of Whimbrel in the Sakhalin oblast in 2019 amounted to 302 birds (including 2 birds in the spring period). Information on the bird harvest is submitted to the Department for Hunting of the Ministry for Forestry and Hunting of the region with the return of bird harvest permit stubs. Reporting harvest used to be somewhat controlled by the employees of the Department for Hunting during personal contact with hunters but nowadays this report form is submitted to the Multifunctional Centre where nobody reminds hunters about the requirement to fill it in.

Based on the result of our study, 82.9% of the respondents regularly hunt shorebirds and have harvested them in the last five years. 38.2% of them harvested large shorebirds (not including Whimbrels which is hunted by 79.4% of respondents), 55.9% harvested medium-sized shorebirds and 29.4% — small ones. This ratio points to the fact that regardless of the number of harvest birds priority for hunters is most often medium-sized shorebirds, among which the most common are Woodcock, Snipes, Spotted Redshank, Redshank, Common Greenshank. In this respect, the most worrying is possible accompanying harvest of Nordmann's Greenshank which could not be identified or distinguished in the field book by any of the respondents. The majority of the interviewed hunters (of all age groups) do not distinguish between different shorebird species, apart from Woodcock and Snipes (without division into species, although Latham's Snipe is included in the Red Data book of the Sakhalin oblast) and as a rule distinguish between Eurasian Curlew and Whimbrel.

During surveys it was established that under certain circumstances shorebirds are harvested or used to be harvested by the majority of bird hunters on Sakhalin. It is a traditional object for training in hunting for children and teenagers as well as the most accessible game which can almost always be found in any place in the vicinity of water. Large shorebirds are harvested at any opportunity. At the same time, shorebirds apart from traditional hunting species such as Whimbrel, Common Snipe, Woodcock (which most respondents do not consider as shorebirds) strangely are not considered as serious game in collective consciousness of hunters. During survey hunters were asked a question "Would it be better if the small shorebird hunting was closed and would it impinge upon interests of hunters?". 70.2% of respondents gave an affirmative answer to this question, noting that nobody will suffer from that ("nobody will be upset as nobody hunts them intentionally anyway"). 18.9% of hunters were against this suggestion motivating their refusal by saying that "It is important for children to have an opportunity to harvest accessible game" and "What if there is nothing else?" (meaning larger game). The same number of respondents (18.9%) could not answer this question. Insignificance of small and medium-sized shorebirds as hunting objects is also proved by the fact that the majority of respondents (72%) could not give an assessment of the dynamics of their population over the years. At the same time the remaining

part of hunters that pay attention to this group of birds has divided quite indicatively. Thus, the vast majority of them (86%) are convinced that the population of small shorebirds has fallen drastically in the last decades. Among the most widespread evaluations are "twofold", "manifold", "by ten fold" decrease of the population. Some respondents assessed the decrease of the population of abundant migratory shorebirds in 50 or even 60 times. And only 13% of the interviewees believe that population of small shorebirds is relatively stable.

We managed to study the catch of hunters at the control plot at the northern spit of the Piltun bay in the Okhinsky district of the Sakhalin oblast. Several hunting stations, equipped for the permanent stay during hunting season, are located here at the area of 3 sq. km (fig. 36). Observations took place from August 30 to September 11, 2020. Harvest inspection was conducted during these eight days. 142 birds of 12 species were inspected in total. They included 8 duck species and 4 shorebird species (table 8).

Table 8. Proportion of different waterfowl and shorebird species in the hunters catch at the northern spit of the Piltun bay (Northern Sakhalin) in the period from 30.08 to 11.09.2020

Ducks	**Birds harvested**	**Ratio in total harvest (n=142), %**	**Ratio in the group of species (n=98), %**
Mallard	1	0.7	1.0
Common teal	57	40.1	58.2
Baikal teal	12	8.5	12.2
Wigeon	2	1.4	2.0
Pintail	16	11.3	16.3
Garganey	1	0.7	1.0
Shoveler	5	3.5	5.1
Greater scaup	4	2.8	4.1
Ducks in total	98	69.0	100.0
Shorebirds	**Birds harvested**	**Ratio in total harvest (n=142), %**	**Ratio in the group of species (n=44), %**
Redshank	2	1.4	4.5
Common Sandpiper	2	1.4	4.5
Dunlin	13	9.2	29.5
Whimbrel	27	19.0	61.4
Shorebirds in total	44	31.0	100.0

As we can see from the presented data, shorebirds compose 31% in the total number of harvested birds. Dunlins composed a hefty amount among them (29.5%), apart from Whimbrel, one of the main hunting object at this time. Other shorebird species (Redshank, Common Sandpiper), insignificant number of which were sighted at the Piltun bay at the time, were also harvested. According to the data from published papers, ratio of shorebirds in the total harvest of hunters (spring-autumn) in the year 2000 at the north-east of Sakhalin amounted to 12.2% (Blokhin et al., 2002). Lower ratio of shorebirds in these

publications is explained by consolidation of the data on spring and autumn hunting, whereas shorebird hunting at the region happens predominantly in the period of autumn hunting.

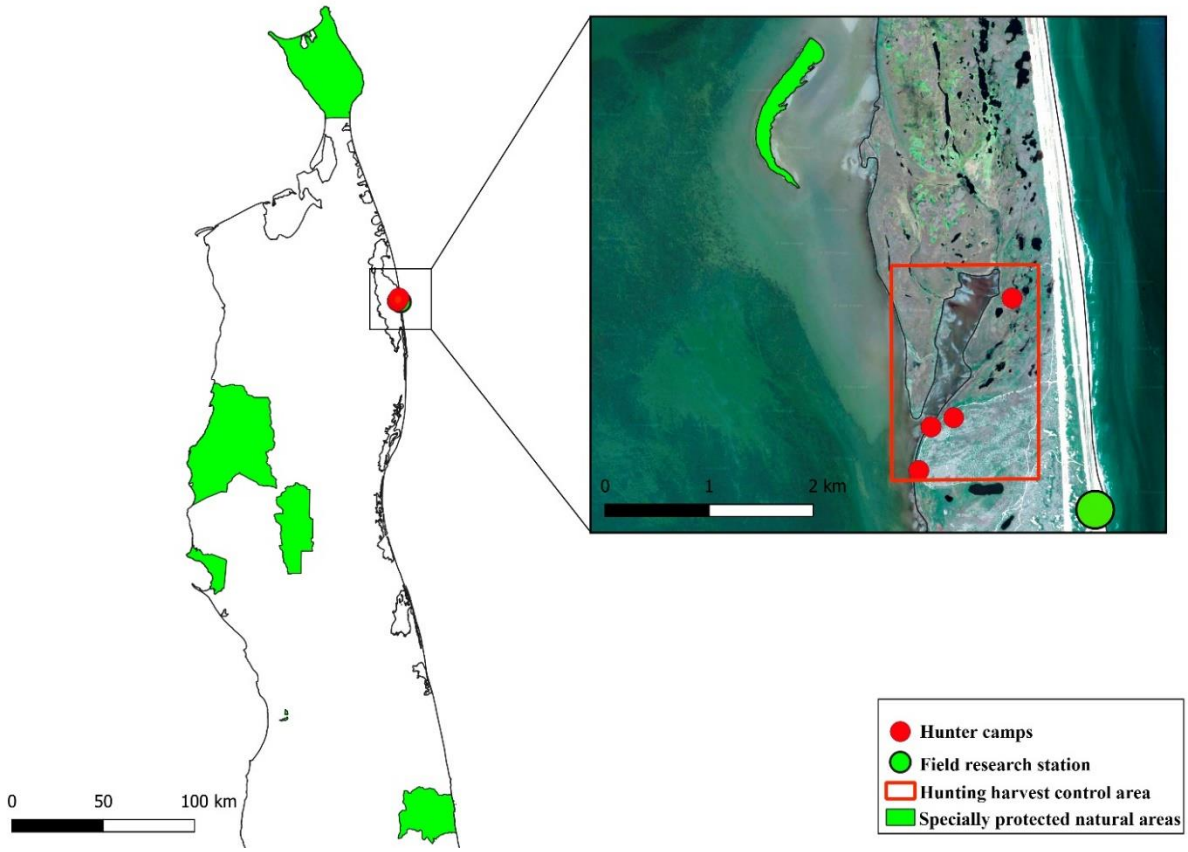

Figure 36. Location of the control plot of the bird harvest during hunting at the northern spit of Piltun bay in the period from 30.08 to 11.09.2020

Large islands of the Kuril ridge (Iturup, Kunashir, Shumshu, Paramushir) are also sites of waterfowl and shorebird hunting. The authors of the research had an opportunity to study this questions while working on Iturup island in 2006-2011. Materials of those observations were also used in preparation of this report. Additional information was obtained through detailed telephone interviews with employees of the Kuril forestry (Iturup island) that we conducted in 2020.

4.5.1. Whimbrel

Whimbrel remains one of the most frequently harvested shorebirds in Sakhalin. According to previously published data, the portion of this species amounted to 4.5% in the total bird harvest at the north-west of Sakhalin in 2000 and to 37.1% among shorebirds (Blokhin et al., 2002). According to our data (table 8), the portion of Whimbrel constituted 19% in the total bird harvest at the Piltun bay in the period from August 30 to September 11, 2020 and 61.4% among all shorebird species. High aggregation level, availability and palatability make them a wanted game for the vast majority of hunters. Whimbrels can be sighted in any part of the Sakhalin oblast during migration, although they most frequently visit the

northern part of the Sakhalin island, the only place where high number of this species is observed during active autumn migration in mid- and late August. We based our calculations on the fact that only hunters that obtained seasonal bird harvest permits in autumn of 2019 (n=7574) participate in Whimbrel hunting and not all hunters in the region (≥ 23000). We know that although not all of them will hunt Whimbrel, the main hunting object in autumn being water birds, there are those who will hunt shorebirds without official permit. That is why we assume that the number of shorebird hunters is comparable with the number of issued permits or even exceeds it.

We received highly uneven distribution of Whimbrel harvest in the region. More than 80% of birds are harvested at the territory of two Sakhalin districts – Okhinsky and Nogliksky, occupying northern and north-eastern part of the island (fig. 37). This is where largest marine lagoons are concentrated, which are surrounded by low coastal berry tundras, attractive to this species. Moreover, these are the first areas of Sakhalin that birds reach, passing through the Sea of Okhotsk during autumn migration. Only 6.9% of the region human population live in these two districts, the total number of local hunters amounting to approximately 1700 people. Not more than 500 of them regularly hunt Whimbrel, but many other hunters from southern districts of the region, primarily from Yuzhno-Sakhalinsk, arrive there in August with the purpose of hunting Whimbrel. Their number could reach 2000 and more. Based on the anonymous questionnaire results, we established that average seasonal Whimbrel harvest per hunter varies over a wide range (table 9).

66% of the hunters we interviewed harvested Whimbrel in 2019. In some cases, individual harvest reached 140 or even 180 birds per season (Okhinsky district). In Nogliksky district the maximum number of harvested birds by one hunter did not exceed 20 birds. Needless to say, we operate a small sample size but even these examples are impressive.

