

BirdsRussia

Working Group on Shorebirds of Northern Eurasia

**EVALUATION OF HUNTING PRESSURE OF SHOREBIRDS
IN THE RUSSIAN FAR EAST WITH SPECIAL ATTENTION
TO NUMENIUS (CURLEWS, WHIMBRELS) AND OTHER
THREATENED SPECIES**

**STAGE III: SURVEYS IN KHABAROVSKIY KRAI
AND AMUR OBLAST'**



Moscow – Nizhny Novgorod – Khabarovsk – Blagoveshchensk

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Report prepared by

Konstantin Borisovich Klokov, St. Petersburg State University, k.b.klokov@gmail.com

Matsyna Alexander Ivanovich, Working Group on Shorebirds of Northern Eurasia,
OrnithoLab@mail.ru

Pronkevich Vladimir Valentinovich, Institute for Water Environmental Problems,
vp_tringa@mail.ru

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

Syroechkovsky Evgeny Evgenievich, Ministry of Natural Resources of Russia / Birds Russia,
Russia. ees_jr@yahoo.co.uk

Alexey Antonov, Khingansky Nature State Reserve, alex_bgsu@mail.ru

Anton Aleksandrovich Sasin, Far Eastern State Agrarian University, anton_160386@mail.ru

With the participation of:

Sergey Kharitonov, Russian Bird Ringing Center IPE RAS Rus Acad.

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

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INTRODUCTION

Two regions – Khabarovsk Krai and Amur Oblast – were surveyed in 2021 as part of the work to assess the impact of hunting on shorebirds in the Russian Far East. As before, the main research approach was to conduct anonymous questionnaires and personal interviews of hunters, as well as detailed interviews with experts during personal meetings, which focused on finding out the degree of involvement of hunters of different age and social groups in the process of shorebird hunting.

In the course of the work we found a huge difference in economic pressure on different species of shorebirds and on the group as a whole, depending on the geographical location of each surveyed area. In contrast to Kamchatka and Sakhalin, much of whose territory is represented by coastal, nearshore ecosystems, Khabarovsk Krai and Amur Oblast are inland regions. Most of their territory is remote from the sea coast and is outside the area of mass concentrations of shorebirds during seasonal migrations. For this reason, harvesting of flocking species of shorebird is much lower here. On the contrary, the yield of the Far Eastern Curlew, which nests mainly in the inland areas of Khabarovsk Krai and Amur Oblast, is higher here. This large and protected shorebird, as our survey showed, is regularly shot by hunters both during the breeding season and during migrations.

1. NATURAL AND ECONOMIC CONDITIONS OF THE REGIONS

1.1. KHABAROVSK KRAI

Khabarovsk Krai is the third largest region of the Russian Federation. Its area is 787 thousand km². Khabarovsk Krai is divided into 17 districts, differing noticeably in their area and natural conditions (Figure 1). The length of the Krai in the meridional direction exceeds 1700 km. Stretching from the border of Magadan Oblast in the north, to Primorsky Krai in the south, Khabarovsk Krai is characterized by extremely diverse natural conditions. The northern part of the Krai is characterized by mountainous landscapes, harsh climate, and the presence of permafrost in the ground. The southern part is characterized by great landscape diversity, combining both mountain and plain types of landscapes, and includes the basin of the Amur River, the largest river on the Asian continent.

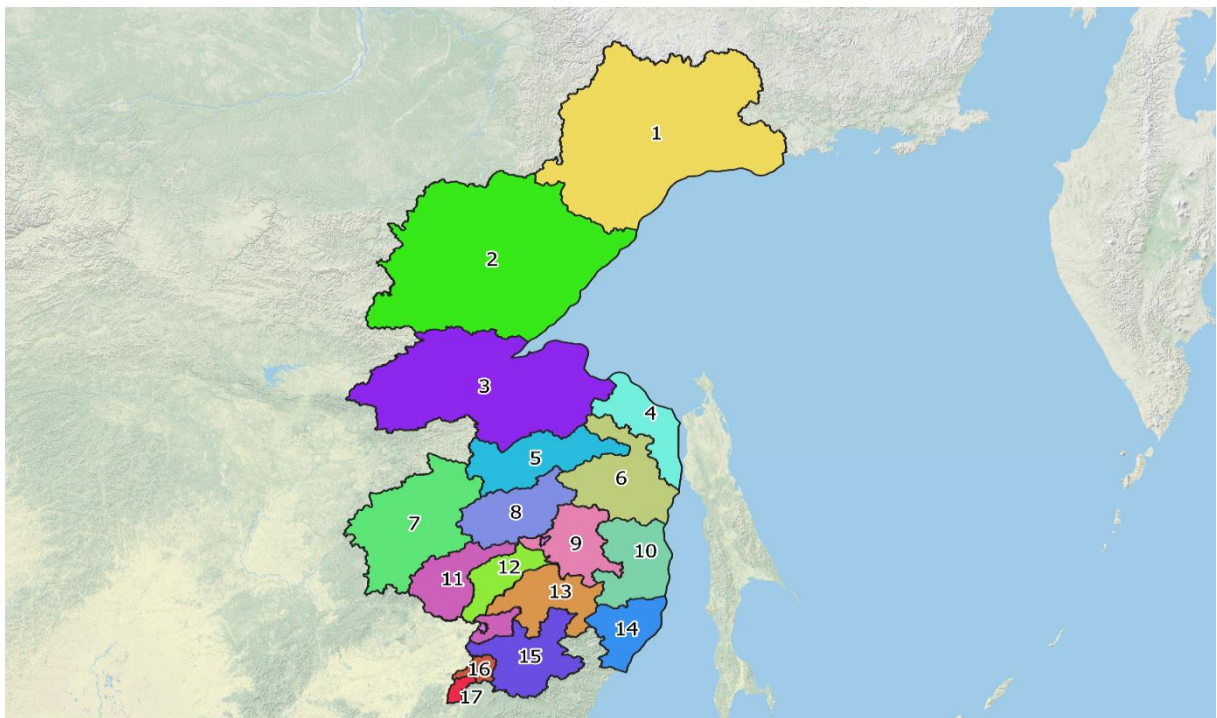


Figure 1. Districts of Khabarovsk Krai: 1 – Okhotsky, 2 – Ayano-Maysky, 3 – Tuguro-Chumikansky, 4 – Nikolaevsky, 5 – Polina Osipenko, 6 – Ulchsky, 7 – Verkhnebureinsky, 8 – Solnechnyi, 9 – Komsomolsky, 10 – Vaninsky, 11 – Khabarovskiy, 12 – Amursky, 13 – Nanaysky, 14 – Soviet-Gavansky, 15 – Lazo, 16 – Vyazemsky, 17 – Bikinsky



Figure 2: High and prolonged floods in the middle and lower reaches of the Amur River result in flooding and erosion of the banks, reducing the area of territories attractive to shorebirds



Figure 3: The banks of most rivers in the region are covered with forests, and their low-lying areas with dense grass cover



Figure 4: Pebble spits on rivers in summer



Figure 5: Numerous marshes provide habitat for several species of shorebirds, including the Far Eastern Curlew

The climatic conditions in the region are harsh. There is a lot of precipitation both in winter and summer. On the left bank of the Amur River and in the northern part of the region there are plots of permafrost.



Figure 6. A rainy day in Lazarev town forces a break in travel as the dirt roads become unsafe

The population of Khabarovsk Krai exceeds 1.3 million and the population density is only 1.65 persons/square kilometers. This is slightly higher than in Kamchatka (0.67 persons/square kilometers), but much lower than in Sakhalin (6.39 persons/square kilometers). At the same time, the population is extremely unevenly distributed across the region. Most of it (about 40%) is concentrated in the regional center Khabarovsk-Sity, as well as in communities in the south and central parts of the region. The largest cities – Komsomolsk-on-Amur, Amursk and Nikolaevsk-on-Amur – are located on the banks of the Amur River, and large settlements Vanino and Sovetskaya Gavan are located near the ferry to Sakhalin Island. The region's three largest northern administrative districts, occupying more than half of its territory, Okhotsky, Ayano-Maysky, and Tuguro-Chumikansky Districts are extremely sparsely populated (Fig. 7).

The distinctive feature of the region is the complex ethnic composition of its population – there are representatives of more than 40 ethnicities and indigenous minority ethnic groups – Nanai, Nivkhi, Evenki, Eveny, Udegei, Ulchi, Orochi, and others.

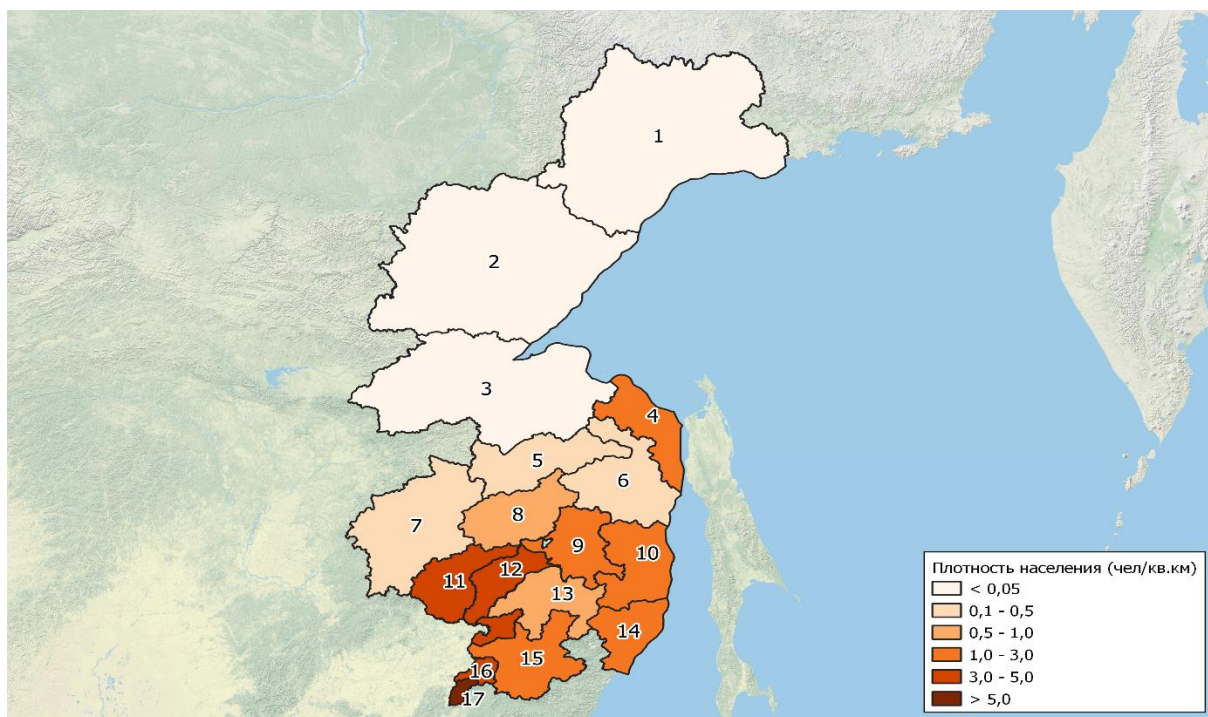


Figure 7. Population density in different districts of Khabarovsk Krai: 1 – Okhotsky, 2 – Ayano-Maisky, 3 – Tuguro-Chumikansky, 4 – Nikolaevsky, 5 – Polina Osipenko, 6 – Ulchsky, 7 – Verkhnebureinsky, 8 – Solnechnyi, 9 – Komsomolsky, 10 – Vaninsky, 11 – Khabarovskiy, 12 – Amursky, 13 – Nanaysky, 14 – Soviet-Gavansky, 15 – Lazo, 16 – Vyazemsky, 17 – Bikinsky



Figure 8. Paved roads were constructed only in the south of Khabarovsk Krai and some sections of the trunk road along the Amur River



Figure 9: The bulk of regional roads are fortified embankments that require constant repair due to high precipitation

Khabarovsk Krai is the economic center of the Russian Far East. Large industrial enterprises are concentrated there, as well as important logistics centers. The region is crossed by the Trans-Siberian and Baikal-Amur (BAM) railroads, which link the other Far Eastern regions of Russia (Sakhalin Oblast and Primorsky Krai) with the federal center. The Amur River continues to be an important transportation artery, although its role in cargo transportation has significantly decreased in recent decades.

In Khabarovsk Krai, mining of minerals, mainly ores, is developed and new fields are actively explored and developed. Of particular concern is the implementation of industrial projects near the coast of the Sea of Okhotsk and on its shelf, where important shorebird habitats are located. A new polymetal mining project near the Tugur Peninsula is currently under development. This project could potentially have a negative impact on shorebird habitats and increase anthropogenic pressures on them during migration periods.

Many armed forces personnel live in Khabarovsk Krai, so one of the most organized and numerous hunting societies in the region is the Military Hunting Society. This society also has offices in other regions of the Russian Far East.