Table 9. Average harvest of Whimbrel by one hunter per season according to the results of different kinds of survey

Administrative district	**harvested birds/1 hunter anonymous questionnaire**	**harvested birds/1 hunter personal questionnaires**
Okhinsky district	22.2	13.5
Nogliksky district	8.4	12.7
Dolinsky district	4.0	4.0
Poronaysky district	2.7	2.7
Makarovsky district	2.0	2.7
Korsakovsky district	0.2	0.7

The results of hunter surveys in personal and anonymous format gave a different picture of this species harvest distribution in the region (table 10). But in total the derived estimate in both cases yielded a similar result, setting the level of total yearly harvest of this species in 2019 at 33 000 – 38 000 birds.

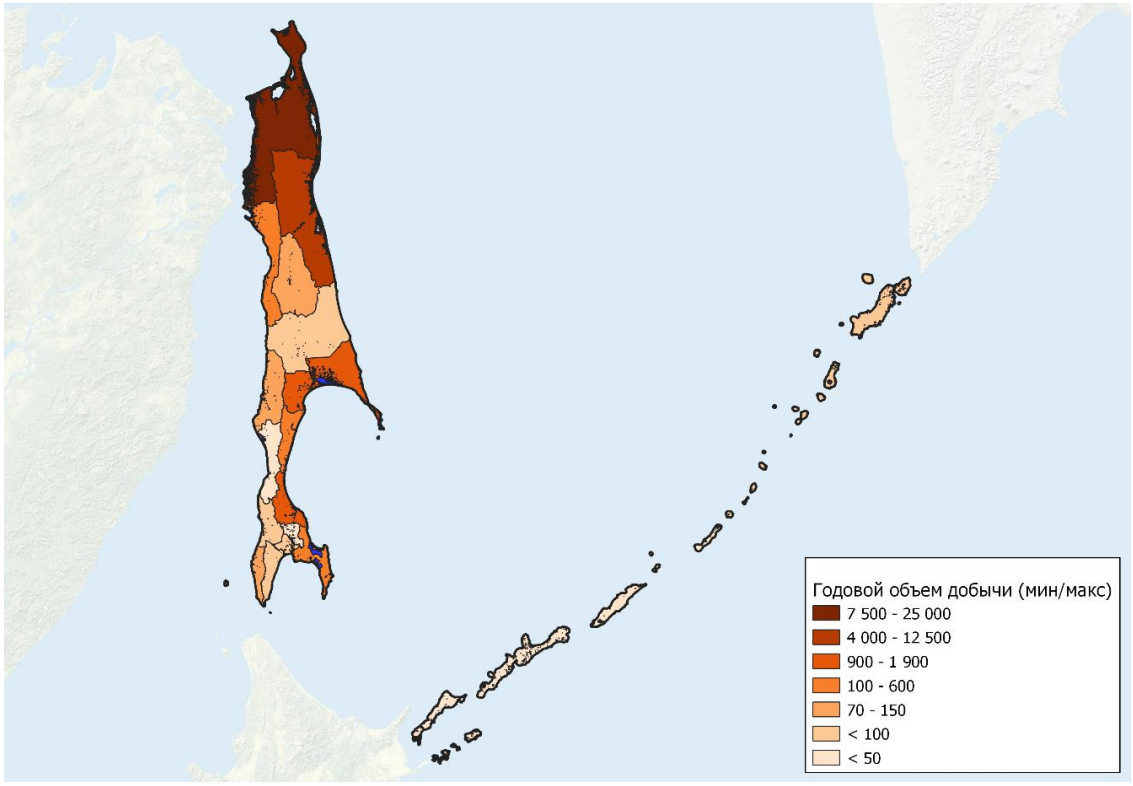

Figure 37. Distribution of Whimbrel harvest in the Sakhalin oblast in 2019 based on the survey results

Table 10. Estimate of seasonal Whimbrel harvest at the territory of the Sakhalin oblast in 2019 based on the survey data

Administrative district	according to personal questionnaires (n=48)			according to anonymous questionnaires (n=43)		
	harvested in 2019	1/2 of harvest	%	harvested in 2019	1/2 of harvest	%
Okhinsky district	15 271	7 636	45.4	25 174	12 587	64.9
Nogliksky district	12 463	6 231	37.1	8 265	4 132	21.3
Poronaysky district	1 951	976	5.8	1 951	976	5.0
Dolinsky district	1 874	937	5.6	1 874	937	4.8
Korsakovsky district	664	332	2.0	186	93	0.5
Makarovsky district	446	223	1.3	334	167	0.9
Alexandrovsk-Sakhalinsky district	264	132	0.8	264	132	0.7
Uglegorsky district	157	78	0.5	157	78	0.4
Nevelsky district	139	69	0.4	139	69	0.4
Tymovsky district	133	66	0.4	133	66	0.3
Severo-Kurilsky district	80	40	0.2	80	40	0.2
Kholmsky district	60	30	0.2	60	30	0.2
Anivsky district	45	23	0.1	45	23	0.1
Smirnykhovsky district	23	11	0.1	23	11	0.1
Yuzhno-Sakhalinsk city district	19	10	0.1	19	10	0.0
Yuzhno-Kurilsky dostrict	18	9	0.1	18	9	0.0
Tomarinsky district	17	9	0.1	85	43	0.2
Kurilsky dostrict	10	5	0.1	10	5	0.1
total harvest	33 633	16 816		38 816	19 408	

The received amount seems to be quite considerable, taking into account the fact that this species does not nest in Sakhalin and the total assessment of this species population, migrating along East-Asian Australasian Flyway (clearly underestimated) amounts to 55 000 birds (Bamford et al., 2008; Conklin et al., 2014; Wetlands International, 2016.). The volumes of individual and average harvest of this species are quite high. In addition, it is impossible to give an assessment of the illegal harvest by individuals without a permit. According to local experts, the number of unlicensed hunters and hunters without permits may exceed 10% of the official number.

An assessment of total Whimbrel population in the Far Eastern region in the range of 120 000 - 150 000 birds, given by doctor Gerasimov in a similar study concerning the Kamchatka peninsula (Klokov, Gerasimov, Syroechkovskiy, 2019) seems quite reasonable, if to the number of birds counted on wintering sites (in the range of 55 000 birds) we add 60 – 70 000 birds, which are harvested in total in Kamchatka and Sakhalin and simply do not reach the wintering sites. We also know that this species is actively harvested on the mainland of the Sea of Okhotsk region and the collection of this data is to occur in the future. It is of extreme importance for the assessment of total population of this species, as according to our data hunting has a significant impact on it.

It is important to note that there is a lack of information on the portion of different bird species removed from the total population even for relatively abundant shorebird species, which, as a rule, have large habitat areas, including breeding, migration and wintering sites (Gallo-Cajiao et al., 2020). In particular, the impact of hunting is most probably greatly underestimated. As the example of Whimbrel shows, there is a huge gap between official and expert assessment of this species harvest in the region. Unfortunately, the official statistics is unreliable and it cannot be used to assess harvest impact on individual populations (even for species that are formally allowed for hunting and traditionally harvested). The lack of reliable data on the population of this species in the region and its dynamics over the years also make this task impossible.

The majority of the respondents noted a significant increase in the harvest of Whimbrel in 2018 and 2019 following a visible depression of the population in the previous 10 years. For that reason, in our assessment of the harvest we also set a lower limit of the harvest at 1/2 of the established maximum figures, which could correspond to the season with low Whimbrel population.

Figure 38. Whimbrels harvested at the Piltun bay in August, 2020

Figure 39. Harvested birds are left in the wind using special suspenders, this way the harvest could be stored for 1-2 days without additional refrigeration

Figure 40. Two thirds of surveyed hunters consider Whimbrel meat a delicacy and value it higher than all other game species

Figure 41. These fat depots necessary to birds for migration make them a wanted game

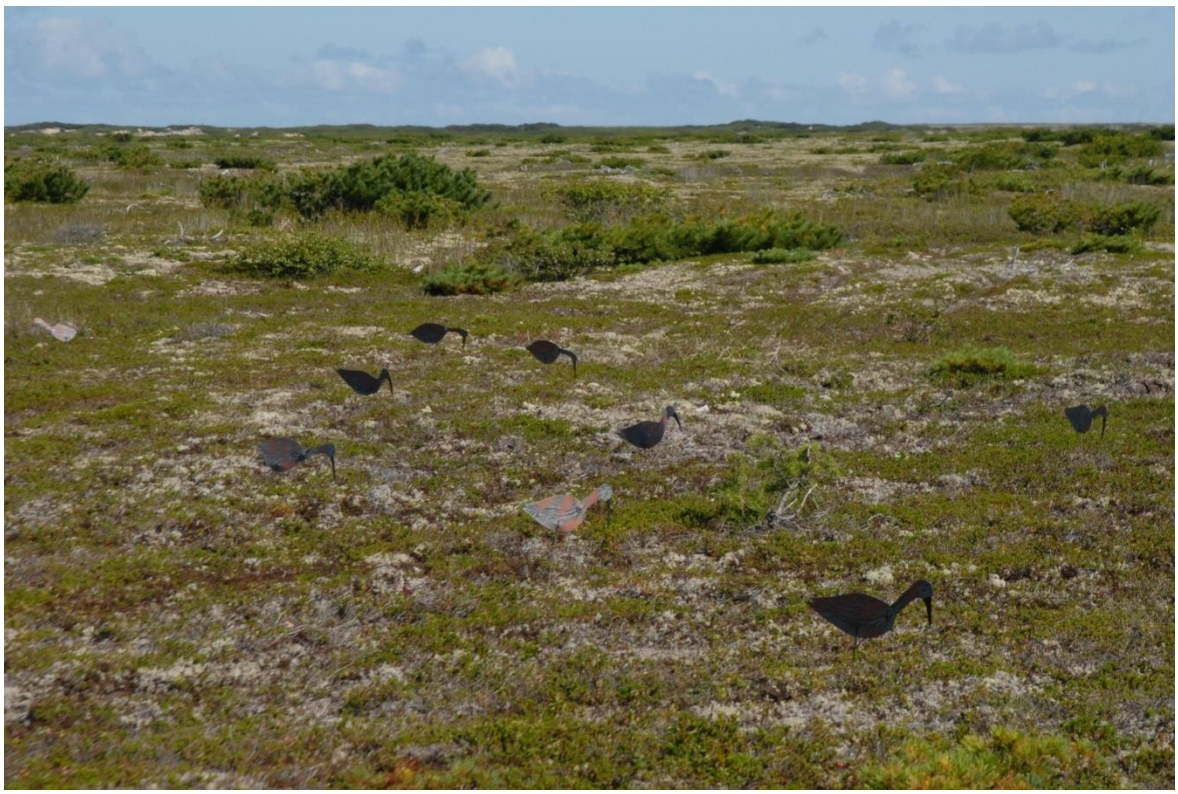

Figure 42. To hunt Whimbrel hunters often use simple silhouette profiles made with metal or plywood imitating birds and also use a special bird call

Figure 43. Average harvest of a group of hunters composed of four people made during one evening hunt on August 30 at the Piltun bay: Whimbrel – 12, Dunlin – 12, Wigeon – 2, Common teal – 8, Pintail – 4, Shoveler – 1

Speaking about seasonal harvest, we understand bird harvest during summer-autumn hunting, which usually opens in Sakhalin on August 5 for the owners of hunting dogs. In reality, the owner of any dog can get a permit for early hunting as documents on a dog are not required at the Multifunctional Centre when the permit is drawn up. Whimbrel hunting does not require a dog as it is carried out from a hide with silhouette profiles (decoys) and bird call. However, the availability of a permit allows dog owners to be in the hunting grounds and to start shooting Whimbrel on the first days of August (according to hunters themselves, duck fledglings also got shot by unethical hunters in this period). The harvest of marsh-meadow birds for other hunters is allowed from August 15. As a rule, it coincides with the peak of Whimbrel migration lasting until the middle of September.

Whimbrel hunting practically does not take place in spring as the birds migrate in the end of May when the spring hunting is over. This is true for areas where there is control and hunters comply with the hunting season time frames. But certain number of birds of this species is definitely harvested in spring and early summer as many hunters that live in remote areas constantly carry a weapon with them under the pretext of protection from bear attack and harvest shorebirds regardless of hunting seasons. Assessing such harvest now is not possible.

In 2020 new hunting rules were adopted in the Russian Federation, which speculate that spring hunting is to be conducted in the period from March 1 to June 16 with overall duration of at least 30 days. This will sharply intensify the negative impact of spring hunting on shorebirds, Whimbrel in particular. In the northern Sakhalin ice and snow melt on the sea shore usually from the end of May to the beginning of June. In this period, coinciding with the peak migration of the majority of shorebirds species, active waterfowl and incidental shorebird hunting will take place. As the results of the survey showed, most hunters eagerly harvest shorebirds in spring despite they are not included in the list of bird species allowed for hunting. Official hunting seasons did not use to correspond to shorebird migration period, but now they will inevitably coincide. It will lead to the decrease of the population of many shorebird species as reproductive part of their populations will inevitably be harvested in a much larger quantity than before.

As already mentioned, the main staging sites for Whimbrel in Sakhalin are concentrated on the shores of the northern part of the island as well as in the vicinity of the Nevskoye lake (Poronaisky district). The main protected areas are concentrated in these districts (fig. 44). The largest are Poronaisky nature reserve, Severny (Northern) reserve at the Schmidt peninsula, Tundra reserve at the coast of the Amur estuary and the Nevelskoy strait, which are located in remote and sparsely populated areas. Hunting pressure is relatively low here. At the same time, the territories of coastal habitats at most bays of the north-western coast of the island are highly accessible for people. Recent human population decrease in the northern Sakhalin most likely will reduce the shorebird harvest as transport accessibility of the region remains at the previous level or increases in some places and the technical resources used by hunters are constantly on the rise. The latter is what can increase the hunting pressure.

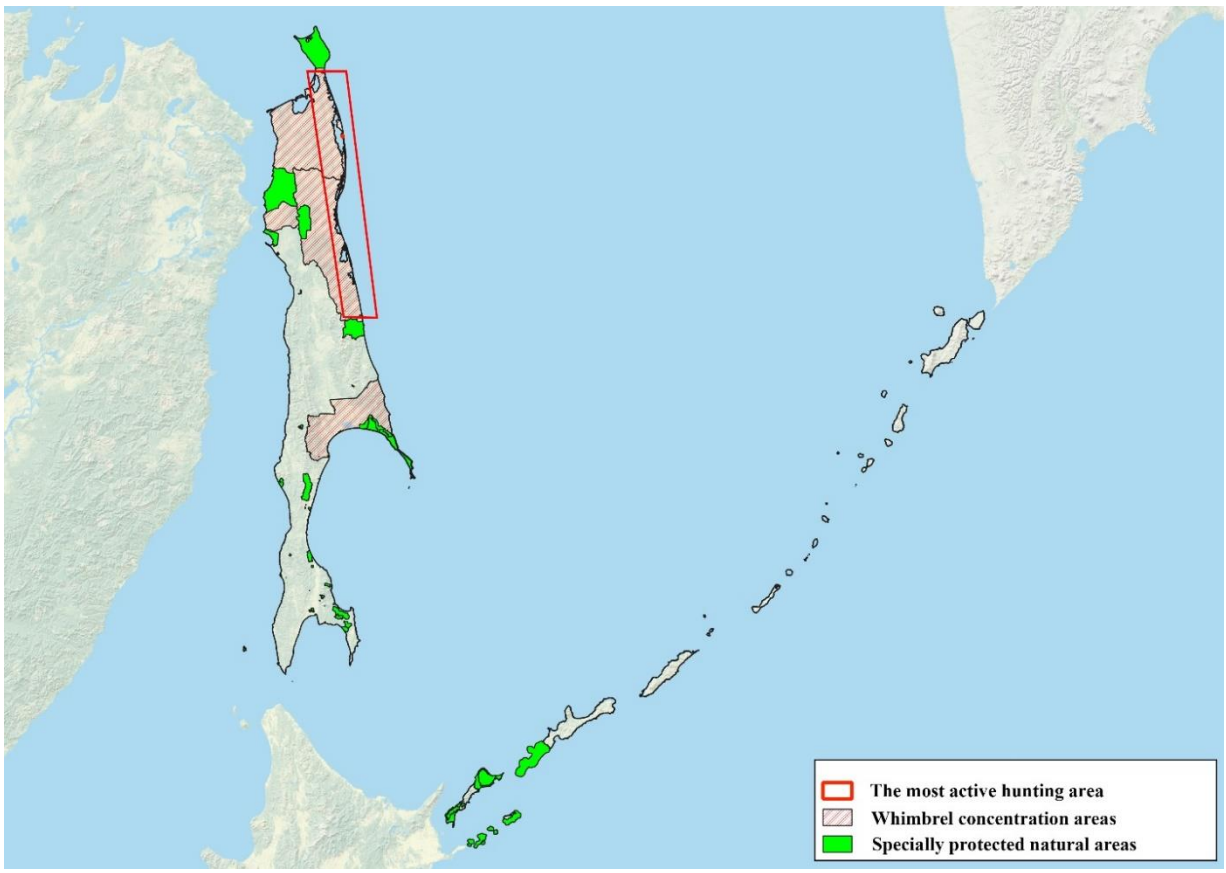

Figure 44. Relative position of protected areas in Sakhalin and concentrations sites of Whimbrel during autumn migration

Hunters in Sakhalin most often use local name "kronshpil" for Whimbrel. This is modified name of the species in the Russian language. A third of the respondents noted a decline of the species in the harvest in the last 30 years. As a rule, these are hunters harvesting this species regularly and in a large quantity (in total this group of respondents harvested 84% of all Whimbrels) who have their own observations on the issue. Noting a general decline of the species population in the last ten years, the majority linked it with the beginning of the development of oil industry in the north of Sakhalin and increase of the human-induced impact. Almost all still noticed that there are fewer birds in places where it is getting "crowded", without pointing to the direct link between hunting pressure and human population dynamics of the Okhinsky district. Several hunters point to the decline in the harvest of this species after 1995 Neftegorsk earthquake. They also noted the "pestilence" of 2004, after which the population decreased very significantly. Many noted the disappearance of this species from its typical habitats in the mountain tundra during autumn migration. Most also noted a significant growth in the Whimbrel harvest from 2018, which was also observed in 2019. It is particularly revealing that hunters repeatedly suggested to close hunting on this species for 5 years to restore the population.

4.5.2. Far Eastern Curlew

Sakhalin hunters know this species well and in majority of cases distinguish it from other shorebird species, including Whimbrel, based on appearance, flight features and voice. Local names of Far Eastern Curlew are "morskoy" (marine), "kamchadal" (from Kamchatka region), "vzrosly" (adult) and others. It is usually harvested not by mistake but intentionally as one of the most valuable trophies rated as highly as goose. In other words, it is taken at any possibility. Once we were told of a situation when in poor visibility conditions a shorebird flock of 6 birds, which turned out to be Far Eastern Curlews, was taken at the Arakul river in the Korsakovsky district in the south of Sakhalin. It is the most numerous group of this species among all sightings described to us by hunters. Single birds or groups of 2-3 birds are usually sighted. Many note that although it is significantly inferior taste-wise to Whimbrel and Teals, it is considered a prestigious trophy which everybody dreams of. According to the survey results, 32.6% of respondents have harvested Far Eastern Curlew in Sakhalin at least once. 17.6% of interviewed hunters harvested it in 2019. Another 4.3% of hunters sighted it but did not harvest the birds (or could not harvest even though they were not against it). Based on the survey results, we managed to establish that 6 birds were harvested between 41 surveyed hunters in 2019, which amounted to 0.15 birds per person on average. This average value was further multiplied by the total number of hunters who received bird harvest permit in 2019 (7545 permits). Therefore, according to our estimate, total yearly harvest of this species in the Sakhalin oblast can reach 1100 birds. The number may seem large at first but if we take into consideration that anybody who sights it tries to harvest it. The geography of harvest sites in Sakhalin (fig. 45) is quite broad and includes southern (Korsakovsky, Kholmsky, Dolinsky, Makarovsky), central (Poronaysky) and northern districts of Sakhalin (Nogliksky, Okhinsky). The majority of sighting and harvest sites that we established are located in the eastern coast of the island. The fact that no sightings were registered on the western coast is most likely connected with insufficient data and inaccessibility of many districts on the western coast.