Figure 10. Timber harvesting is one of the main industries in Khabarovsk Krai, following mining (mainly gold and polymetals)

The areas adjacent to the southwestern coast of the Sea of Okhotsk are the most important for shorebirds. Many bays of this sea are the most important key migration stopover points for most shorebirds of the EAAF (Fig. 11). Among them is Schastya Bay, located north of the Amur River mouth. The Chkalov, Baidukov, and other islands located here form the largest single and extremely important coastal area for migrating shorebirds in the Sea of Okhotsk, which integrates the north of Sakhalin Island and the adjacent part of the mainland coast. Depending on local weather conditions, shorebirds may make local movements between the coasts of Sakhalin and Khabarovsk Krai. The nature and quantitative characteristics of these movements have not yet been studied. In recent decades, people have been visiting Schastya Bay more frequently, which will undoubtedly have a negative effect on the resting and feeding conditions of migrating shorebirds, which form mass aggregations here. The breeding areas of the Nordmann's Greenshank (*Tinga guttifer*), endemic and one of the most endangered species of shorebirds, are localized in Schastya Bay. In recent years, active studies of the biology of this species have been conducted here (Pronkevich et al., 2021).

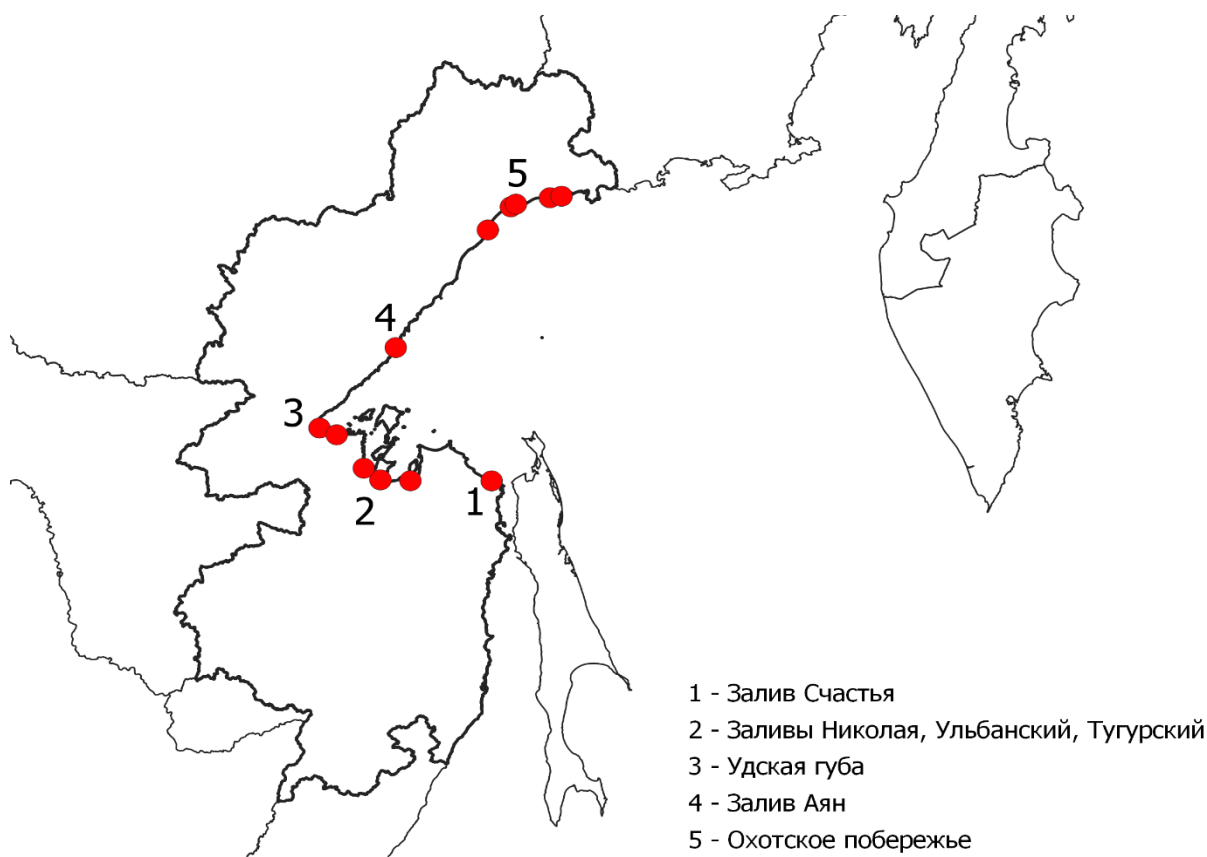


Figure 11. The most important stopover sites for migrating shorebirds in Khabarovsk Krai.
 1 – Schastya Bay; 2 – Nikolay, Ulbansky and Tugurskiy Bays; 3 – Uda Bay; 4 – Aian Bay; 5 – coast of the Sea of Okhotsk

In addition to Schastya Bay, bays located in the vicinity of the Shantar group of islands (Ulbansky, Nikolay and Konstantin) and to the west, Tugursky and Uda Bays, are of great importance for shorebirds. The northern part of the Sea of Okhotsk coastal area up to the border with the Magadan Oblast is almost unstudied from an ornithological perspective. At the same time, our 2021 survey data indicate the presence of large migratory stops of shorebirds near the Okhotsk town (the former capital and center of the entire Far East region of Russia). Important shorebird habitats along the Okhotsk coastline include the Kukhtui and Okhota bays at the mouths of rivers of the same name, estuaries near the Vostretsovo settlement south of Okhotsk, and bays and lagoons north of Okhotsk to the mouth of the Inya River and the Inya settlement. There is no data on numbers and seasonal migration dynamics of shorebirds in these areas because they have not been specifically studied there. However, there is evidence that many rare shorebird species, including the Spoon-billed Sandpiper (*Eurynorhynchus pygmeus*), have been encountered and captured here (Pronkevich and Morokov 2012).

1.2. THE AMUR OBLAST

The total area of the Amur Oblast is 363,000 km², its maximum length from north to south is over 1,000 km. Administratively, it is divided into 20 districts (Fig. 12). Like the neighboring Khabarovsk Krai, the Amur Oblast is characterized by a great diversity of natural conditions and a high contrast between the zone of broad-leaved plain forests in the south, in the Amur River floodplain, and taiga forests in the mountainous landscapes in the north. The diversity of natural landscapes is enhanced by large rivers (Amur, Zeya, Bureya) with well-developed valleys. This creates a high mosaic of shorebird habitats in the region. Several isolated natural landscapes are distinguished on the territory of the

Amur Oblast: the Zeya-Bureya plain, located in the very south; the Amur-Zeya plain (the middle part of the region); the mountainous north-east of the region and the Stanovoi ridge in the north-west.

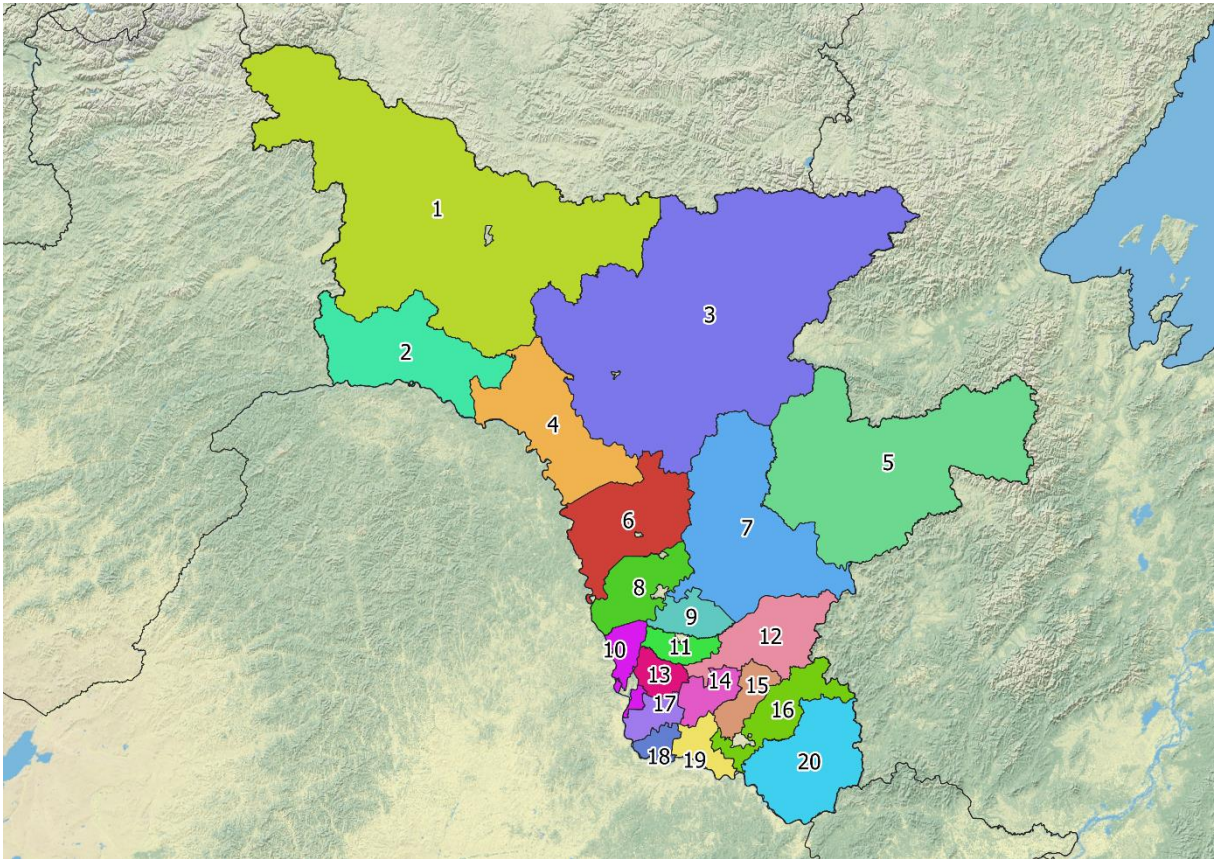


Figure 12. Districts of the Amur Oblast: 1 – Tyndinsky, 2 – Skovorodinsky, 3 – Zeisky, 4 – Magdagachinsky, 5 – Selezdzinsky, 6 – Shimanovsky, 7 – Mazanovsky, 8 – Svobodnensky, 9 – Seryshevsky, 10 – Blagoveshchensky, 11 – Belogorsky, 12 – Romnensky, 13 – Ivanovsky, 14 – Oktyabrsky, 15 – Zavitinsky, 16 – Bureinsky, 17 – Tambovsky, 18 – Konstantinovsky, 19 – Mikhailovsky, 20 – Arkharinsky



Figure 13. Swamp massif in Romnensky District of Amur Oblast on the Zeya-Bureya plain



Figure 14. River channel in the mountainous part of the Amur Oblast

The population of Amur Oblast is only 780 thousand people and population density (Fig. 15) is 2.16 people/square kilometers, which is slightly higher than in Khabarovsk Krai (1.65 people/square kilometers). Most of the population is concentrated in the south of the Amur Oblast, near Amur River. The region is home to major hydroelectric power plants on the Zeya and Bureya Rivers, as well as railroads and highways that connect the Russian Far East with Siberia and the European part of the country.

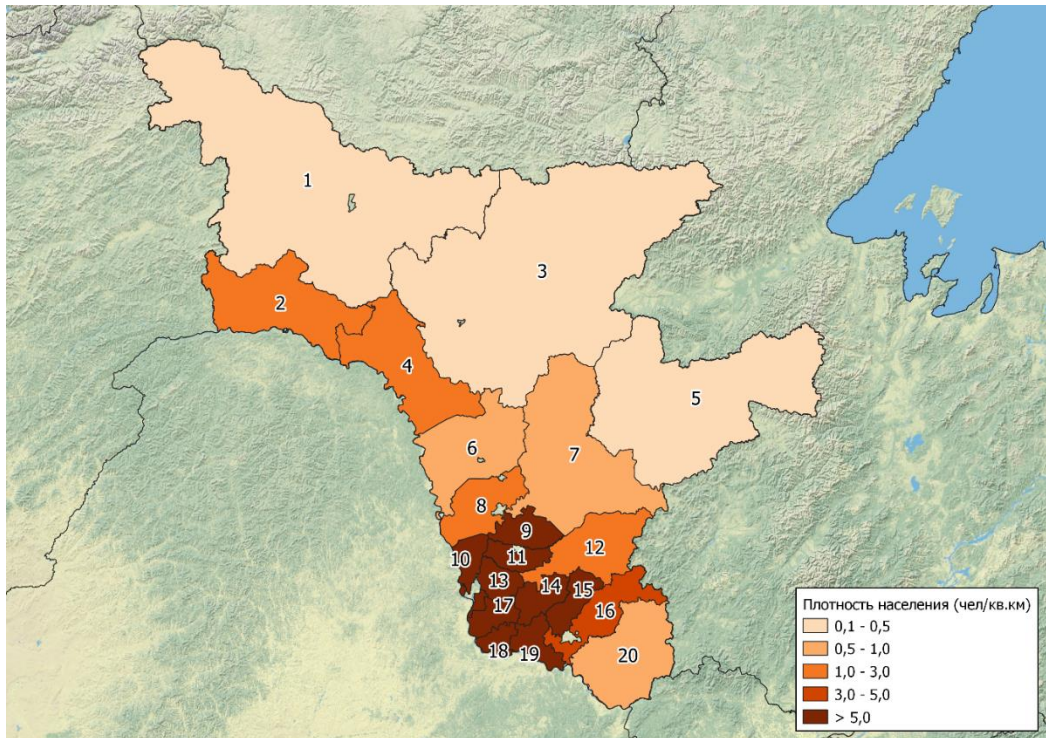


Figure 15. Population density in different districts of the Amur Oblast: 1 – Tyndinsky, 2 – Skovorodinsky, 3 – Zeisky, 4 – Magdagachinsky, 5 – Selezdinsky, 6 – Shimanovsky, 7 – Mazanovsky, 8 – Svobodnensky, 9 – Seryshevsky, 10 – Blagoveshchensky, 11 – Belogorsky, 12 – Romnensky, 13 – Ivanovsky, 14 – Oktyabrsky, 15 – Zavitsky, 16 – Bureinsky, 17 – Tambovsky, 18 – Konstantinovsky, 19 – Mikhailovsky, 20 – Arkharinsky

The Amur Oblast is far from the sea, so there are no such large migratory concentrations of shorebirds as on the coast of the Sea of Okhotsk. Nevertheless, the shorebird fauna here is quite rich. It is significant that the Amur Oblast is located in an important part of the range of the Far Eastern Curlew (*Numenius madagascariensis*), the key species in the center of our study. The Far Eastern Curlew nests in the majority of districts of Amur Oblast. As it was revealed in the surveys, it is often shot by hunters. In most cases it is taken together with ducks and geese during waterfowl hunting. Absence of places of high concentration of shorebirds reduces the risk of their mass extermination both during hunting and other economic activities. At the same time, transformation of coastal areas of large rivers as a result of hydroelectric power plant reservoirs leads to deterioration of breeding conditions of some shorebird species, such as the Long-billed Plover (*Charadrius placidus*).