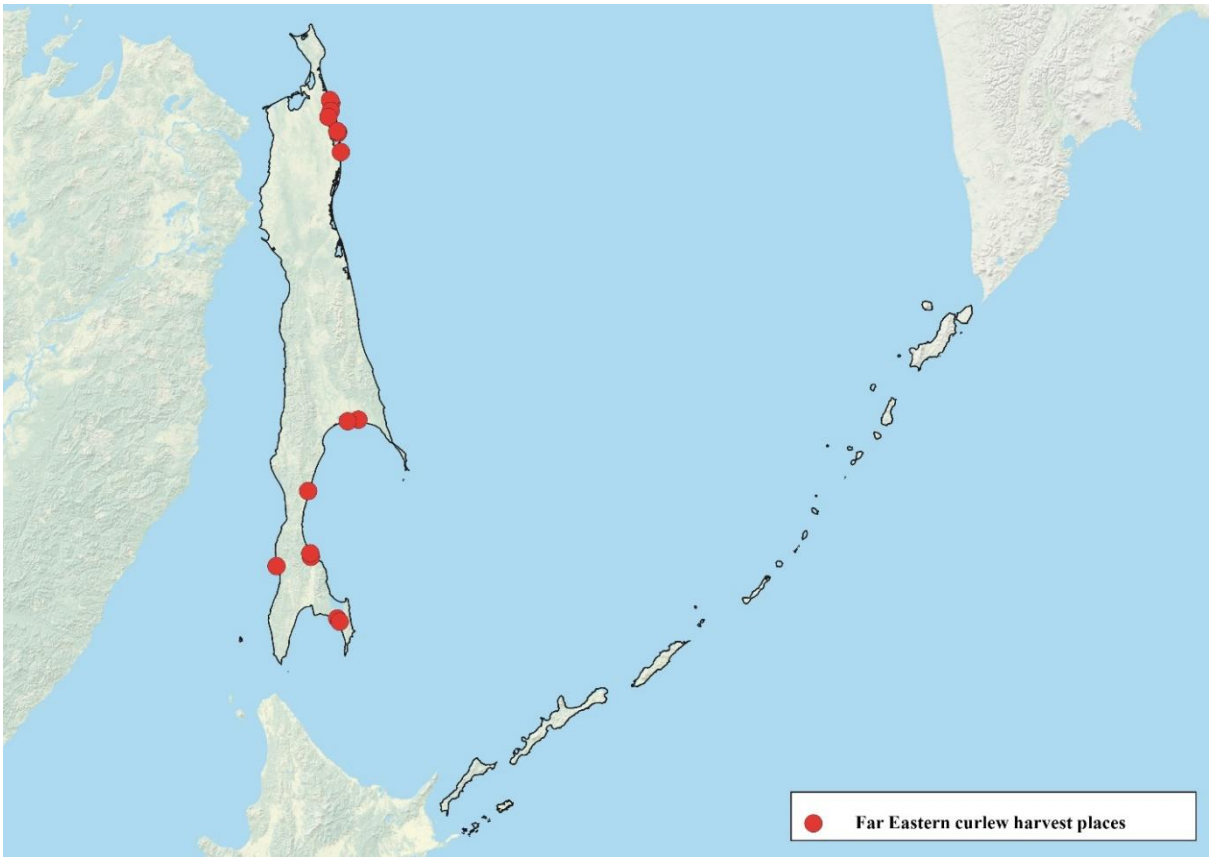

Figure 45. Harvest sites of Far Eastern Curlew in Sakhalin

4.5.3. Godwits

Godwits, like all large shorebirds, are regularly harvested by hunters in Sakhalin. Analysis of the data of the Bird Ringing Centre of Russia showed that Bar-tailed Godwit is the second among the most harvested shorebird (12%). According to our survey results, 26.5% of hunters gave an affirmative answer to the question about Godwit harvest, not distinguishing their species. According to our expert estimate, the total harvest of Black-tailed and Bar-tailed Godwits in the Sakhalin oblast can reach 1600 and 1100 respectively.

Main migratory stopover sites of Godwits during autumn migration are concentrated at the large bays in the northern part of Sakhalin (Piltun, Baikal, Pomr'). Unfortunately, many of them were inaccessible within planned field work. Nevertheless, the bays of the northern part of the Sakhalin island are the places which hunters identified as sighting and harvest sites of Godwits. These species are also regularly sighted and harvested in the central (Poronaysky district) and southern part of the island (Dolinsky district, the Aniva bay and others).

Local names of this group of species are "bekasy" (Snipes) or "kekeshki". They are usually harvested incidentally like any other relatively large birds or when confused with Whimbrels.

Figure 46. Bar-tailed Godwit, wounded by hunters at the Odoptu bay, Okhinsky district. The majority of wounded birds become victims of unspecialized predators – Skuas, Crows. The outcome for them is sad as they are doomed to the painful death

4.5.4. Medium-sized shorebirds

This large group of shorebirds, which includes many rare and protected birds, is traditionally not subdivided by hunters into individual species. Not having abundant population (the majority of species of this size group are rare or uncommon), some medium-sized shorebird species are widespread in Sakhalin. That is why they are regularly and eagerly harvested by hunters. Most notably, these are Redshank and Common Greenshank. These species visually seem to be a decent game. Moreover, they often form small flocks during migration and nomadic movements. We became aware that summer shorebird hunting regularly occurs in several districts of the northern Sakhalin, the grounds of which are visited for fishing or recreational purposes. The harvested Greenshanks in some cases can turn out to be rare and protected Nordmann's Greenshanks, whose disappearance is noted in the majority of sites in the west of the island where they used to breed. Blokhin et al. (2002) pointed to the harvest of Nordmann's Greenshank by poachers. Because of low population, these species are highly sensitive to each bird shooting. Prolongation of the spring hunting until June threatens the remaining population of Nordmann's Greenshank in the Sakhalin island, which probably constitutes half of the world population. That is to say that survival of the species as a whole is threatened. To assess the number of harvested shorebirds of this group, additional research is required during the period of breeding and post-fledging movements (June-August). The assessment of the number of harvested medium-sized shorebirds is given in table 11.

Table 11. Expert assessment of yearly harvest of medium-sized shorebirds in the Sakhalin oblast based on the survey results

Species	**Yearly harvest**
Pacific Golden Plover *Pluvialis fulva*	200
Turnstone *Arenaria interpres oahuensis*	700
Oystercatcher *Haematopus ostralegus osculans*	200
Common Greenshank *Tringa nebularia*	4800
Redshank *Tringa totanus*	900
Spotted Redshank *Tringa erythropus*	400
Grey-tailed Tattler *Heteroscelus brevipes*	900
Great Knot *Calidris tenuirostris* *	200
Red Knot *Calidris canutus*	500
Common Snipe *Gallinago gallinago*	500
Woodcock *Scolopax rusticola*	2600
Birds in total	11900

* - harvest is underestimated as survey data does not fully reflect the shorebird harvest in the north and south of Sakhalin island

Figure 47. Spotted Redshanks in the nuptial plumage, harvested during spring duck hunting at the Piltun bay in the Okhinsky district of the Sakhalin oblast

4.5.5. Small shorebirds

Small shorebirds have a special place in the hunting practice in Sakhalin. They are regularly harvested, but incidentally, as a rule when **there** is no other game "in order not to return empty-handed", or intentionally. We had to witness special trips to hunt small shorebirds. There are firmly fixed collective terms for this groups of birds - "galushki" or "pelmeni" in the local lingo. They are traditionally used for cooking shurpa, a thick broth with fowl and vegetables. As a rule, there is at least one enthusiast in each group of hunters, who can always harvest and cook this birds. During our survey different examples of easy and fruitful hunting were given: "60 birds with one cartridge", "a basin with two cartridges", "a dozen with one shot" and others. Even with the adjustment for a known tendency to exaggerate the result, this information is unfortunately proved by our observations. For example, on August 30 2020, 12 Dunlins listed in Table 8 were harvested with one shot by a hunter who was barely 10 years old. In September at the Odoptu bay (Northern Sakhalin) we observed two hunters who fired 5 shots on dense flocks of small shorebirds in 15 minutes and left, collecting a whole bag of game. Inspecting this territory half an hour later, we found 6 other shot Dunlins, among which were wounded birds hiding in the grass. Incidental harvest of small and medium-sized shorebirds as a rule is not a memorable experience for hunters and that is why many of them give a negative answer when the question about the harvest of these birds is first asked. Therefore, remotely completed questionnaires often provide underestimated data. But during a conversation, when they are asked clarifying questions, almost all the hunters remember doing it incidentally, in passing, and only cases of a massive harvest are imprinted in memory with figures of speech, such as "half a bucket in one go". In a number of cases we were informed that these birds may not be used for food but are thrown away if hunters take more desirable game.

Among surveyed hunters, 24% noted a manifold decrease of small shorebird population in the last decades. The rest could not give a comment on this question. The increase of the population was not noted by any one of the hunters. Among the given estimates of the decrease, the most common were "tenfold", "by orders of magnitude", the estimate of "50 times" was also given. Unfortunately, it is not possible to check these assumptions with materials of long-term counts in the region. Observations conducted by many researchers over the years do not have the necessary repeatability. The assessment of small-sized shorebird harvest is given in table 12. The table includes data only on those shorebird species on which we received survey information. The harvest of Red-necked Stint is greatly underestimated as hunters do not distinguish it from other small Stints. For the same reason the table does not include such species as Long-toed Stint, although there is an equal probability that other species could be shot.

Table 12. Expert assessment of yearly harvest of small-sized shorebirds in the Sakhalin oblast based on the survey results

Species	**Yearly harvest**
Mongolian Plover Charadrius mongolus	1200
Wood Sandpiper Tringa glareola	200
Terek Sandpiper Xenus cinereus	1400
Common Sandpiper Actitis hypoleucos	900
Red-necked Phalarope Phalaropus lobatus	300
Чернозобик Calidris alpina	14500
Sanderling Calidris alba	500
Red-necked Stint Calidris ruficollis *	1500
Broad-billed Sandpiper Limicola falcinellus	100
Birds in total	20600

In total, at least 20,000 small-sized shorebirds could be harvested yearly at Sakhalin, according to our estimate. For more details, a special study should be conducted focusing on shorebirds of this size group.

Figure 48. A flock of Dunlins at the Odoptu bay in the Okhinsky district

Figure 49. Wounded and dead Dunlins at the Odoptu bay, Okhinsky district

Figure 50. A Dunlin wounded by a hunter at the Odoptu bay, Okhinsky district

Figure 51. A Dunlin shot and not retrieved by hunter at the Odoptu bay, Okhinsky district

Figure 52. A Dunlin unretrieved by hunter at the Odoptu bay, Okhinsky district

Figure 53. Old and new cartridge cases at the site of regular hunting at the Odoptu bay

4.5.6. Spoon-billed Sandpiper

Spoon-billed Sandpiper *Eurynorhynchus pygmeus* (Linnaeus, 1758) currently remains one of the most endangered bird species in the world. It has a narrow nesting range in the coastal tundras of the Chukotka peninsula. IUCN international conservation status of this species is "Critically Endangered". The most detailed summary of localisation of Spoon-billed Sandpiper sightings in Sakhalin during seasonal migrations is given in the publication by Ivanov and Ktitorov (2016). Sakhalin plays an important role for migratory stopovers of this species. Spoon-billed Sandpiper was registered here by many researchers during spring and autumn migration. Unfortunately, main Spoon-billed Sandpiper sighting sites in Sakhalin fully coincide with the sites of active shorebird hunting (fig. 32 B-G, fig. 54). To harvest shorebirds, hunters most often shoot dense flying flocks consisting of several species, in which Spoon-billed Sandpipers usually move as well. Thus, they can become victim of any such shot.

Clearly, taking into account low population of Spoon-billed Sandpiper in total, we are far from knowing all its traditional staging sites in Sakhalin. It is a cause for concern that during autumn migration coinciding with autumn hunting season, Spoon-billed Sandpiper's sightings on the shores of Sakhalin are most dispersive and the birds could potentially end up in any place where they will be shot. In our 2020 research we did not have an opportunity to look further into this topic but now we know of many districts where there is hunting pressure in the known Spoon-billed Sandpiper staging sites. Monitoring and special

research should be conducted in several districts of Sakhalin, important for the declining population of Spoon-billed Sandpiper. Seasonal protection should be introduced in a number of such sites so that there is no hunting there.