2. MATERIAL AND METHODS

Before starting fieldwork, we conducted a preliminary analysis of literature data and information from available official sources: the Ministry of Natural Resources of Khabarovsk Krai, Khabarovsk Krai State Institution (KGSI), Service for Wildlife Conservation and Protected Areas of Khabarovsk Krai, etc. In the course of fieldwork, we interviewed local residents and experts (hunters, fishermen, nature protection service staff), conducted anonymous questionnaires among hunters, and monitored the process of hunting in the model areas. In addition we made the analysis of data from the Russian Bird Ringing Center (see Section 3.3).

In preparation for the field survey we consulted ornithologists working in the region and summarized information presented in the literature and other sources on geographical distribution and population dynamics of shorebirds: dates of migration; migration directions; numbers and places of concentration during migration; breeding ranges; population changes, etc. We also studied regulatory documents regulating the dates of hunting season and location of protected areas. In addition, we analyzed the recoveries of shorebird rings from the territory of Khabarovsk Krai according to the data of the Russian Ringing Center. There was only one ring recovery from the Amur Oblast for the entire period.

Vladimir Pronkevich, a leading ornithologist who has been working in the region for several decades and has excellent knowledge of local conditions, made a great contribution to the preparation of the fieldwork. His participation in the fieldwork has greatly increased efficiency of the survey, making it possible to quickly find the most informed and valuable respondents. In conditions of such a vast region as Khabarovsk Krai, it turned out to be especially relevant for selection of places and routes for field work and for remote methods of information collection. Thus, according to his advice, the really inaccessible northern districts of Khabarovsk Krai along the coast of the Sea of Okhotsk were immediately identified as one of the most promising for collecting information on shorebird hunting. Due to the fact that it was extremely difficult to visit these areas, we used remote methods to gather information, through local trusted experts who were known to Vladimir Pronkevich. We sent questionnaires for an anonymous survey of hunters, handouts, and posters with images of Far East shorebird species to the experts from these districts. Later we interviewed five local experts by telephone: these were local employees of the regional Ministry of Ecology and Natural Resources Protection Service – S.V. Mamonov (Okhotsk), I.A. Kashitsyn (Chumikan settlement), A.E. Lutsishin (Nelkan settlement), A.V. Gonyaev (Ayan settlement), and others.

On the basis of preliminary information, we made a plan of the survey, defined routes and key places – settlements (villages and towns) in which the works will be carried out. In planning the survey, we considered two conditions: the need to focus the surveys primarily on settlements where, according to preliminary data, the greatest number of shorebirds was shot during hunting seasons; and their transport accessibility. The transport accessibility is important, among other things, because it determined the possibility of local and guest hunters to visit the remote areas.

Collection of data in Khabarovsk Krai continued from 10 September to 20 December 2021. It included several stages during which we surveyed:

- the Amur Oblast (Nanaysky, Komsomolsky, Ulchsky Districts),
- the Sea of Okhotsk coast (Nikolaevsky, Tuguro-Chumikan, Ayano-Maisky Districts, and Okhotsk town),
- the inland continental areas of Khabarovsk Krai in its the southern part (Lazo, Bikinsky, Vyazemsky Districts)
- and in the center of the region (Verkhnebureinsky District, Solnechny, Polina Osipenko Districts).

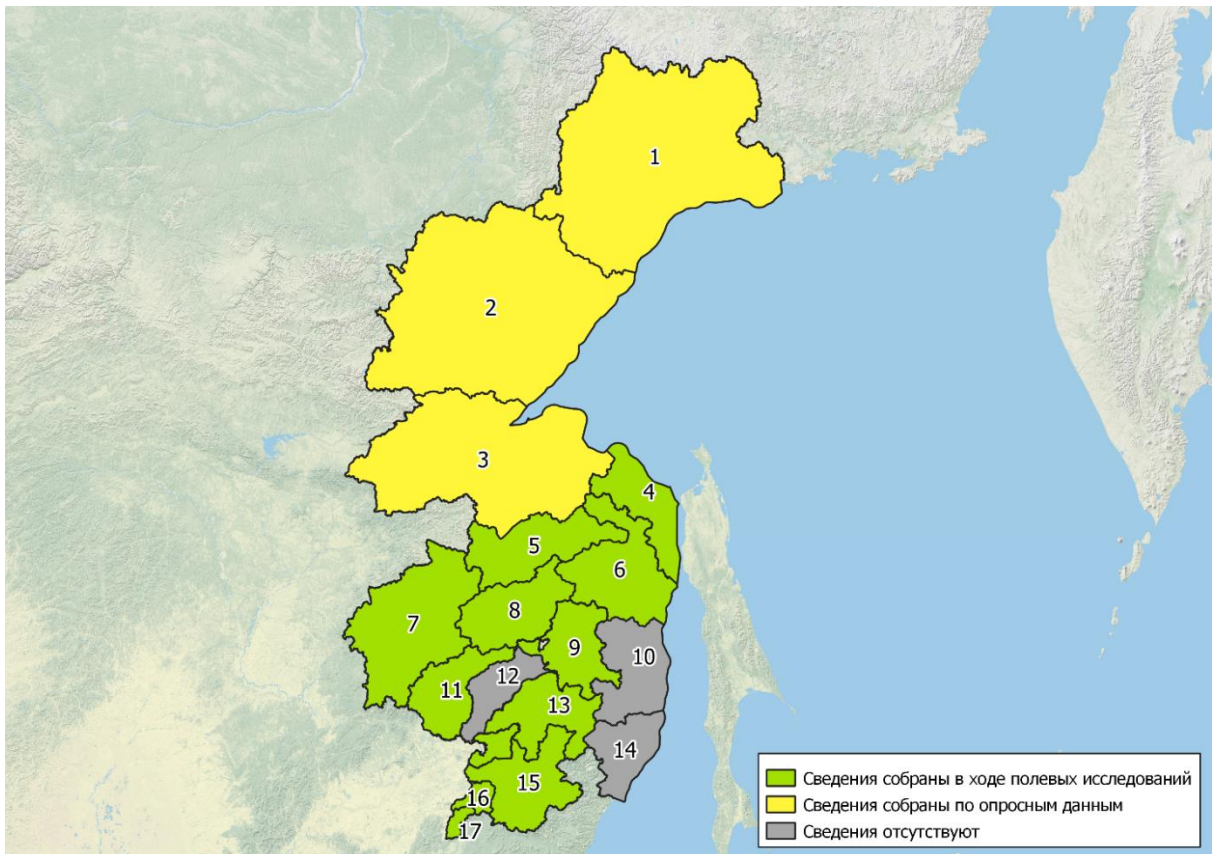


Figure 16. Areas of collection of data on shorebird hunting in Khabarovsk Krai. Districts: 1 – Okhotsksky, 2 – Ayano-Maysky, 3 – Tuguro-Chumikansky, 4 – Nikolaevsky, 5 – Polina Osipenko, 6 – Ulchsky, 7 – Verkhnebureinsky, 8 – Solnechny, 9 – Komsomolsky, 10 – Vaninsky, 11 – Khabarovskiy, 12 – Amursky, 13 – Nanaysky, 14 – Sovetsk-Gavansky, 15 – Lazo, 16 – Vyazemsky, 17 – Bikinsky

After holding necessary and important meetings with representatives of the administration in Khabarovsk, the capital of Khabarovsk Krai, we mailed questionnaires and necessary handouts to the Amur Oblast, where the work of distributing and collecting the anonymous questionnaires was done by Andrey A. Sasin. Questionnaires and materials were also sent by mail to the northern villages of Khabarovsk Krai. After that we made the first automobile trip along the long, multi-day route from Khabarovsk through several districts. Its final destination was the town of Nikolaevsk-on-Amur and the villages of Mago and Ozerpakh located at the mouth of the Amur River (Fig. 17).

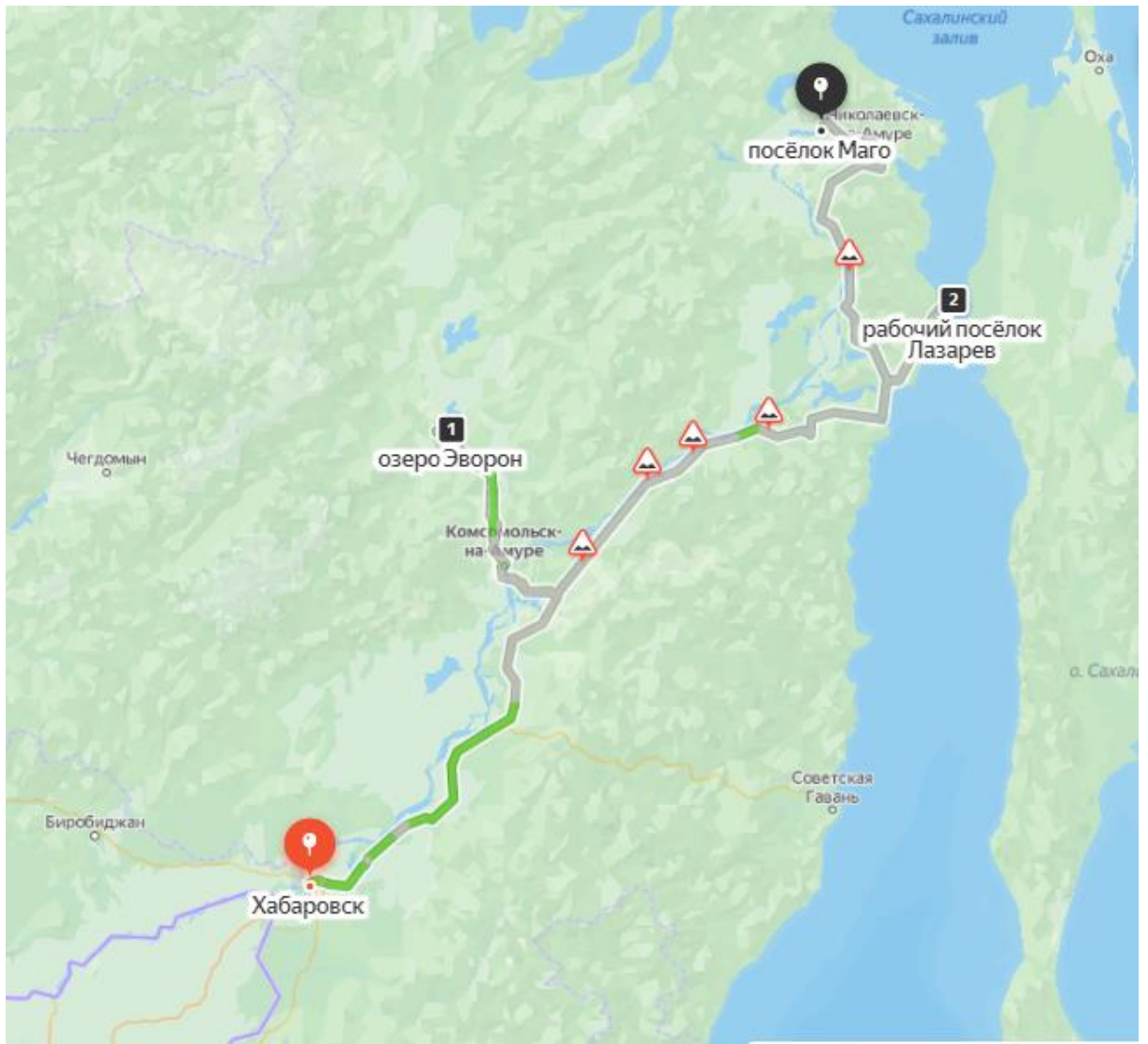


Figure 17. The automobile track in the Amur River area in Khabarovsk Krai in September 2021

During this trip, we visited and interviewed hunters also on Lake Evoron in Solnechny District, in the city of Komsomolsk-on-Amur, a number of settlements located along the right bank of the Amur River and in its lower reaches (Oremif and Ozerpakh settlements), and in the settlements located on the Sea of Okhotsk in the Nevelsky Strait – De-Kastri, Lazarev. In the Nikolayevsky District, we surveyed the settlements of Puir and Baidukova Island, located in Schastya Bay.