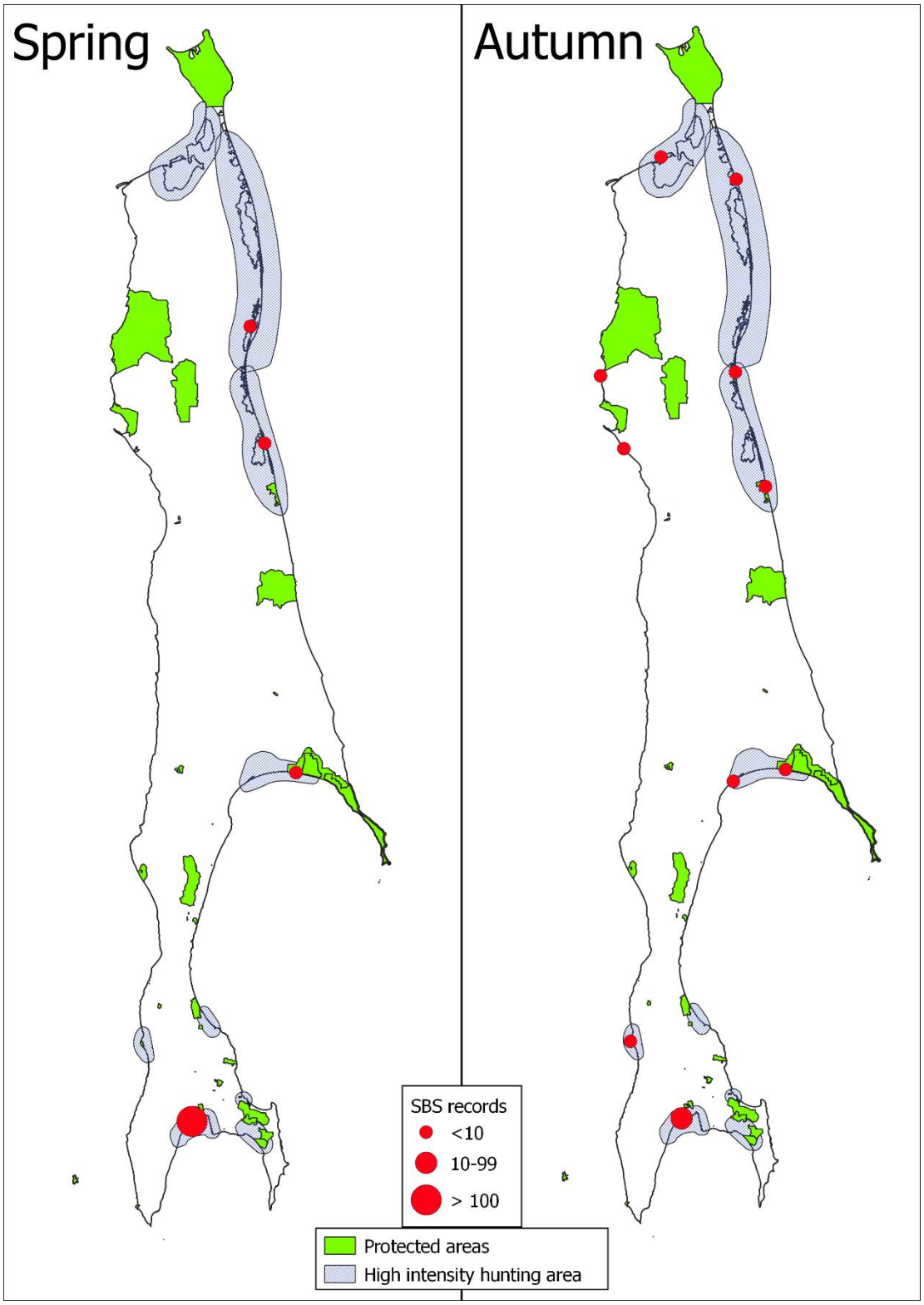

Figure 54. Spoon-billed Sandpiper sighting sites (Ivanov, Ktitorov, 2016) in relation to places of intensive hunting and protected areas

4.6. Main threats for shorebirds in the Sakhalin oblast

The most cited reason for the decline of shorebird population in Eastern Asia is coastal habitat transformation, both natural and human-induced. Shores of Sakhalin are strongly affected by wave action, leading to bay mouth areas being washed out and isolated, which leads to the change of hydrological conditions. However, this process is iterative and has remained as such for a long historical timespan. There are no large-scale human-induced changes of coastal habitats, but active economic development takes place in the region, especially in the north of the island.

If we analyze the human population dynamics of Okha (fig. 55), the largest town in the north of Sakhalin, in the last and the beginning of this century, it can be said that until 1995 population of the district was constantly on the rise. Actual population far exceeded the official population as there were many shift teams working in exploration and production of hydrocarbons. However, since 1996 a steady decline of the population is observed and as a result there is less human-induced impact on the natural complexes and biological resources of the region. Oil fields remained but oil production procedures underwent a significant conversion. Numerous isolated sites gave way to fewer but larger modern digging facilities. The number of staff decreased, but many districts became significantly more accessible for transport. In particular, building of all-weather roads and bridge crossing at the Nabil, Chayvo, Piltun and others gulfs gave people (including fishermen and hunters) access to the previously inaccessible marine sand bars. Therefore, the ability of active hunters to visit bird concentration sites is connected not so much with the dynamics of the human population but with better transport accessibility.

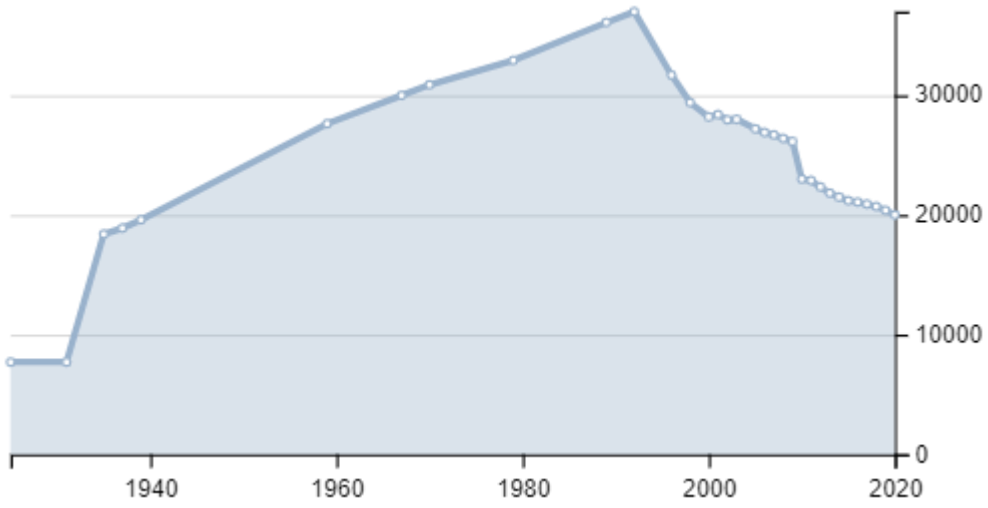

Figure 55. Human population dynamics of the town of Okha (according to https://ru.wikipedia.org)

4.6.1. Illegal shorebird hunting

In Russia, illegal hunting is traditionally understood as bird harvest without necessary permits, with unregistered firearms or traps, as well as hunting during closed season and in forbidden places (protected areas). If a hunter has permits but out of ignorance or by mistake shoots a prohibited species, it is not usually called illegal hunting.

Catching and massive harvest of shorebirds with other methods rather than shooting used to be common in the past but did not survive up to the now. Police constantly fights against unregistered firearms, and their number is steadily decreasing. However, it does not have an impact on the general increase of the spread of firearms among the population as the procedure of purchasing it is quite straightforward. According to our expert estimate, based on the opinion of specialists of the Ministry for Forestry as well as ornithologists who have worked in this region for many years, the total number of individuals taking part in hunting in Sakhalin without documents on firearms and required permits may not exceed 10% of the number of registered hunters. Most probably, it is significantly lower. Therefore, illegal hunting in the sense traditional for Russia is not a significant factor that has a big impact on shorebirds in the Sakhalin oblast. It is highly likely that the level of poaching was significantly higher in the end of the last century and declines as low-populated and remote settlements in the region go "extinct".

At the same time, we managed to learn recently that consumer's market of fowl based on commercial hunting on ducks and several shorebird species has been taking shape in several areas of active hunting. This service is provided in private groups in messengers (WhatsApp), so called "local neighbourhood groups", to which local population has access. According to the information we received, during hunting season these groups provide an opportunity to purchase different fowl without any effort, including Whimbrel carcasses and possibly Far Eastern Curlew and other shorebirds. The sale of excessive hunting products in itself is not against the law. What is illegal is its sale without veterinary inspection and in breach of tax regulations requirements. But overall it is a red flag, as this explains how individual harvest consisting of 180 Whimbrels, 140 geese and 1,500 ducks, harvested by one hunter in one season, could be used. Such rates of personal bird harvest per season for some hunters were established during interviews. Certainly, such phenomenon is not large-scale in nature, but considering that population in this region traditionally has technological capabilities for processing and storage of biological resources (refrigerated coolers, vacuumizers, equipment for preservation in containers and others), it can be expected that in number of cases, harvest of some bird species, including shorebirds, can be significantly over the established standard. In order to demonstrate this fact, we can also cite incidents of sending small shipments of frozen meat of wild anseriformes from Northern Sakhalin to Khabarovsk by air.

Surveys of the local population provide conflicting information, some of which is quite alarming. According to witnesses, bags filled with shot Whimbrels were found at the landfill site of the town of Okha

in the northern part of Sakhalin in the early August 2019. The birds were thrown away for the sole reason that they were not fatty enough. In this case we talk about many dozens of birds. Such "skinny" birds are harvested in early August when young birds, which have not got strong enough and accumulated fat reserves yet, start the migration. According to witnesses, it is not an isolated incident. Even during out project, one of the hunters said that having harvested a Whimbrel had just thrown it away because it was very small and thin. Early opening of Whimbrel hunting inevitably provokes hunters to pointlessly harvest young, inexperienced and "sub-standard" birds. In fact, it is a legalized form of poaching.

Hunting Whimbrel early, before August 15, can also be considered a validated form of illegal hunting. During this period, an official permit to harvest marsh-meadow fowl can be obtained under pretence of owning a dog. However, pointers and spaniels are not used in Whimbrel hunting as this species does not hide and hunting is carried out from a hide or by hump shooting.

Analyzing the impact of hunting on such a difficult systematic group as shorebirds that includes many similar species which even specialists sometimes find it hard to identify, it is possible that at least a half of harvested birds may turn out to be harvested illegally. It is equally easy to shoot any bird whereas gaining knowledge and skills to identify them requires huge effort. The same amount of effort and personal are required to follow the hunting rules when there is almost no control over it. Assuming that more than 50 shorebird species are sighted more or less regularly in the Sakhalin oblast and any of them could be harvested intentionally or by mistake, while only 17 species are officially allowed for hunting, then in this case 2/3 of shorebird species are harvested illegally. Among them are the most frequently harvested Dunlin, Red-necked Stint and Mongolian Plover. Even harvest of seemingly known shorebirds, such as Snipes, in Sakhalin leads to Latham's Snipe *Gallinago hardwickii*, included in the regional and federal Red Data Books, being harvested together with Common Snipe *Gallinago gallinago*. All sibling species, undistinguishable by hunters, such as Nordmann's Greenshank and others are under the same pressure. They also include Spoon-billed Sandpiper that hunters cannot distinguish from other small shorebirds. In total the number of harvested birds of prohibited species can exceed the number of legally harvested birds.