The second trip included an automobile route from Khabarovsk city southward through the settlements of Khor, Vyazemskoye, Lermontovo, Bikin, etc. to the border with Primorsky Krai in the village of Lesopilnoye.

To survey Verkhnebureinsky District, located in the central part of Khabarovsk Krai, we went there by rail, since automobile communication with this area is difficult.

We continued collecting information in northern Khabarovsk Krai in October-November, when hunters were finishing the field season and returning reports on the number of harvested bird. Then, locals experts collected anonymous questionnaires and sent them to us by mail. We received them in the second half of December (Table 1).

Table 1. Number of interviews and questionnaires collected in districts of Khabarovsk Krai

Name of district	Interviews number	Number of received anonymous questionnaire
Okhotsky District	3	
Ayano-Maysky District	2	
Tuguro-Chumikansky District	2	31
Nikolayevsky District	10	12
imeni Poliny Osipenko District	2	
Ulchsky District	4	3
Verkhnebureinsky District	7	5
Solnechny District	4	2
Komsomolsky	7	12
Khabarovsky District	3	
Amursky District	2	
Nanaysky District	7	8
Lazo District	3	3
Vyazemsky District	5	4
Bikinsky District	4	4
Khabarovsk Urban Area	10	15
Komsomolsk-on-Amur Urban Area	5	5
Total	80	104

The questionnaires in the Amur Oblast in the amount of 400 copies were distributed among the main hunting societies of the region: AROO "RAOOiR", Military Hunting Society, LLC "Okhotkhozhestvo Shimanovskoye". In this regard, the data on hunting were obtained for the most densely populated part of the region (Fig. 18). At the end of the hunting season 130 questionnaires were collected (Table 2).

Table 2. Number of questionnaires collected in districts of the Amur Oblast

District name	Number of questionnaires
Skovorodinsky	5
Mazanovsky	4
Svobodnensky	5
Seryshevsky	8
Blagoveshchensky	16
Belogorsky	11
Romnensky	9
Ivanovsky	13

Oktyabrsky	12
Bureysky	9
Tambovsky	10
Konstantinovsky	8
Mikhailovsky	11
Arkharinsky	3
District is not specified	6
Total	130

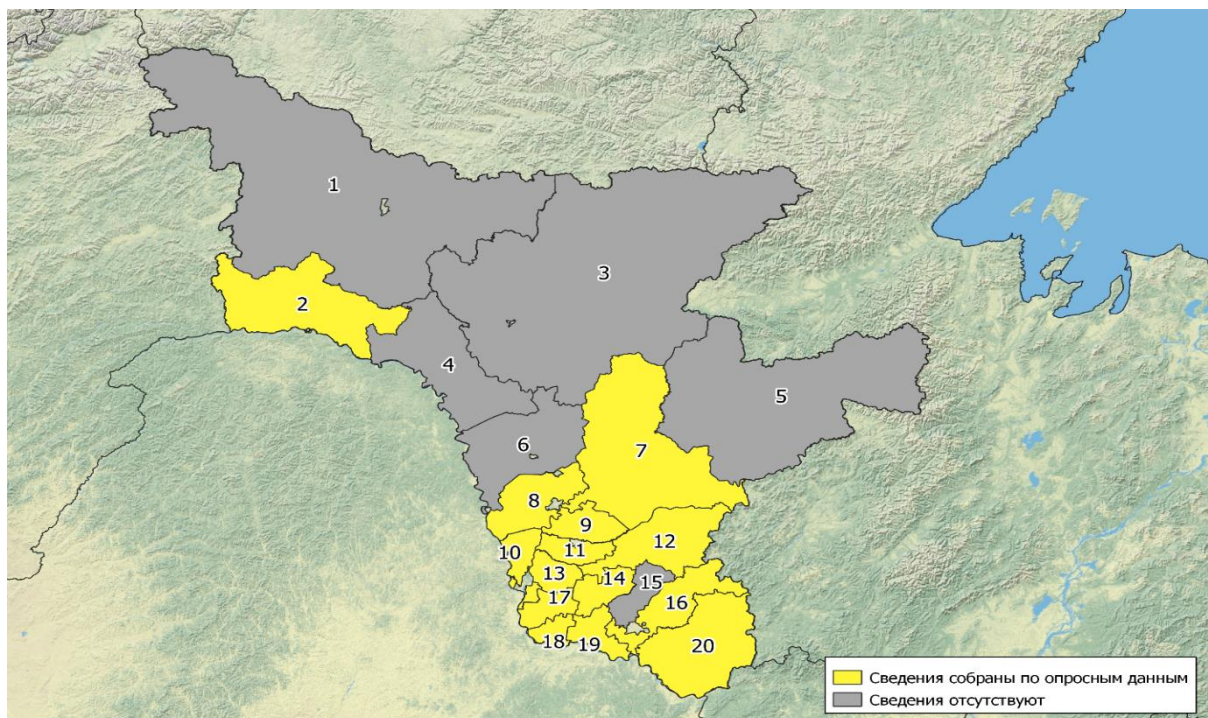


Figure 18. Areas of collection of data on shorebird hunting in the Amur Oblast. Districts: 1 – Tyndinsky, 2 – Skovorodinsky, 3 – Zeisky, 4 – Magdagachinsky, 5 – Selemdzinsky, 6 – Shimanovsky, 7 – Mazanovsky, 8 – Svobodnensky, 9 – Seryshevsky, 10 – Blagoveshchensky, 11 – Belogorsky, 12 – Romnensky, 13 – Ivanovsky, 14 – Oktyabrsky, 15 – Zavitinsky, 16 – Bureinsky, 17 – Tambovsky, 18 – Konstantinovsky, 19 – Mikhailovsky, 20 – Arkharinsky.

In Khabarovsk Krai, we used basically the same methodological approaches as in Sakhalin in 2020. In 2021, they were slightly modified and expanded. They were still based on the method developed by E.E. Syroechkovsky and K.B. Klovov for estimating bird harvesting in the Russian Arctic (Syroechkovsky and Klovov, 2010), which was adapted to study shorebird hunting in the first phase of the project in 2019. In 2021, the methodological approaches were further improved. Thus, several additional questions on the dynamics of the number and harvesting of rare species of ducks and geese were included in the questionnaires. This was due to the fact that in these areas shorebirds are not a special target for hunting, many hunters do not hunt them at all. Therefore, the interview focused on shorebirds caused surprise and bewilderment among hunters. This made it difficult to establish contact with the respondents and to get sufficiently detailed information about how hunting takes place. Therefore, we started the conversation with questions about duck and geese hunting and then moved on to questions about shorebirds.

The survey of each model village included two phases. First, we conducted in-depth interviews with 2-3 experts to provide a qualitative-level overview of how shorebird hunting occurs in the area and how important it is to both local and guest hunters in the area. Given that shorebirds are often not a specific hunting target, we also found out the general picture of waterfowl hunting, in which shorebirds can also be shot. We used additional questionnaires on rare and common waterfowl species. We did not analyze collected data on waterfowl in this report.

The interview included several dozens of free-form questions on the following topics:

1. General information about the population of the settlement, the number of hunters, ownership of hunting weapons and the vehicles used for hunting.
 2. Whether people from other places come to the settlement to hunt, how often and how many?
 3. Places where residents of the settlement and guest hunters hunt shorebirds or hunt waterfowl, shooting shorebirds in passing and accidentally.
 4. An approximate estimate (from an expert's point of view) of the number of locals hunters and guest hunters in this area.
 5. Methods by which local hunters usually hunt shorebirds.
 6. Whether hunting has become more or less intense in recent years, whether the number of hunters (local and guest) has increased or decreased.
 7. How strictly the rules and deadlines of hunting seasons are observed in the area. Do hunters know what species of birds are not allowed to hunt. Whether local people have unregistered weapons. How regularly inspectors and police officers monitor compliance with hunting regulations.
- And others questions.

The interview could be more or less detailed, depending on how interesting information the hunter could provide. The hunter sampling was based on the "snowball" method. The method consisted of each hunter providing contact information for one or more other hunters when answering questions or completing a questionnaire. In addition, we interviewed hunters we met at the hunting sites.

We also used anonymous questionnaires filled out by the hunters themselves. The questionnaire was made as short as possible, because each additional question increases the likelihood that the hunter would find the questionnaire too complicated and not want to spend time completing it. Because shorebird hunting is not popular everywhere, a special shorebird-only questionnaire may have caused misunderstanding on the part of some hunters and refusal to fill it out. Therefore, it also included questions about waterfowl hunting.

The questionnaire contained three groups of questions.

A. Shorebird hunting questions.

1. Have you hunted shorebirds in the last 5 years? (YES, NO)
2. How many shorebirds have you shot in the last 3 years, including the number of large-sized, medium-sized, and small-sized shorebirds?
3. If you know, write the names of the species of shorebirds you have shot? (you can give a local name).
4. How often are shorebirds taken by other (besides you) hunters in your area (FREQUENTLY; REGULARLY; ONLY OCCASIONALLY WHEN HUNTING OTHER BIRDS; NEVER)??
5. Who hunts them (LOCAL PEOPLE FROM YOUR VILLAGE; VISITORS; BOTH LOCAL or VISITORS)?
6. List the months when shorebirds are hunted in your area.

B. Waterfowl hunting questions: the hunter was asked to indicate the number and species of ducks and geese taken last year in spring and fall.

C. Questions about the hunter himself/herself: age, hunting experience, areas where he/she has hunted birds in the past five years.

Anonymous paper questionnaires were filled out during meetings with hunters during the field work period. A total of 104 anonymous questionnaires were collected in Khabarovsk Krai and 130 questionnaires in Amur Oblast. We distributed them mainly through hunting societies, which exist in most districts of Khabarovsk Krai (in contrast to Sakhalin Oblast).

In general, the field survey research tools (Fig. 19) included:

- a) anonymous questionnaires distributed both during face-to-face meetings with hunters and by posting information on the Internet;
- b) a questionnaire filled out by the interviewer from the words of the hunter during an individual conversation with the hunter;
- c) The questionnaire for a certain community filling in after deep interviews with hunters and experts living there;
- d) handouts: postcards and calendars with pictures of different species of shorebirds and additional information (Fig.11)
- e) color posters with drawings of shorebirds, for which the main species found in the Russian Far East were selected.



Figure 19. Handouts (posters, calendars) used for hunter interviews

Given significant differences in how hunting is organized in different parts of Khabarovsk Krai and Amur Oblast, we used different approaches to extrapolate data and estimate the number of shorebirds taken in different areas.

In areas along the coast of the Sea of Okhotsk, shorebird hunting is regular. We have used the method of formal extrapolation to estimate the number of shorebirds harvested in these areas. Data for this were based on the average number of shorebirds shot per hunter per year, obtained from surveys. We multiplied these averages by the total number of hunters receiving permits for waterfowl harvesting in the indicated areas (recall that permits are not issued specifically for shorebird hunting

there). In 2020, a total of 6,837 such permits were issued in Khabarovsk Krai. The number of hunters hunting birds without permits should be added to this figure. The number of such hunters, according to local experts, is at least 10% of the number of hunters who have received official permits.

In remote settlements in the north of the region (e.g. Inya), the proportion of hunters without official permits is much higher. This was taken into account when calculating the volume of harvesting of each species of shorebirds in some districts of Khabarovsk Krai. For shorebird species, which were not reported by hunters during the survey, the average annual harvest volume was estimated based on their relative abundance in the wild, ranging from 0.01 to 0.05 birds harvested per one hunter who received a permit to capture birds.

The number of harvested birds was calculated separately for different species/groups of species:

- separately for the most important species: Far Eastern Curlew, Middle Curlew, and Great Stint,
- together for medium and large shorebirds (Black-tailed and Bar-tailed Godwits, Woodcock and Snipes)
- together for all small shorebirds (primarily Dunlin, Red-necked Stint, etc.).



Figure 20. Vladimir Pronkevich interviewing an experienced hunter in De-Kastri village, Khabarovsk Krai



Figure 21. Interview with an expert hunter in Ulchsky District of Khabarovsk Krai



Figure 22. Interview with young hunters in the Nikolayevsky District of Khabarovsk Krai



Figure 23. Survey of hunters in Verkhnebureinsky District of Khabarovsk Krai



Figure 24. The poster can be left even in places where hunters come rarely. The Bikinsky District Society of Hunters and Fishermen is located in the very south of Khabarovsk Krai

3. RESULTS

3.1. SPECIES COMPOSITION, ABUNDANCE AND HABITATION PATTERNS OF SHOREBIRDS IN KHABAROVSK KRAI AND AMUR OBLAST

KHABAROVSK KRAI

Data on the abundance and distribution of shorebirds during seasonal migrations in Khabarovsk Krai are based on a review of available published data (Panov, 1973; Babenko, 2000; Nechaev, Gamova, 2009 et al.). To date, 56 shorebird species have been recorded in Khabarovsk Krai (Table 3). Of those, 16 species are nesting in the region, breeding of another 3 species is suspected, and 37 species and subspecies (Sakhalin *Calidris alpina actites*) are only migrating through the region and/or belong to the rare vagrant species. The Red Data Book of Khabarovsk Krai contains 11 species of shorebirds; in addition, 12 species of shorebirds inhabiting Khabarovsk Krai are included in the Red Data Book of Russia (Table 3). In recent years, studies of migrating shorebirds in the region have been significantly intensified. As a consequence, we should expect an expansion of their species list, which should not differ significantly from the more comprehensive similar lists of Sakhalin and Kamchatka.

Table 3: List of shorebirds of Khabarovsk Krai

№	Species	Red data book of Khabarovsk Krai	Red data book of Russia	IUCN. Red List	Number Category	Status		
						N	Tr	Acc
1	Grey Plover, <i>Pluvialis squatarola</i>			LC	U		+	
2	Pacific Golden, Plover <i>Pluvialis fulva</i>			LC	C		+	
3	Common Ringed, Plover <i>Charadrius hiaticula</i>			LC	R		+	
4	Little Ringed Plover, <i>Charadrius dubius</i>			LC	C	+	+	
5	Long-billed Plover, <i>Charadrius placidus</i>	+		LC	R	+		
6	Mongolian Plover, <i>Charadrius mongolus</i>			LC	C		+	
7	Eurasian Dotterel, <i>Eudromias morinellus</i>			LC	R		+	
8	Northern Lapwing, <i>Vanellus vanellus</i>			NT	C	+	+	
9	Grey-headed Lapwing, <i>Vanellus cinereus</i>			LC	R			+
10	Turnstone, <i>Arenaria interpres</i>			LC	C		+	
11	Oystercatcher, <i>Haematopus ostralegus</i>	+	+	NT	R	+	+	
12	Green Sandpiper, <i>Tringa ochropus</i>			LC	C	+	+	
13	Wood Sandpiper, <i>Tringa glareola</i>			LC	C	+	+	
14	Common Greenshank, <i>Tringa nebularia</i>			LC	C	+	+	
15	Nordmann's Greenshank, <i>Tringa guttifer</i>	+	+	EN	R	+	+	
16	Redshank, <i>Tringa totanus</i>			LC	R	+	+	
17	Spotted Redshank, <i>Tringa erythropus</i>			LC	C		+	
18	Marsh Sandpiper, <i>Tringa stagnatilis</i>	+		LC	R			+
19	Grey-tailed Tattler, <i>Heteroscelus brevipes</i>			NT	U		+	
20	Common Sandpiper, <i>Actitis hypoleucos</i>			LC	C	+	+	
21	Terek Sandpiper, <i>Xenus cinereus</i>			LC	R		+	
22	Grey Phalarope, <i>Phalaropus fulicarius</i>			LC	R		+	
23	Red-necked Phalarope, <i>Phalaropus lobatus</i>			LC	U		+	

24	Ruff, <i>Philomachus pugnax</i>	+		LC	R		+	
25	Spoon-billed Sandpiper, <i>Eurynorhynchus pygmeus</i>	+	+	CR	R		+	
26	Little Stint, <i>Calidris minuta</i>			LC	U		+	
27	Red-necked Stint, <i>Calidris ruficollis</i>			NT	C		+	
28	Long-toed Stint, <i>Calidris subminuta</i>			LC	U		+	
29	Temminck's Stint, <i>Calidris temminckii</i>			LC	U		+	
30	Baird's Sandpiper, <i>Calidris bairdii</i>			LC	R		+	
31	Curlew Sandpiper, <i>Calidris ferruginea</i>		+	NT	U		+	
32	Sakhalin Dunlin, <i>Calidris alpina actites</i>		+				+	
33	Dunlin, <i>Calidris alpina</i>			LC	C		+	
34	Sharp-tailed Sandpiper, <i>Calidris acuminata</i>	+		LC	R		+	
35	Pectoral Sandpiper, <i>Calidris melanotos</i>			LC	R			+
36	Great Knot, <i>Calidris tenuirostris</i>		+	EN	C		+	
37	Red Knot, <i>Calidris canutus</i>		+	NT	R		+	
38	Western Sandpiper, <i>Calidris mauri</i>			LC	U		+	
39	Sanderling, <i>Calidris alba</i>			LC	R		+	
40	Buff-breasted Sandpiper, <i>Tryngites subruficollis</i>		+	NT	R			
41	Broad-billed Sandpiper, <i>Limicola falcinellus</i>			LC	R		+	
42	Jack Snipe, <i>Limnocyptes minimus</i>			LC	R	+	+	
43	Common Snipe, <i>Gallinago gallinago</i>			LC	C		+	
44	Latham's Snipe, <i>Gallinago hardwickii</i>		+	LC	R	+		
45	Swinhoe's Snipe, <i>Gallinago megala</i>			LC	U	+	+	
46	Pin-tailed Snipe, <i>Gallinago stenura</i>			LC	C	+	+	
47	Solitary Snipe, <i>Gallinago solitaria</i>	+		LC	R	+	+	
48	Eurasian Woodcock, <i>Scolopax rusticola</i>			LC	U	+	+	
49	Little Curlew, <i>Numenius minutus</i>	+	+	LC	R		+	
50	Eurasian Curlew, <i>Numenius arquata</i>			NT	R			+
51	Far Eastern Curlew, <i>Numenius madagascariensis</i>	+	+	EN	R	+	+	
52	Whimbrel, <i>Numenius phaeopus</i>			LC	C		+	
53	Black-tailed Godwit, <i>Limosa limosa</i>			NT	R	+	+	
54	Bar-tailed Godwit, <i>Limosa lapponica</i>			NT	R		+	
55	Long-billed Dowitcher, <i>Limnodromus scolopaceus</i>			LC	R			+
56	Asian dowitcher, <i>Limnodromus semipalmatus</i>	+	+	NT	R	+	+	

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

AMUR OBLAST

Forty-eight species of shorebirds have been recorded in the Amur Oblast (Table 4). Of these, 19 species nest in the region, 29 only migrate through the region and/or are classified as rare vagrant species (Antonov and Dugintsov, 2018). The overall species list here is noticeably more modest than in other Far Eastern regions. This is partly due to the remoteness from the shores of the Sea of Okhotsk and the main migration routes of shorebirds. The Red Data Book of Amur Oblast includes 11 species of shorebirds, besides the Red Data Book of the Russian Federation includes 9 species of shorebirds inhabiting the Amur Oblast (Table 4).

Table 4: List of shorebirds of the Amur Oblast

№	Species	Red data book of Amur Oblast	Red data book of Russia	IUCN. Red List	Number Category	Status		
						N	Tr	Acc
1	Grey Plover, <i>Pluvialis squatarola</i>			LC	R		+	
2	Pacific Golden, Plover <i>Pluvialis fulva</i>			LC	U		+	
3	Common Ringed, Plover <i>Charadrius hiaticula</i>			LC	R		+	
4	Little Ringed Plover, <i>Charadrius dubius</i>			LC	C	+	+	
5	Long-billed Plover, <i>Charadrius placidus</i>	+	+	LC	R	+	+	
6	Mongolian Plover, <i>Charadrius mongolus</i>	+		LC	R	+	+	
7	Eurasian Dotterel, <i>Eudromias morinellus</i>		+	LC	R			+
8	Northern Lapwing, <i>Vanellus vanellus</i>			NT	R	+	+	
9	Grey-headed Lapwing, <i>Vanellus cinereus</i>			LC	R			+
10	Sociable Lapwing, <i>Vanellus gregarius</i>			CR	R			+
11	Turnstone, <i>Arenaria interpres oahuensis</i>			LC	R		+	
12	Black-winged Stilt, <i>Himantopus himantopus himantopus</i>	+		LC	R	+	+	
13	Pied Avoced, <i>Recurvirostra avosetta</i>	+		LC	R			+
14	Oystercatcher, <i>Haematopus ostralegus</i>	+	+	NT	R	+	+	
15	Green Sandpiper, <i>Tringa ochropus</i>			LC	C	+	+	
16	Wood Sandpiper, <i>Tringa glareola</i>			LC	C	+	+	
17	Common Greenshank, <i>Tringa nebularia</i>			LC	C	+	+	
18	Redshank, <i>Tringa totanus</i>	+		LC	R	+	+	
19	Spotted Redshank, <i>Tringa erythropus</i>			LC	C		+	
20	Marsh Sandpiper, <i>Tringa stagnatilis</i>			LC	R	+	+	
21	Grey-tailed Tattler, <i>Heteroscelus brevipes</i>			NT	R		+	
22	Common Sandpiper, <i>Actitis hypoleucos</i>			LC	A	+	+	
23	Terek Sandpiper, <i>Xenus cinereus</i>			LC	R		+	
24	Red-necked Phalarope, <i>Phalaropus lobatus</i>			LC	R		+	
25	Ruff, <i>Philomachus pugnax</i>			LC	R		+	
26	Red-necked Stint, <i>Calidris ruficollis</i>			NT	R		+	
27	Long-toed Stint, <i>Calidris subminuta</i>			LC	R		+	
28	Temminck's Stint, <i>Calidris temminckii</i>			LC	R		+	

29	Curlew Sandpiper, <i>Calidris ferruginea</i>		+	NT	R		+	
30	Sakhalin Dunlin, <i>Calidris alpina actites</i>		+		U	+		
31	Dunlin, <i>Calidris alpina</i>			LC	R		+	
32	Sharp-tailed Sandpiper, <i>Calidris acuminata</i>			LC	R		+	
33	Broad-billed Sandpiper, <i>Limicola falcinellus</i>			LC	R		+	
34	Jack Snipe, <i>Limnocyptes minimus</i>			LC	R		+	
35	Common Snipe, <i>Gallinago gallinago</i>			LC	A	+	+	
36	Latham's Snipe, <i>Gallinago hardwickii</i>		+	LC	C	+		
37	Swinhoe's Snipe, <i>Gallinago megala</i>	+		LC	R		+	
38	Pin-tailed Snipe, <i>Gallinago stenura</i>			LC	C	+	+	
39	Solitary Snipe, <i>Gallinago solitaria</i>	+		LC	R		+	
40	Eurasian Woodcock, <i>Scolopax rusticola</i>			LC	U	+	+	
41	Little Curlew, <i>Numenius minutus</i>	+	+	LC	R		+	
42	Eurasian Curlew, <i>Numenius arquata</i>			NT	R			+
43	Far Eastern Curlew, <i>Numenius madagascariensis</i>	+	+	EN	R	+	+	
44	Whimbrel, <i>Numenius phaeopus</i>			LC	R		+	
45	Black-tailed Godwit, <i>Limosa limosa</i>			NT	R			+
46	Bar-tailed Godwit, <i>Limosa lapponica</i>			NT	R		+	
47	Long-billed Dowitcher, <i>Limnodromus scolopaceus</i>			LC	R			+
48	<u>Asian dowitcher</u> , <i>Limnodromus semipalmatus</i>	+	+	NT	R	+	+	

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

3.2. POPULATION AND RANGE STATUS OF THE FAR EASTERN CURLEW (*NUMENIUS MADAGASCARIENSIS*) IN SOUTH FAR EAST RUSSIA

3.2.1. NESTING RANGE STRUCTURE AND ABUNDANCE

The most detailed data on the Far Eastern Curlew range in the late 20th and early 21st centuries are presented in Antonov (2011; 2016) and Sleptsov (2019). Based on these data, 33 breeding areas with a total area of about 150 thousand sq. km were mapped (Fig. 25). Six clusters of Far Eastern Curlew nesting pockets were identified (so-called population-geographical nuclei), including Priamurskoe, located in the Amur River basin from Lake Khanka in the south to the Verkhnezeiskoe Plain and the Evoron-Chukchagirskaya Lowland in the north. A total of 18 elementary breeding grounds of Far Eastern Curlew were identified in the Amur basin. The Amurian breeding area is more extensive than other clusters and occupies the southernmost part of the known breeding range of the species. Chronologically, nesting of Far Eastern Curlew was firstly described in Primorsky Krai (near Lake Khanka and in the lower reaches of the Bolshoi Ussurka River), then in Khabarovsk Krai and Amur Oblast.

Let us review the history of studies and the present state of the elementary breeding grounds of the Far Eastern Curlew breeding core area in the Amur Oblast.