In conclusion of this section, we can note that unfortunately existing hunting rules in real practice do not stop hunters from harvesting a big number of shorebirds whose species they cannot identify or do not deem it necessary to do so. That is why changing hunting rules so that simple and reliable control over it could be established can become the most significant measure of shorebird conservation in the region. One of the most effective solutions could be, first, the reduction of official allowed shorebird species list and, second, the change of hunting period. Harvest of all shorebird species which hunters cannot identify before the shot is taken should be forbidden. Hunters should have the right to shoot only well-known birds. An essential measure is also to increase the level of competence of people who gain access to

firearms and reinstate compulsory hunting minimum exams to obtain a hunting license and a permit to purchase a firearm.

4.6.2. Land development and habitat transformation

Development of the Sakhalin island has a long and complicated history. Development of mineral reserves in Sakhalin defined intensive human-induced impact. It is manifested most in the northern part of the island, at the territory of the Okhinsky district, where hydrocarbon production started in the beginning of the last century. Definitely, oil and gas facilities located here, despite the gradual technical refinement, continue to have a negative impact on the nesting and migrating shorebirds (fig. 56-60).

One of the main indicators of human-induced transformation of natural habitats of Sakhalin was building of a developed road network, predominantly without hard surface. The use of seismic surveys and drilling rigs for oil and gas exploration and later the creation of a large number of autonomous oil production sites (fig. 58) required laying of hundreds and thousands kilometres of roads (fig. 59). Development of these territories led to reduction of natural habitats, suitable for rest and feeding of many shorebird species. Roads contributed to the fragmentation of once single mass of coastal tundras and ensured unlimited access of hunters there.

Figure 56. Light pollution in the area of Exxon site at the Piltun bay

Figure 57. Light pollution in the area of Exxon industrial site at the Piltun bay. The picture was taken 30 km from the light source

Figure 58. Beam-pumping unit at the oil production site in the north of Sakhalin, Okhinsky district

Figure 59. The scale of transformation of natural habitats of shorebirds at the marine (northern) spit at the Piltun bay in the Okhinsky district, excluded from feeding and defensive habitats

Figure 60. Erosion and washing away of the shore of the Sea of Okhotsk at the plot of illegal dead weight loading to anchor gill net

5. MAIN CONCLUSIONS

1. The survey of the Sakhalin island showed that Kamchatka is far from being the only region in the Far East of Russia where intense shorebird hunting takes place. The scale of such hunting here, in general, turned out to be even larger than in Kamchatka. It is evident that similar surveys should be conducted in other regions of the Far East (see Recommendations for Further Research, para. 1) to have a complete picture of the situation in the region.
2. Hunting focused on shorebirds is deeply rooted and remains large in scale in Sakhalin as opposed to most of Kamchatka (at least to the districts which were surveyed in 2019). The proportion of hunters who intentionally hunt shorebirds and the size of the harvest is significantly larger than in those areas of Kamchatka, which were covered by our survey in first year. There is also a bigger impact on rare and protected shorebird species in Sakhalin.
3. Shorebird populations of Sakhalin are much less studied than those of Kamchatka. In order to be able to adopt effective conservation measures, a number of knowledge gaps on shorebirds should be filled in (see Recommendations for Further Research, para. 3).
4. According to the official data, the total number of hunters in Sakhalin is 23 thousand people, 30% of whom or 7.5 thousand people receive a permit for autumn hunting, which includes shorebird hunting. More than a quarter of them are residents of the city of Yuzhno-Sakhalinsk. According to the available estimates, the number of unregistered hunters in Sakhalin does not exceed 10%.
5. The greatest hunting pressure is in the north-eastern districts of Sakhalin. The most intense hunting is in Okhinsky and Nogliksky districts, where the largest shallow lagoons of the island, concentration sites of shorebirds and waterfowl during autumn migration, are located. Almost 3 thousand local hunters hunt here as well as several thousand visiting hunters from other districts of the region and the city of Yuzhno-Sakhalinsk.
6. Despite the continuous decrease of the Sakhalin human population, the number of hunters here tends to increase. This distinguishes Sakhalin from the majority of other regions of Russia. In recent years, road construction on the island made areas of the seashore, which used to be hard to access now available for hunters. As a result, hunting pressure on shorebirds as well as waterfowl has increased. In the future, it will apparently go up even more as the construction of new roads continues against the backdrop of the increasing number of hunters.
7. According to a number of old publications and interviews with some elderly hunters, hunting pressure on shorebirds was at its peak in the 1970s and 80s. Therefore, it had contributed to the total reduction of many shorebird populations of the flyway at the time of their maximum decreases. Nowadays, hunting pressure has gone down as the number of shorebirds has

significantly decreased and the hunting has become less productive. Nevertheless, hunting continues to have a significant impact on the populations.

8. Among shorebird species, only Whimbrel is a special object of hunting on Sakhalin, as well as Woodcock in the south and to a lesser extent Snipe. As informal interviews showed, many hunters also intentionally shoot Far Eastern Curlew. However, other large, medium-sized, and small shorebirds are also regularly shot.

   Small and medium-sized shorebirds are mainly harvested under the following circumstances:

   a) by children and teenagers, who do not have an official right to hunt but whose parents want to train them as hunters;

   b) in the absence of other game, in order not to return home empty-handed;

   c) by some gourmet hunters who love cooking and eating small shorebird soup considered a delicacy.

9. As the interviews showed, hunters save cartridges and usually harvest small and medium-sized shorebirds by shooting dense flocks. This results in a big number of wounded birds that die later and a significant number of killed birds that remain unrecovered. In this case, the total mortality of birds is likely 2-3 times higher than the number of birds used by hunters.
10. According to the opinion of majority of interviewed Sakhalin hunters, the shorebird population during autumn migration has been in decline in recent years. This decline is observed for Whimbrel (the main game species) as well as for shorebird species as a whole. Hunters who were interviewed for our project in Kamchatka in 2019 did not observe such decline.
11. As the interviews showed, majority of hunters lack the ability to distinguish shorebird species well. The only exception is Whimbrel, which is not considered to be a shorebird by many. There is common believe among hunters that Whimbrels and shorebirds are not related. The interviews showed that less than 15% of Sakhalin hunters know the names of shorebird species that are allowed or prohibited for hunting. Their practical skills of bird identification are at an even worse level. The only species they identify well are Whimbrel and Snipes (without identifying species); many know Far Eastern Curlew; the majority of hunters in the south know Woodcock, where it is more common. The level of the ecological education is extremely low. Nobody conducts any educational work in this field in Sakhalin and it will clearly not change in observable future.
12. Many Sakhalin hunters intentionally shoot Far Eastern Curlew and can identify it in the wild. This knowledge allowed us to give an expert estimate of how many birds of this species were harvested in 2019 – approximately 1100. It was more difficult to make such calculations in Kamchatka as hunters there pay less attention to this species and often do not differentiate Whimbrels from Far Eastern Curlews (especially young birds with short beaks, which are more common and are still not full grown in August).

13. Recent changes in the game management of the Russian Federation contribute to the fact that hunting rights are granted to people who do not know birds and cannot identify species before shooting. This is especially dangerous for shorebirds as many species are difficult for hunters to identify in the wild. Due to this, in order to ensure efficient conservation of rare shorebird species, current Russian state game management should be fundamentally revised. Possible approach may be that only shorebird species that can be identified by the majority of hunters before the shot is taken should be allowed to be hunted (see section Recommendations for Shorebird Conservation, para. 2). As the interviews showed, additional restrictions on shorebird hunting will probably not lead to massive protests of hunters in Sakhalin as the majority do not consider small and medium-sized shorebirds as serious game.
14. Our research showed that hunting in the Far East of Russia is probably a more significant factor in the population decline of several shorebird species along the EAAF than it was previously believed. That is why international collaboration to assess hunting pressure should be continued, including activities under EAAFP, partnership with AMBI-CAFF and interactions with bilateral conventions. Based on the full inventory of knowledge about hunting in all the regions of the Russian Far East, it is necessary to conduct further research, organise monitoring and implement conservation programs.
15. In 2020 in spite of pandemic restrictions, we managed to conduct a first research of that sort in Sakhalin; many things should be further examined and many questions answered. That is why it is necessary to continue the research here and initiate monitoring of shorebird hunting in the island, including the creation of a network of informants among hunters. It is also necessary to develop a systematic interaction with the government agencies for nature conservation to protect the populations of migratory shorebirds.
16. The sustainability of Whimbrel hunting in Sakhalin is doubtful. Current harvest is critically high. There is clear tendency for the long-term depression of the population. A temporary moratorium on hunting should probably be introduced for the population to recover.
17. It is also necessary to investigate more deeply the situation concerning Whimbrel in the whole of the Russia Far East, anywhere where active shooting on this species takes place, especially in the Khabarovsk Krai, Primorye, and the Magadan oblast. It is clear that at least some of its populations are harvested unsustainably and urgent game management measures are required.
18. It is reasonable to initiate international cooperation on Whimbrel on the flyway scale under EAAFP, through bilateral conventions on conservation of birds in Russia and CAFF's AMBI program of the Arctic Council. Since March 2021, Whimbrel is included in the priority species of AMBI. The received information on the serious decline of some of its populations is new for the region. The EAAFP should pay attention to this. It is one of the least studied shorebirds along the EAAF. Its

population in this region is seriously underestimated, trends knowledge doesn't exist and no conservation planning is even in the planning stage.

19. The population of the Far Eastern Curlew in Sakhalin is in a threatened state. Nowadays, we have more data on its harvest rather than sightings or observations. On many occasions, hunters distinguish it from similar species, but unfortunately this only increases their eagerness to shoot these birds, which remain one of the most treasured hunting quarries. The development of a complex of measures could change the situation (see section Recommendations for shorebird conservation, para. 4).
20. Methods used to assess the hunting pressure may require a significant revision in each new region of the Far East, which complicates our study process. Sakhalin was very different from Kamchatka and new challenges might appear in the Khabarovsk Krai and other regions, which will complicate the collection of representative data.
21. Territorial protection of shorebird staging sites in Sakhalin is completely insufficient. We may aim to establish some protected areas in key stationary shorebird concentration areas and we may test a new approach – to try to introduce seasonal hunting restrictions and no-shooting zones in the key coastal lagoons. This issue is currently not a priority for local conservation services and conservation NGOs.