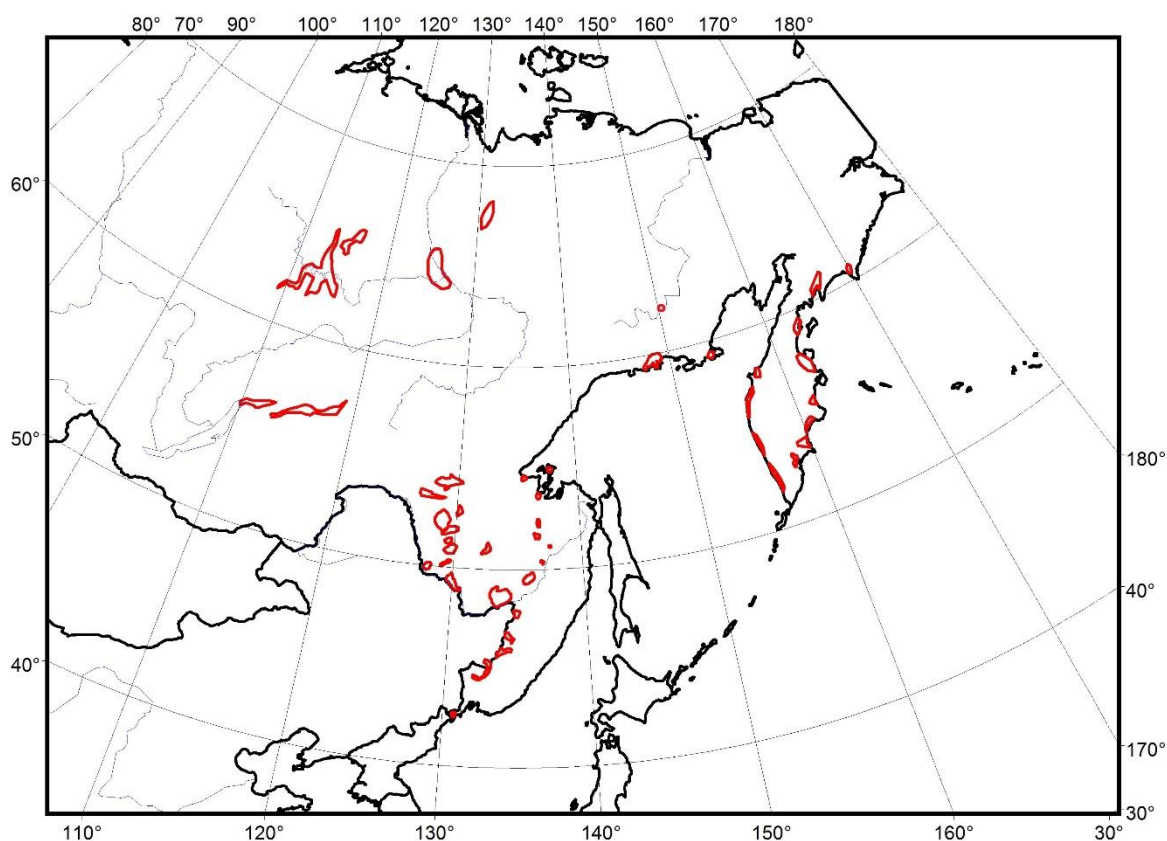


Figure 25. Breeding range of Far Eastern Curlew *Numenius madagascariensis* (Antonov, 2011, 2016; Sleptsov, 2019)

K.A. Vorobyev (1954) supposed the nesting of Far Eastern Curlew in the area of Possiet Bay in the south of Primorsky Krai, but no one has confirmed this nesting after this author.

The breeding area in the lowlands of Lake Khanka has a long history of studies. The first nest was found here in 1928 (Shulpin, 1936). In the mid-1970s, about 50 pairs were breeding in the Lake Khanka Lowland (Gluschenko, 1982).

The nesting of Far Eastern Curlew in the lower reaches of the Bolshaya Ussurka River was reported by E. P. Spangenberg (1965). The status of this breeding area is currently unknown.

Nesting on the Bikin River was discovered by B.K. Shibnev, and Far Eastern Curlew was common there in the middle of the 20th century (Shibnev 1976). Later, in the 1970s, B.B. Pukinsky (2003) stated a sharp decrease in the number of the local breeding group there.

Mention of Far Eastern Curlew nesting in the lower reaches of the Khor river is mentioned only in the work of L.M. Shulpin (1936), the current status is unknown.

C. B. Winter (1980) discovered the Far Eastern Curlew breeding area in the Bureinsko-Khinganskaya Lowland in the mid-1970s. The density of nesting birds in this area is decreasing, but as a whole by the abundance of nesting pairs this area occupies one of the key positions. It is the only locality from which we already know more than 10 documented nest finds (Antonov, 2009). It should be taken into account that this record number of found nests is probably due to the large number of ecological studies of the Far Eastern Curlew in the area.

A significant breeding area of the Far Eastern Curlew is located in the north of the Zeya-Bureya Plain in the basins of the Tom, Ulma, and other rivers with their tributaries (Antonov et al., 2016). However, we do not have data on its abundance (nor absolute, either relative) from this region.

Several large nesting pockets have been described in the Upper Zeya River basin. Most of them exist and maintain a significant density of birds up to the present time.

The nesting conditions of the Far Eastern Curlew in the Verkhnezeiskoe Plain have now deteriorated due to flooding of most of the suitable nesting sites by the waters of the Zeya Reservoir. Nevertheless, successful nesting there by Far Eastern Curlew has been documented (Antonov et al., 2015). For example, 5 nesting pairs were found in Dutkan Bay and adjacent marshes of the Bol'shaia Palpaga River floodplain in the last decade of June 2014 – birds were at brood at the time of the survey. Nesting is also probable in the Khaimkan *mariae* (larch peatmoss bog open woodland) and in the Gulik River valley near the Zeisky Nature Reserve, where mating birds and pairs were observed on 21-23 May 2014 and 10 May 2015 (Antonov et al., 2015). In 2021, Far Eastern Curlews were nesting near the village of Bomnak, and they had not been observed here before (data from interviews with local hunters).

According to Voronov (1983, et al.), Far Eastern Curlew is a sparse or rare migrating and probably nesting species in the middle reaches of the Zeya River. It has been known to appear there in spring since 5 May. It has also been recorded in summer in the Dep River basin from source to mouth, among other an actively disturbing male was observed on 18 June 2015. A pre-breeding flock of 14 females (judging by beak length) was observed at the mouth of the Dep River on 16 June 2015.

In the Middle Amur Plain in the Evreyskaya Autonomous Oblast, Far Eastern Curlew nests in larch peatmoss bog open woodland, but there are few specific data on numbers. In the Bolon Lake basin in Khabarovsk Krai, Far Eastern Curlew has been recorded since the middle of the last century (Kistyakovskiy, Smogorzhevskiy, 1973), but its nesting was not confirmed until much later (Antonov, 2004). The abundance of breeding birds in this area has decreased significantly over the last 20 years (Table 5).

Further down the Amur River valley, Far Eastern Curlew nesting is known in the interfluvies of Bol'shaya and Mal'aya Khurbinok Rivers and in the basin of the Gorin River, on lakes Evoron and Udyk, on Oljikan River and also (presumably) up to the mainland coast of Tugur Bay (Tugur River estuary) and Bol'shoi Shantar Island (Babenko, 2000; Pronkevich, Voronov, 1996; Roslyakov, 1990; Koblik et al, 2001; Pronkevich, 1998).

3.2.2. SEASONAL MIGRATION

During spring migration in the Ussuri River floodplain (south of Khabarovsk Krai) in 2005, Far Eastern Curlew was observed from 12 April (Pronkevich, 2011). The maximum intensity of migration was observed on 5 May, when two flocks of 40 and 50 Far Eastern Curlews were observed. A total of 209 birds were recorded during the period of observations from 1 April to 11 May. Far Eastern Curlew migrates to Bologna Lake at the beginning of the third decade of April. Migration is by broad front, in small groups of 8-10 birds at a height of 150-200 m. Sometimes they form clusters up to 150-200 individuals (Roslyakov, 1990). On Lake Evoron in spring Far Eastern Curlew appear on the same dates (Pronkevich and Voronov, 1996). During the summer, non-breeding Far Eastern Curlews occur within

the breeding range. For example, flocks of 5-7 Far Eastern Curlews stayed until early August in the Bureinsko-Khinganskaya depression (Winter, 1980). In the summer of 1978 flocks of several dozens of Far Eastern Curlews were recorded on Lake Bolon (Mishchenko, Smirenskii, 1981). A flock of 23 Far Eastern Curlews flying southward was observed on 10 June 1976 near Malyshevo settlement, Khabarovsk Region (Valchuk, 1997). Since mid-June there has been a permanent migration of single and failed breeding birds. In central Sikhote-Alin, autumn migration is from early to mid-3rd decade of September (Rakhilin, 1973c). As well, Far Eastern Curlews are known to be shot in Khabarovsk Krai (Malyshevo village) and in October (Roslyakov, 1990).

Table 5. Data on the decline in numbers of Far Eastern Curlew in the breeding grounds of the Amour breeding area

Breeding grounds	Years of surveys		Authors	Decrease in numbers, %
	1975-78	1999		
Arhara	1975-78	1999	Winter 1980, Antonov 1999	40
Bologn	1980s	2000	Roslyakov 1990, Antonov 2004	94
Bikin	early 1970s	late 1970s	Pukinsky 2003	30

Table 6. Population number of Far Eastern Curlew in the Amur River basin according to published data

Name of breeding area	Region	Location	Year of count	Number of nesting pairs (according to the source)	Nesting rate (pairs number per 10 km ²)
Bolon	Khabarovsk Krai	vicinity of the village of Djuen on Bolon Lake	2000	15 pairs / 100 sq km	1.5 pairs
In	Evreiskaia Avtonomnaia Oblast	In River	2002	3 pairs / 10 sq km	3 pairs
Bikin	Khabarovsk Krai	Interfluves of Bikin and Alchana Rivers	1970-e	3-4 pairs / 10 sq km	3-4 pairs
Arhara	Amur Oblast	Bureinsko-Khinganskaia Lowland	1999	1- 1.5 pairs / 1 sq km	15 pairs
Khurba	Khabarovsk Krai	Interfluves of Bol'shaia and Malaya Khurbinok Rivers	Year unknown	2 pairs / 1 sq km	20 pairs
Arhara	Amur Oblast	Bureinsko-Khinganskaia Lowland	1975-78		17-33 pairs
Bolon	Khabarovsk Krai	Bolon lake	1980-e	2-3 pairs / 1 sq km	20-30 pairs
Evoron	Khabarovsk Krai	Evoron lake	Year unknown	4 pairs / 1 sq km	40 pairs
Selemdkha	Amur Oblast	Ziesko-Selemdzhinskaia Plane	Year unknown	2 birds / per 10 km of route length	
Zeia	Amur Oblast	Verkhnezeiskaya Plane	Year unknown	5 birds / per 10 km of route length	
Nora	Amur Oblast	Burunda River	Year unknown	1-9 birds per 10 km of river	

Sources – see table 5



Figure 26. Far Eastern Curlew after returning to breeding grounds in mid-April, Amur Oblast. Photo by A. Antonov



Figure 27. A pair of Far Eastern Curlews in the breeding biotope, Amur Oblast. Photo by A. Antonov



Figure 28. Far Eastern Curlew in the breeding biotope, Amur Oblast. Photo by A. Antonov



Figure 29. Far Eastern Curlew nesting biotope in the Amur Oblast. Photo by A. Antonov



Figure 30. Hatchlings in Far Eastern Curlew nest. Photo by A. Antonov



Figure 31. Ruined egg-laying of Far Eastern Curlew, Amur Oblast. Photo by A. Antonov

3.3. ANALYSIS OF RECORDS OF THE RUSSIAN BIRD RINGING CENTRE

KHABAROVSK KRAI

The Russian Ringing Centre contains data on 96 ringing recoveries from 13 species of shorebirds, which were received from 1958-2020 in the Khabarovsk Krai. Of these, 83 birds were shot, and another 7 shorebirds (5 Great Knots, Ruff and Bar-tailed Godwit) were found injured or dying. In our analysis we assume that all of them died or were injured as a result of hunting, as birds attacked by predators rarely remain just "wounded" or "dying". One Far Eastern Curlew, ringed in Australia on 5 March 2001 (Victoria), died on 22 April 2006 after being caught in a fishing net near Birobidzhan (Evreiskaia Autonomous Oblast), it is possible that it was shot and wounded and then caught in a net having fallen into water. Nevertheless, we excluded it from further analysis. Information on 5 ringed shorebirds (4 Red-necked Stints and one Great Knot) was obtained by recapturing tagged birds and reading individual tags. These shorebirds were also not included in the analysis.

Among the shot shorebirds, the most numerous were those of the species forming migratory aggregations in dense flocks that were usually shot. In Khabarovsk Krai, these were Great and Red Knot (Figure 25). Their proportions among ringed birds were 73.3% and 11.1%, respectively. At high tide, these birds usually rest on the shore and sit literally huddled together and easily allow a human to take a shot, especially when approaching from the water by boat. Hunters take advantage of this trustfulness. Although hunters manage to shoot only once or twice, the number of victims can be in the tens and even hundreds of birds.

A Long-billed Dowitcher ringed in Taimyr on 17 July 1999 at the mouth of the Khatanga River when he was a chick, was shot on 20 September of the same year near the settlement of Vostretsovo, in the Okhotsk District of Khabarovsk Krai. In the accompanying letter to the Ringing Centre, it is erroneously listed as "Eurasian Woodcock". In other letters Common Sandpiper was listed as "Common Snipe", one Red Knot was described as "Great Knot". In 81 cases "Shorebird" or "Bird" was listed. Thus, only 5.6% of the birds shot or found were correctly identified in the accompanying letters. In the remaining 94.4% of cases species identity of shorebirds was not identified at all or incorrectly identified (in three cases). Among the correctly identified birds were Common Greenshank, Red Knot and in three cases Great Knot.

It should be noted, that of all shorebirds shot in Khabarovsk Krai, only half (50.6%) were considered by hunters as shorebirds due to official records provided by the Russian Ringing Centre. For the other half of shorebirds (49.4%) just "bird" was indicated. This fact demonstrates the poor knowledge of birds, in particular shorebirds, by hunters in the region. We ourselves were repeatedly convinced of this when we interviewed hunters and showed them colour images of shorebirds. Good knowledge of shorebird species was demonstrated only by a few experienced hunters, who had long been interested in hunting and diversity of birds. Young hunters and novice hunters usually have very poor knowledge about species of shorebirds allowed to hunt, and even less knowledge about species not allowed to be hunted. Among the ringed shorebirds taken by hunters, only four species are allowed to be hunted in Khabarovsk Krai (Figure 32). The remaining species are either not included in the list of officially permitted to hunt (3 species) or are strictly prohibited from hunting (5 species) because of their protected status. Of the total number of shorebirds' rings recovered by the Russian Ringing Centre, 85.4% were from species prohibited from hunting (n=82).

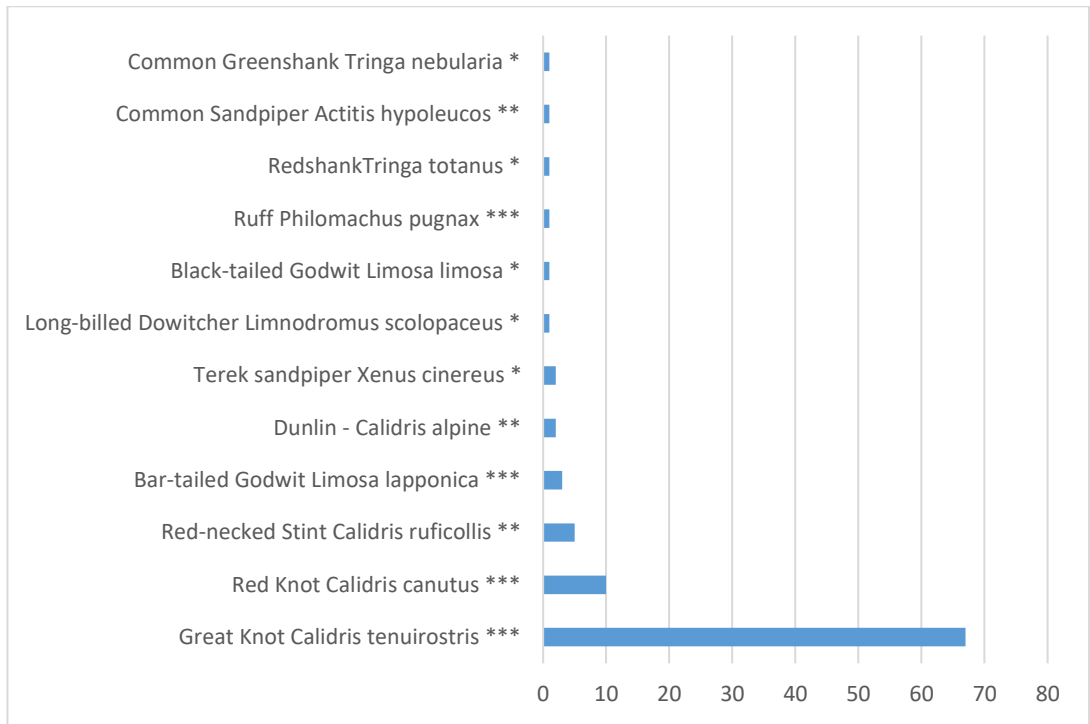
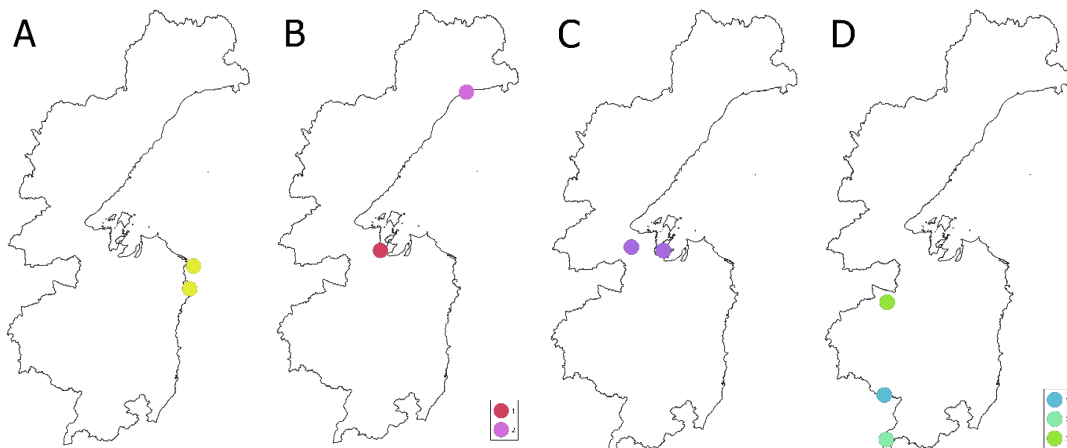


Figure 32. List of species and number of shorebirds from which ring recoveries were obtained in Khabarovsk Krai (* – species allowed to be hunted; ** – species not allowed to be hunted; *** – protected species, hunting prohibited)

Most of the ringed shorebirds in Khabarovsk Krai were shot in coastal areas (Figure 33). Only species with little connection to coastal waters (Redshank, Common Sandpiper) constitute an exception to this rule.

The locations of recovery of ringed shorebirds were generally consistent with the information on the main hunting areas of shorebirds obtained during our survey (Figure 32). They are mostly concentrated around a few localities along the Sea of Okhotsk coast.



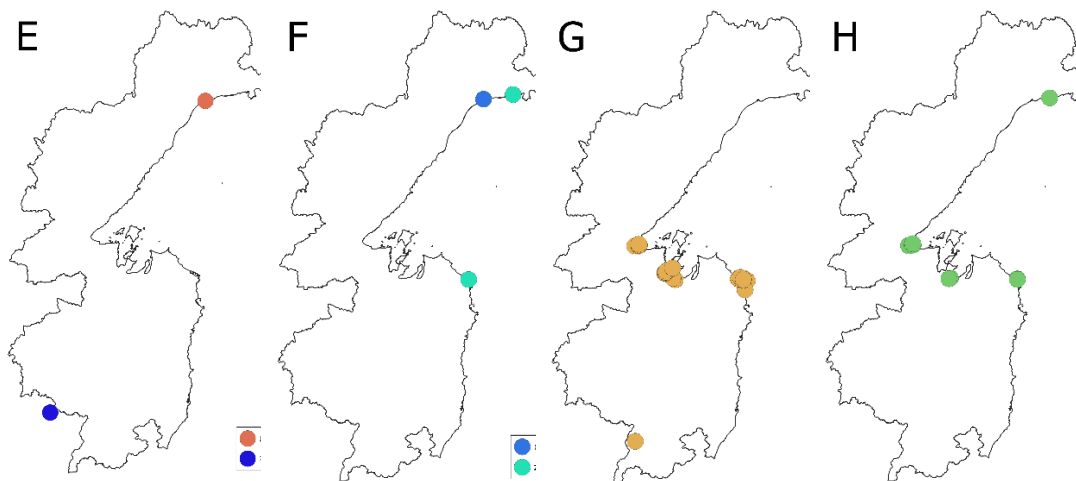


Figure 33. Locations where ringed shorebirds were shot in Khabarovsk Krai: A – Dunlin; B: 1 – Red-necked Stints, 2 – Ruff; C – Terek Sandpiper; D: 1- Common Sandpiper, 2 – Redshank, 3 – Common Greenshank; E: 1 – Long-billed Dowitcher, 2 – Far Eastern Curlew; F: 1- Black-tailed Godwit, 2 – Bar-tailed Godwit; G – Great Knot ; H – Red Knot .

Most of the ringed shorebirds (primarily Great Knot , Red Knot) were shot in the Schastya Bay area north of the Amur River mouth in the Nikolaevsky district of Khabarovsk Krai (Figure 34) and also in the bays of the Sea of Okhotsk located in the Tuguro-Chumikansky District: Udskaya Bay, Tugursky Bay, Ulbansky Bay (Figure 35).



Figure 34. Locations where ringed Great Knots (*Calidris tenuirostris*) were shot in Nikolaevsky District of Khabarovsk Krai

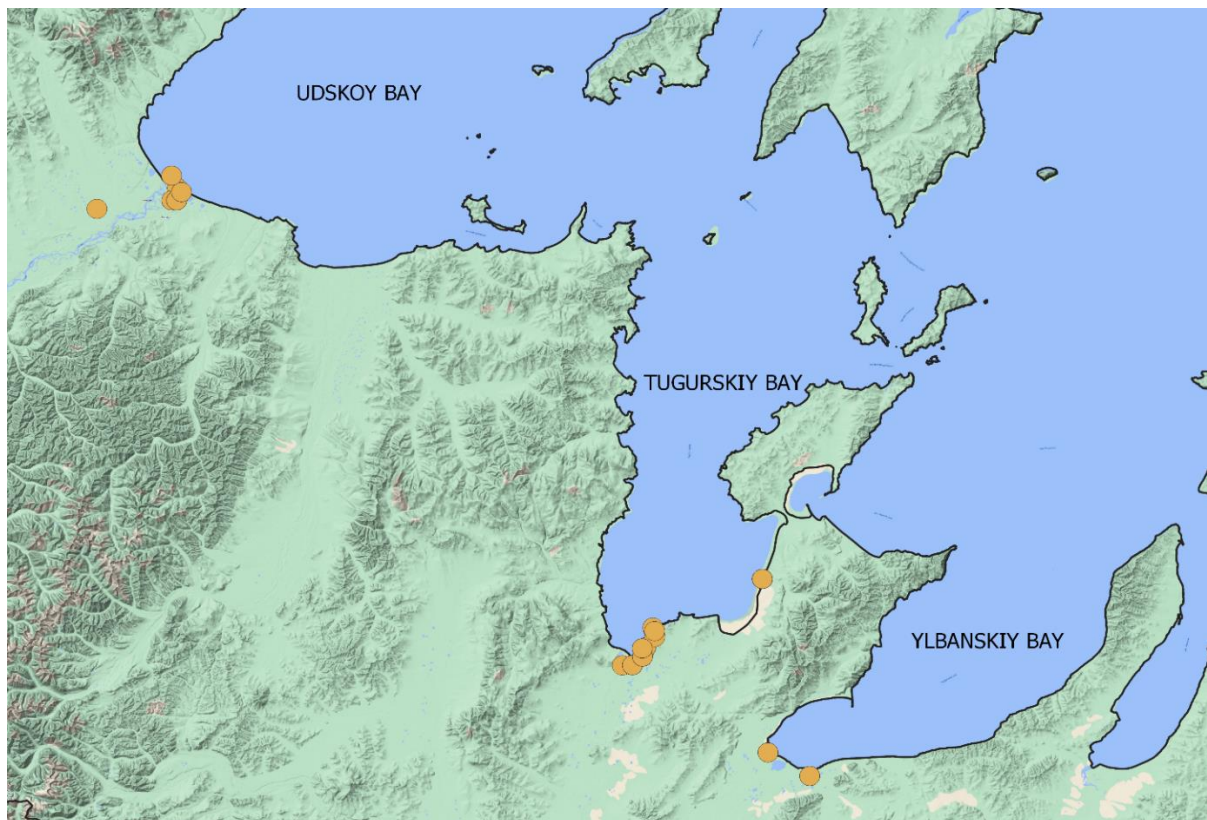


Figure 35. Locations where ringed Great Knots (*Calidris tenuirostris*) were shot in Tuguro-Chumikansky District, Khabarovsk Krai

One Black-tailed Godwit and two Bar-tailed ones ringed in Western Australia were shot in Schastya Bay, Okhotsk Sea (Nikolaevsky District) and in the Okhotsky District, at the mouth of the Kukhtui River (Pronkevich, 2013) and around Novaya Inya. A single ringed Redshank (which was ringed in the Philippines, 5 November 1967) was shot in Vyazemsky District in the south of Khabarovsk Krai on 28 April 1968 shortly after ringing. The Common Sandpiper, ringed in Malaysia on 11 November 1967, was also shot in the spring following the ringing, on 3 May 1968, in the Amursky district of Khabarovsk Krai. Two Terek Sandpipers managed to survive a longer period after ringing. One was ringed in north-eastern Australia (Beaches Crab CK RD Roebuck Bay, Broome) on 31 March 1990, and caught on 15 July 1995 at the mouth of the Uda River (Tuguro-Chumikansky District). A second Terek Sandpiper was ringed in China (Shanghai) on 30 April 2011 and shot on 15 April 2015 in about the same place as the first, in Tugur Bay.

One of the most interesting recovery from ringed shorebirds in Khabarovsk Krai is a female Ruffa found on 18 May 1958 near the town of Okhotsk (the species is listed in the Red Data Book of Khabarovsk Krai). This bird was ringed in Denmark on September 19, 1951, in its first calendar year of life (i.e., seven years earlier). The bird was found dying, it was possible that it was injured while hunting.