6. RECOMMENDATIONS FOR SHOREBIRD CONSERVATION IN SAKHALIN OBLAST

1. One of the main reasons for the illegal/ incidental harvest of the majority of protected shorebird species is that hunters do not pay attention to the fact that some shorebirds are protected and simply do not distinguish shorebird species. The action should be taken in two directions. Firstly, it is necessary to develop hunters' understanding that they can harvest only those birds whose species was identified before the shot is made. Secondly, all measures should be taken to increase hunters' skills of bird identification in the wild. In this regard, it is advisable to develop and publish a field guide of the Far Eastern shorebirds, possibly together with waterfowl species. It will also be useful to publish a mass scale series of posters showing common and protected shorebird species and the map of their distribution in the region. The regional department for hunting is interested in this activity and ready to provide any assistance in the distribution of such materials but at this stage they had stated that their resources are insufficient to develop and publish them.
2. Taking into consideration a high ratio of rare and protected species in the fauna of Sakhalin oblast, among which are Nordmann's Greenshank *Tringa guttifer*, Far Eastern Curlew *Numenius madagascariensis*, Sakhalin dunlin *Calidris alpina actites* and Spoon-billed Sandpiper, agood step towards effective measure for their conservation will be a significant reduction of the list of shorebirds allowed for hunting. Combined with education. It will help to reduce the possibility of an incidental harvest of rare species. As it is only possible by changing the existing hunting rules, it is necessary to initiate the introduction of such changes at the federal and regional level.
3. As it would be very hard to change hunting rules at both federal and regional level without consolidating efforts and unifying the position of conservation institutions, academic circles, and NGOs of all the regions of the Far East, it is necessary to organise a number of interregional meetings on shorebird and waterfowl conservation in the Russian Far East with the participation of decision makers, hunting community, experts from other EAAFP countries, prepare publications and based on these measures systematically address the responsible authorities.
4. To develop and implement a complex of measures for the conservation of Far Eastern Curlew, which has a threatened status, a long-term efforts are needed including:
    a. work on changing the hunting legislation on the federal and regional level (see para. 2 and 3 above);
    b. development of a special PR-campaign, aimed at raising awareness of the importance of rare shorebird species conservation and its long-term consistent promotion in Sakhalin oblast (see para. 1 above);
    c. work with the Sakhalin government, game management authorities, hunter and the public;

d. creation of no-shooting zones – territories where, if necessary, hunting could be temporarily limited (closed) by the decision of local authorities.

Far Eastern Curlew could become the driver of the social monitoring campaign for the conservation of rare and threatened species of Sakhalin shorebirds, as this species is well-known for hunters.

5. The Ministry of Forestry and Hunting of Sakhalin oblast is recommended to create several additional protected areas (hunting reserves) in the concentration sites of Whimbrel at the north-eastern coast of the Sakhalin island, in particular at the northern and southern spit of Piltun bay. Lake Ush within Baikal bay system (Okhinsky district) is also an important concentration site for different shorebird species. This area is understudied, despite playing a key role for migration stopovers of Bar-tailed Godwit, Great Knot, and other protected species. Compulsory no-shooting days (without hunting) during the Whimbrel migration are recommended to be put into practice.
6. Contacts of game managers, employees of the Wildlife and Forest services, amateur ornithologists, and experts, who shared their observations with us and are ready to do so in the future, are considered valuable information obtained by us while working on this project in Kamchatka and Sakhalin. Communication with them should be continued and this network should be further expanded in the future. Based on the collected personal data (names, telephone numbers, email addresses), an independent system should be created to monitor the harvest of shorebirds (and other birds), their population dynamics, and occurring threats. This requires a regular exchange of information with this correspondent network. One of the ways to organize such exchange might be the preparation and issue of an annual report on the population dynamics and bird harvest in the Far East of Russia. This will encourage hunters to take more interest in studying the diversity of shorebirds and to take part in their conservation, primarily through following the hunting rules. But implementation mechanism and funding for these are currently not available.

7. RECOMMENDATIONS FOR FURTHER RESEARCH

1. Conducted research proved that there is a diverse and significant impact of hunting on many EAAF shorebird species both in Kamchatka and Sakhalin. In order to create a complete picture for the northern breeding grounds of the FLyway, it is recommended to continue the research in Khabarovsk Krai, Magadan Oblast, Primorsky Krai and later on in Yakutia, as well as streamline the system of monitoring in all the parts of the Far East of Russia.
2. There are different trends of Whimbrel population changes in Kamchatka and Sakhalin. We should identify the reasons for this difference. Different migratory groups of this species might be predominant in Kamchatka and Sakhalin. It is advisable to conduct: a) research with remote (satellite and GPS/GSM transmitters) tracking of Whimbrel in the Far East of Russia to establish their population differentiation and develop conservation measures, b) collate information on Whimbrel along the flyways of Eastern and Central Asia; c) streamline the system of Whimbrel monitoring; d) work on the flyway to make more precise estimates of Whimbrel population in the region.
3. There is a serious shortage of systematically collected qualitative data on the population dynamics of all the shorebird species which inhabit Sakhalin and the Kuril Islands. It is difficult to assess the status of populations of separate shorebird species. There is much miscellaneous data from different sites in different years. The possibility to organise monitoring of the seasonal population of Far Eastern Curlew, Nordmann's Greenshank, Great Knot, Bar-tailed Godwit, Whimbrel, and Spoon-billed Sandpiper should be explored. It is advisable to conduct counts during shorebird migration in the summer-autumn period in the north of Sakhalin, together with daily control of hunters' harvest. It will allow to assess the proportion of harvested Far Eastern Curlews, Godwits and other species in the Whimbrel harvest.
4. South-western coast of Sakhalin stayed by our survey unexplored by our survey due to limited funds and project team ability. It is important for the nesting and migration of shorebirds but very poorly studied. The most important of its bays (Tyk, Viakhtu, the Lakh river estuary) are lacking data on the number and species composition on stopovers. This is the place where Spoon-billed Sandpiper stops for a long time (Qing, Syroechkovskiy et al, 2020) and where the largest of known habitats of Nordmann's Greenshank remain. There are many indications showing the importance of these habitats for all migratory shorebirds but there are no recent data. As these areas are difficult to access this survey will require special funding, transport, and a good team.
5. It seems important to conduct a revision of the Nordmann's Greenshank (NG) population status, a threatened species, which has currently disappeared from the majority of known nesting sites in Sakhalin (V. Zykov and Z. Revyakina per. comm.). Although we have not received

direct indications of NG harvest, we are aware of the harvest of similar species (Common Greenshank, Redshank) during the nesting period in many bays of the island (Nabilsky, Baikal), including the habitats of Nordmann's Greenshank. Taking into consideration the fact that hunters lack the skills to identify this species (even harvested), local hunting may play a role as negative factors contributing to the decline of the world species population.

6. Long-term monitoring of shorebird stopovers at the premises of state natural reserve Poronaisky can be developed. The reserve administration is preapred to discuss possible of a long-term observation station (the most prospective locations for the station are the mouth of the Vladimirka river or the eastern part of Nevskoye lake) and is interested in the collection of ornithological data for nature records. However there are currently no ornithologists in the reserve.

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Annex 1. The list of questions, completed by the interviewer based on the hunter's answers during an individual interview with him

ВОПРОСНИК ПО ОХОТЕ НА КУЛИКОВ

1.Сведения об охотнике

1.1. Ваш возраст_____

1.2. Место вашего проживания_____.

1.3. Сколько лет живете в этом районе? _____

1.4. Сколько лет живете на Сахалине?_____

1.5. Основная работа (связана ли она в постоянными выездами на природу?)

1.6. Охотничий стаж_____

1.7. Состоите ли членом общества охотников (одного из общественных охотничьих объединений)?_____

2.Сведения об охоте на среднего кроншнепа (ягодника)

2.1. Пролетают ли весной в вашей местности средние кроншнепы, как много и в какие сроки? _____

А) Удается ли на них охотиться? _____

Б) Сколько птиц Вы добыли весной 2019 г? _____

В) Где охотились?

Г) Использовали профиля?_____

2.2. Какие места остановок ягодника на осеннем пролете Вы знаете (если нужно, покажите на карте)? _____

А) Менялись ли они за последние несколько лет? _____

Б) Изменялось ли число птиц в этих местах (увеличилось, уменьшилось, осталось прежним)?

2.3. Где, когда и какими способами (в т.ч. с использованием профилей) Вы охотились на среднего кроншнепа в 2018 г.?

А) Сколько птиц добыли осенью и весной ?

Б) В период 2013-2017 гг. (те же вопросы)?

В) Бывали ли случаи, когда, охотясь на среднего кроншнепа, Вы добывали куликов других видов (каких)?

2.4. Соотношение сроков охоты и сроков миграции весной и осенью? Совпадают они или нет?

2.5. Как изменились за последние годы (рост, снижение, колебания на одном уровне, без изменений):

А) интенсивность осеннего пролета среднего кроншнепа?

Б) число птиц, которые останавливаются на осеннем пролете в вашей местности?

В) интенсивность весеннего пролета?

Г) количество местных жителей, которые охотятся на среднего кроншнепа?

Д) количество приезжих (из других поселков, других районов), которые на него охотятся?

3.Сведения об охоте на большого и малого веретенника (показать изображения птиц)

(Особо отметить, если охотник может различать большого и малого веретенника)

3.1. Приходилось ли Вам добывать веретенников? Когда, где и при каких обстоятельствах?

3.2. Сколько всего веретенников Вы добыли за 2018 г.? _____

Где это было?_____

3.3. Знаете ли Вы о добыче веретенников другими охотниками (что именно)?

<u>Сведения об охоте на другие виды куликов, которые охотник знает (можно показать изображения птиц).</u>

4.Название вида (научное и местное)_____

Вопросы, аналогичные 3.1-3.3.

<u>Сведения об охоте на куликов среднего размера и маленького размера, которые охотник не различает по видам.</u>

7.1. Какие места остановок средних и мелких куликов на осеннем пролете Вы знаете (если нужно, покажите на карте)? Менялись ли они за последние несколько лет? Изменялось ли число птиц в этих местах (увеличилось, уменьшилось, осталось прежним)?

7.2. Встречаются ли в вашей местности средние и мелкие кулики весной? Когда, где, в каком количестве, характер их поведения, другая информация?

7.3. Знаете ли Вы о фактах добычи средних и мелких куликов? (Наблюдали сами, слышали от других людей)? Кто (местные, подростки, приезжие рыбаки, другие приезжие и т.д.), когда, где, при каких обстоятельствах, насколько часто и в каких количествах их добывают? Используются ли сети или ловушки? Что потом делают с добытыми птицами?

7.4. Приходилось ли Вам самим добывать средних и мелких куликов? (когда, где, сколько и т.д.).

7.5. Как изменилась численность у средних и мелких куликов за последние годы

(рост, снижение, колебания на одном уровне, без изменений):

А) интенсивность осеннего пролета средних и мелких куликов в целом?

Б) число птиц, которые останавливаются на осеннем пролете в вашей местности?

В) интенсивность весеннего пролета?

Г) количество местных жителей, которые их добывают?

Д) количество приезжих (из других поселков, других районов, в том числе рыбаков), которые их добывают?

Е) Эти же вопросы могут быть заданы не только о мелких куликах в целом, но и каком-либо отдельном виде, если респондент его знает и выделяет среди других куликов.

8.Насколько важна для Вас лично охота на ягодника ? Какая охота для вас более важная: на уток, на гусей или на ягодника ? и какая наименее важная?

А) Те же вопросы можно задать охотнику как эксперту по отношению к основной массе местных охотников: Считаете ли, что и для большинства охотников вашего района (города) охота на ягодника более/или менее важна, чем охота на уток? И т.д.

Б) Если выясниться, что охотник добывает мелких и средних куликов – аналогичные вопросы по ним.

9. Считаете ли Вы мясо ягодника деликатесом (более вкусным, чем мясо уток и гусей)? Далее свободная беседа на гастрономическую тему – у какой птицы насколько вкусное мясо, как ее готовить. В ходе беседы могут всплыть случаи использования в пищу мелких и средних куликов.

10. При наличии времени: свободная беседа об охоте на куликов в прошлом (в детстве, юности, что рассказывали родители, дедушка и др.) – добывали ли тогда куликов, какими способами, сколько, как готовили и др.

11. Свободная беседа о правилах охоты на куликов и возможных мерах по их охране.

А) Как Вы относитесь к существующим правилам охоты на куликов? Что в них, по вашему мнению, желательно изменить?

Б) Знают ли местные охотники добыча каких видов куликов разрешена, а каких запрещена?

В) Можете ли Вы сами назвать виды куликов, добыча которых запрещена?

Г) Можете ли Вы отличить эти виды во время охоты?

Д) Могут ли это сделать большая часть охотников вашего района?

Е) Может быть лучше закрыть охоту на ВСЕ виды мелких и средних куликов?

Ж) Сильно ли это ущемит интересы местных охотников?

З) Какую добычу куликов в вашем районе можно считать браконьерством?

И) Кто (какие группы населения местного или приезжего) занимается этим в вашем районе, где и когда?

К) Есть ли необходимость принять какие-либо специальные меры для охраны куликов на Сахалине?

Л) Какие меры Вы могли бы предложить?

Annex 2. The form completed for a settlement based on the results of preliminary communication with hunters living there

ОХОТА НА КУЛИКОВ

Данные о ситуации в поселке

Примечание: если ответы не умещаются можно использовать оборот или прикладывать дополнительные листы

1.Общие сведения о поселке:

Название_____

местоположение _____,

транспортное положение: связь с райцентром и областным (краевым) центром, дороги, виды транспорта

_____

численность и этнический состав населения (если нет статистики – то примерно)

_____

основные занятия местного населения

_____

наличие/отсутствие приезжих, которые могут участвовать в охоте

наличие у населения лодок, бездорожных средств транспорта, есть ли дефицит бензина

примерный радиус освоения территории по берегам и вглубь от берега (желательно показать на карте или схеме)

места, которые постоянно посещаются в целях охоты и/или рыбалки (где находятся, как туда ездят, в какие месяцы, сколько примерно людей, берут ли с собой ружья)

_____

2. Общие сведения об окрестностях поселка как о местообитаниях куликов

_____

3. Местоположение поселка по отношению к пролету основных видов куликов весной и осенью

_____

4. Общие сведения об окрестностях поселка как об охотничьих угодьях (по всем видам – т.е. где на кого охотятся)

_____

5. Общие и детальные (по основным видам: т.е. с одной стороны - по массовым, с другой - по охраняемым) сведения об окрестностях поселка с точки зрения возможности охотится там на куликов (желательно отметить на схеме)

_____

_____

6. Сведения об охотниках (экспертная оценка, можно, например, в процентах от общего числа взрослых мужчин – местных жителей или приблизительно, *например: 10-20 чел. всего в поселке, или примерно 30% взрослых мужчин охотится*)

Сколько примерно в поселке:

Людей (местных), имеющих охотбилеты и легальное оружие (местных),

Людей (местных), имеющих охотбилеты и легальное оружие и, кроме того, «черные стволы»,

Людей (местных), имеющих только «черные стволы».

Те же оценки для приезжих (оценки могут быть даже очень приблизительными – скажем: не меньше 10 не больше 100 человек).

Сколько примерно местных охотников (людей, имеющих билеты) вообще не охотятся на водоплавающих и околоводных птиц? (это, например, могут быть оленеводы или соболятники, нужно знать сколько их, чтобы вычесть из общего числа охотников).

_____

7. Какие виды охоты на водоплавающих и на куликов практикуются в поселке (для каждого вида охоты – примерные сроки и основные места охоты)? Какие приспособления для охоты используются (в т.ч. профиля, сети) и как часто? Используются ли собаки, какие, в каких случаях, как часто? Какие номера дроби используются (интерес представляет мелкая дробь на куликов)?

_____

_____

8. Сколько, примерно, людей в поселке (местных и приезжих) участвуют в каждом из видов охоты?

_____

9. Сколько, примерно, птиц по группам видов добывал обычный (типичный) охотник за весну и осень 2019 г.? *(например – от 2 до 10 уток, 1-3 гуся, 3-5 ягодника, иногда 2-3 мелких кулика. Обращаем внимание, что это будет не средняя добыча, а добыча среднего охотника)*

_____

Сколько максимально кто-то из охотников добыл за весну и осень 2019 г., или за другой запомнившийся сезон? *(например: один охотник, рассказывал, что один раз добыл 18 ягодников, это было примерно 5 лет назад)*

_____

10. Наличие/отсутствие трендов за последние 5-10 лет по всем отмеченным выше позициям

(например: охотников с билетами осталось примерно столько же, черных стволов стало значительно меньше, приезжих охотников с билетами стало больше процентов на 10-15, добыча гусей сильно сократилась, так как их стало меньше на пролете, добыча уток – осталась на прежнем уровне, ягодников стало больше, но на них теперь стали меньше охотится, за последние 3-4 года появились квадроциклы, на которых ездят по берегу далеко от поселка, км на 15-20, был один старик, который раньше ловил мелких куликов сетями, но два года назад он умер и т.д. и т.п.)

11. Регулирование охоты.

Знают ли охотники, добыча каких видов запрещена (здесь основное внимание на куликов, но есть смысл спросить и про другие виды)? Какой % охотников (экспертная оценка) может различить эти виды: а) держа птицу в руках б) на расстоянии выстрела?

Где и какие выделены охотугодья, за кем они закреплены (или не закреплены)? Как давно эти угодья были выделены и менялось ли что-нибудь за последние 5-10 лет? Насколько соблюдаются границы охотпользования на практике?

Какие разрешительные документы обычно оформляют местные охотники и как (через кого) они это делают? Какая часть охотников охотится, не имея без всех документов?

Насколько фактически соблюдаются сроки охоты вблизи поселка и в дальних угодьях? В какие периоды года они чаще всего нарушаются?

Кто фактически проверяет охотников (в т.ч. местных и приезжих)?

Если проверяют приезжие, то сколько таких проверяющих побывало в поселке за 2019 г? 2018 г.? за последние 5 лет? Проводятся рейды, или просто приезжает инспектор? Проводятся ли рейды (проверки) среди бригад приезжих рыбаков?

Кто и как контролирует наличие у них оружия и документов на охоту?

Если местные – то насколько их боятся охотники?

Много ли случаев, когда охотников за что-то наказывали?

Известны ли случаи, когда люди считали это несправедливым и случай становился предметом широкого обсуждения в поселке?

Насколько существующие правила устраивают охотников?

Насколько существующие правила реально ограничивают (регулируют) охоту?

Насколько существующие правила обеспечивают сохранение редких видов?

Annex 3. The anonymous questionnaires, distributed during in-person meetings with hunters and posted in the Internet

А Н О Н И М Н А Я А Н К Е Т А

Российское общество сохранения и изучения птиц (РОСИП) проводит изучение влияния охоты на популяции куликов и водоплавающих птиц Тихоокеанского пролетного пути. Вы окажете большую помощь нашему исследованию, если ответите на вопросы этой анкеты.

☐ *Я уже заполнил эту анкету в электронном виде (поставьте отметку и верните пустую анкету)*

Кулики

1.Добывали ли Вы куликов за последние 5 лет? *ДА_, НЕТ_ (подчеркните нужный ответ)*

2.Сколько ягодника (среднего кроншнепа) Вы добыли за 2019 год? _____ шт.

3.Сколько других (***кроме ягодника***) куликов Вы добыли за 2019 год:

КРУПНЫХ_____ шт.	*СРЕДНИХ _____ шт.*	*МЕЛКИХ _____ шт.*

4.Если знаете, напишите названия видов куликов, которых Вы добыли (можно указать местные названия)

_____

_____

5.Насколько часто добывают куликов (**кроме ягодника**) в вашей местности другие охотники (подчеркните):

ЧАСТО	*РЕГУЛЯРНО*	*РЕДКО*	*СЛУЧАЙНО ПРИ ОХОТЕ НА ДРУГИХ ПТИЦ*	*НИКОГДА*

6.Кто их добывает (подчеркните):

МЕСТНЫЕ (из вашего поселка)	*ПРИЕЗЖИЕ*	*И МЕСТНЫЕ И ПРИЕЗЖИЕ*

7. Как чаще добывают куликов:

ИЗ СТАЙ	*ОДИНОЧЕК*

8.Укажите, в какие месяцы добывают куликов в вашей местности:

Отметьте нужные месяцы ***√***	*МАЙ*	*ИЮНЬ*	*ИЮЛЬ*	*АВГУСТ*	*СЕНТЯБРЬ*	*ОКТЯБРЬ*

Продолжение анкеты

<u>Утки и гуси</u>

Укажите, пожалуйста, сколько водоплавающих птиц Вы добыли за последний год

Весной 2020 года		Осенью 2019 года	
Уток ____ штук	*Гусей ____штук*	*Уток ____ штук*	*Гусей ____штук*

Перечислите, пожалуйста, количество уток и гусей каждого вида, которых вы добыли:

Весной 2020 года	Осенью 2019 года

Сообщите, пожалуйста, о себе (нужное подчерните):

Ваш возраст: ***до 21; 21-40; 41-60; более 60 лет***. Ваш охотничий стаж: ***до 5 лет; 5-10; 11-20; более 20 л*****ет.**

Районы, где Вы охотились на птиц за последние 5 лет:

_____

_____

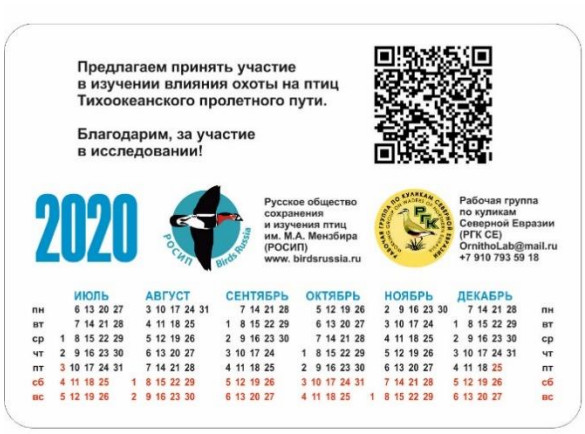
_____

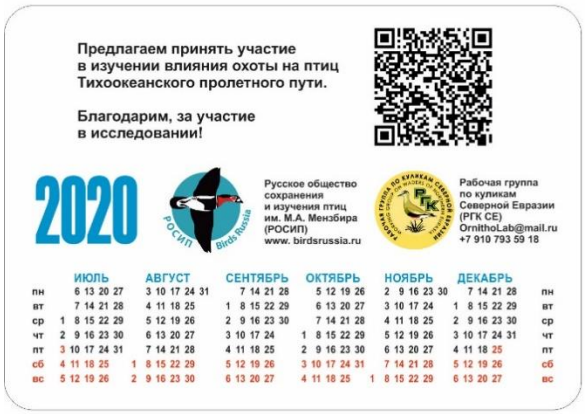
<u>Подписывать анкету не нужно</u>. Сообщенная Вами информация будет использована только в научных целях.

Большое спасибо за помощь в нашем исследовании !!!

Наш контактный адрес ornitholab@mail.ru*, мы будем рады ответить на Ваши вопросы.*

Annex 4. Hand-out materials; postcards and calendars with images of different shorebird species and additional information





Annex 5. Coloured table with pictured of shorebirds