Analysis of the dates when ringed birds were taken, indicates a high level of poaching. Two thirds of them (74.4%) were taken from early May to 20 August (Figure 36). Shorebird hunting is still prohibited during this time. The season when shorebird hunting is allowed in Khabarovsk Krai runs from the fourth Saturday in August to the end of November. During this period only 15.6% of the ringed shorebirds were shot. The date on which the bird was shot of another 10% of shorebirds is inaccurate and questionable.

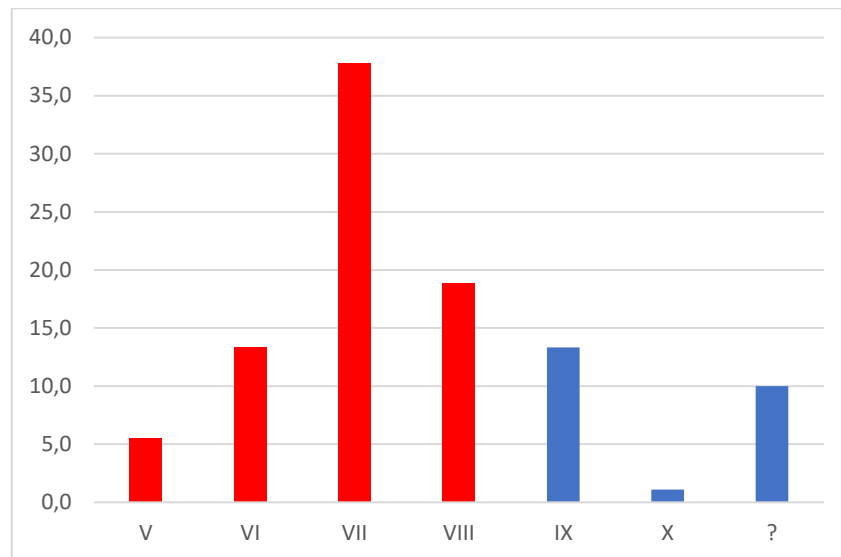


Figure 36. Distribution of time of ringed shorebirds shooting (n=76) by months in Khabarovsk Krai, %. Months in which shorebird hunting is prohibited are highlighted in red. ? – The date of taking is unknown or questionable

AMUR OBLAST

The database of the Ringing Centre of Russia contains information on only one recovery of a ringed shorebird on the territory of the Amur Oblast. The Wood Sandpiper was ringed on 3 March 1965 in India (Calcutta) and shot on 24 May 1966 in the Tynda district of the Amur Oblast.

This fact confirms that not only large but also small shorebirds are hunted here. It should be noted again that only one species of shorebird is allowed for hunting in spring, the Eurasian Woodcock. All hunters are well aware of this, so hunting other species of shorebirds in spring and summer is intentional poaching.

3.4. GENERAL INFORMATION ON SHOREBIRD HUNTING IN KHABAROVSK KRAI AND AMUR OBLAST

As in other regions of Russia, waterfowl and shorebird hunting in Khabarovsk Krai and Amur Oblast is regulated on the basis of the Federal Law "On Hunting and Conservation of Hunting Resources." NO. 164-FZ. To have the right to hunt, the hunter must have 3 documents: a) the hunting ticket, b) permission for hunting weapons and c) permission to hunt for a particular species or group of animals (ducks, geese, shorebirds, etc.).

In addition to the so-called public hunting areas, where hunting permits are issued by the state service, there are a large number of private hunting grounds in Khabarovsk Krai and Amur Oblast. Their owners (there are most often different hunting societies) sell their hunting permits on them and set their costs themselves. Unlike in Sakhalin Oblast, where the system of local hunting societies that existed during the Soviet times has almost collapsed, in Khabarovsk Krai this structure has been generally preserved and is functioning. In most districts hunting societies have their own hunting grounds, keep records of hunters and sell them permits for hunting. In some districts societies even control the level of minimum theoretical training of hunters. The best organised hunting society in Khabarovsk Krai is the "Military Hunting Society (VOHO)".

Hunting season dates

Spring hunting of all shorebirds except Eurasian Woodcock is closed, but in fact, hunters may shoot shorebirds during the spring waterfowl hunt. Until 2021, the duration of spring hunting was 10 days, but in the new version of the Federal Law, approved on 11.06.2021, the spring hunting period has been extended to 1 month. At the same time, different hunting season dates may be fixed for different municipal areas (districts) within the same region (oblast, krai). Thus, hunters may travel to different districts of their region extending the hunting season for themselves. For example, the districts of Amur Oblast are divided into three groups according to the term of spring hunting season, and the districts of Khabarovsk Krai, which is much larger than Amur Oblast, are divided into five groups with different terms of hunting seasons.

In the Amur Oblast, spring waterfowl hunting (for geese? and ducks) is open in the southern districts from 17 to 24 April, in its central part from 24 April to 1 May, and in the northern districts from 1 to 10 May. Besides, from April 24 to May 24, the hunting for he-ducks with live decoy duck is open in the entire area.

On the territory of the Khabarovsk Krai in spring 2021, waterfowl hunting has been officially opened from April 15 to May 22 consecutively for five geographical areas (Table 7). Also, the hunting of he-ducks with live decoy ducks was allowed throughout the region from April 14 to May 15.

The dates of the autumn hunting season for waterfowl and shorebird in the Amur Oblast and Khabarovsk Krai coincide. It is open from the 21st of August until the end of the calendar year. To participate in hunting it is necessary to buy a permit to hunt for specific groups of species, including ducks, geese, and shorebirds. (Figure 37). To do so, hunters apply to those organizations (hunting societies) that organize hunting in their territories. In hard-to-reach northern areas of Khabarovsk Krai (Okhotsky, Ayano-Maisky, Tuguro-Chumikansky Districts), special state hunting controllers are sent annually to deliver permits for hunting birds and other animals before the hunting season starts. Complicated transport logistics do not always allow hunters to purchase permits in time, so hunting without permits, either forced or deliberate, is practiced in a number of remote settlements.

According to the Ministry of Natural Resources of Khabarovsk Krai, 56,600 valid hunting tickets have been issued in the region last year. However, not all persons who have a hunting ticket and a hunting weapon permit hunt birds. In Khabarovsk Krai and Amur Oblast hunting of ungulates and fur-bearing animals is more developed than hunting of birds. According to official data, 5,063 hunters were issued permits for waterfowl hunting in the spring of 2020 in Khabarovsk Krai. Another 6,873 such permits were issued in the autumn. In the Amur Oblast, 8655 permits were issued in autumn 2020 for shorebirds, and 9282 permits for mallard duck, the main waterfowl species. These figures were used as a baseline for extrapolation of our survey data on the harvesting of different species and groups of shorebirds in the regions.

3.5. Estimation of Annual Shorebird Shooting Volume in Khabarovsk Krai and Amur Oblast

Annual shorebird shooting was estimated based on the results of questionnaires and hunter surveys, and also, taking into account, the territorial distribution of hunters across Khabarovsk Krai and Amur Oblast. Due to the great diversity of natural and climatic conditions and large differences in human population density, the hunting pressure on different species and ecological groups of shorebirds varies greatly. Most of the small and medium-sized shorebirds, which form numerous aggregations during seasonal migration, are hunted in the areas adjacent to the Sea of Okhotsk. Shorebird hunting may be very successful here. However, there are few hunters here due to low numbers of resident people and limited access for visitors.

Shorebird species that migrate in small groups in inland areas – Wood Sandpiper, Common Greenshank, Redshank and others, as well as Far Eastern Curlew – are everywhere in very small numbers, but the area where they are harvested is very large.

Table 8: Expert assessment of annual shorebird shooting in different parts of Khabarovsk Krai

Species/group of species	Group of districts				
	Maritime districts	Centre of Khabarovsk Krai	Amur River basin	Southern districts Total	Total
	Okhotsky, Ayano-Maisky, Tuguro-Chumikansky, Vaninsky, Sovetsko-gavaninsky	Polina Osipenko, Verkhnebureinsky, Solnechny, Khabarovsk	Nikolaevsky, Ulchsky, Komsomolsky, Amursky, Nanaysky, urban district Khabarovsk	Lazo, Vyazemsky, Bikinsky	
Far Eastern Curlew	80	140	280	80	580
Whimbrel	1000	220	300	40	1560
Other large-sized shorebirds	900	210	270	100	1480
Medium-sized shorebirds	16800	1800	3900	870	23370
Small-sized shorebirds	10800	280	1700	80	12860
Total birds (shorebirds)	29580	2650	6450	1170	39850

Table 9. Expert assessment of annual shorebird shooting in of Amur Oblast

Species/ group of species	Number of birds harvested per year
Far Eastern Curlew	200
Whimbrel	100
Other large-sized shorebirds	2360
Medium-sized shorebirds	2760
Small-sized shorebirds	150
Total birds (shorebirds)	5570

3.5.1. FAR EASTERN CURLEW

This rare and protected species, which breeds in many areas of Khabarovsk Krai and Amur Oblast, is hunted predominantly in the spring and summer. Of course, all shooting of Far Eastern Curlews is illegal. This species is listed in the regional and federal Red Data Books. However, not all hunters are aware of this. The large size and relative accessibility of these birds make them victims of both accidental and deliberate hunting. Birds are shot most often during spring waterfowl hunting. Ducks are usually shot from a shelter and if a large shorebird is within reach of a hunter, he will often shoot it too. In individual interviews, some hunters reported to us that they harvest Far Eastern Curlews every year in spring on an opportunity. Some respondents even shot several Curlews in one season, noting, however, that this was a good luck. In particular, this has been reported in the Solnechny District of Khabarovsk Krai at Lake Evoron. In Ulch district birds are shot in spring near rain and snow puddles on country roads. In Verkhnebureinsky District of Khabarovsk Krai they have been shot from a shelter while hunting with a decoy duck for he-ducks. Whimbrels fly close to a shelter and are shot in their breeding habitat. There are a number of references to shooting Far Eastern Curlews for ornithological collections in the scientific literature. According to Babenko (2000), Far Eastern Curlews shot on 15 May 1959 near the settlement of Naikhin (Nanai district, Khabarovsk Krai) and on 25 May 1959 on the Kharpi River (Amur district, Khabarovsk Krai) were kept in the collections of Kiev State University. In the vicinity of Okhotsk, Far Eastern Curlew was hunted on 21 June 1915 (Kharitonov, 1915). Sherbakov (1976) reported shooting of Far Eastern Curlews in Middle Priamur'ye (May 7-15, 1966-1968), in the Bikin river basin (May 5, 1939), on Lake Evoron (2 males and 1 female on June 18, 1993), and females of this species on Lake Chukchagirskoe (May 25, 1980). At present, this practice is not widespread due to the difficulty in obtaining permission to harvest birds included in the Russian Red Data Book. Permission must be obtained in Moscow. The activity of replenishing zoological collections has decreased considerably in recent decades. However, from informal interviews with hunters, we have learned that local taxidermists sometimes make stuffed birds of this species for commercial sale.

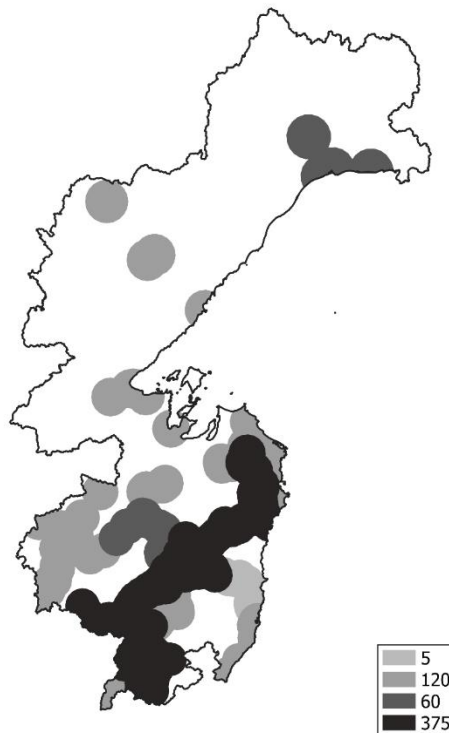


Figure 38. Number of Far Eastern Curlews shot annually within Khabarovsk Krai (expert estimate). The total number of birds shot within the outline shaded by each colour is indicated

In our estimate of the volume of Far Eastern Curlew shot each year, we assume a maximum possible number of birds shot. And we would be happy if it turned out to be an overestimate. However, our surveys indicate that the figures obtained are reasonable and may be realistic. The bulk of these birds are harvested in the central part of Khabarovsk Krai and the Amur River floodplain (Tables 8, 9). A graphical distribution of the total number of Far Eastern Curlews harvested is presented in Figure 38.

In the Amur Oblast, information on shooting of these birds was also obtained from areas where they nest – in the Bureinsko-Khinganskaya Depression, on the Zeya-Bureinskaya Plain. According to the results of the anonymous questionnaire, 5.9% of hunters harvested Far Eastern Curlews in the last 3 years. The species accounted for 3.4% of the total shorebird shot. Based on this data and information on the number of permits issued for waterfowl and shorebirds in the Amur Oblast, we made an assumption that up to 200 Far Eastern Curlews may be shot annually. A significant part of them is harvested in the south of the region, i.e. in Oktyabrsky District and its neighboring districts (Fig. 12). Since only an anonymous survey was carried out in the Amur Oblast, a more detailed study including interviews with hunters and observation of the hunting process could change the assessment of the volume of shooting, presumably upwards.

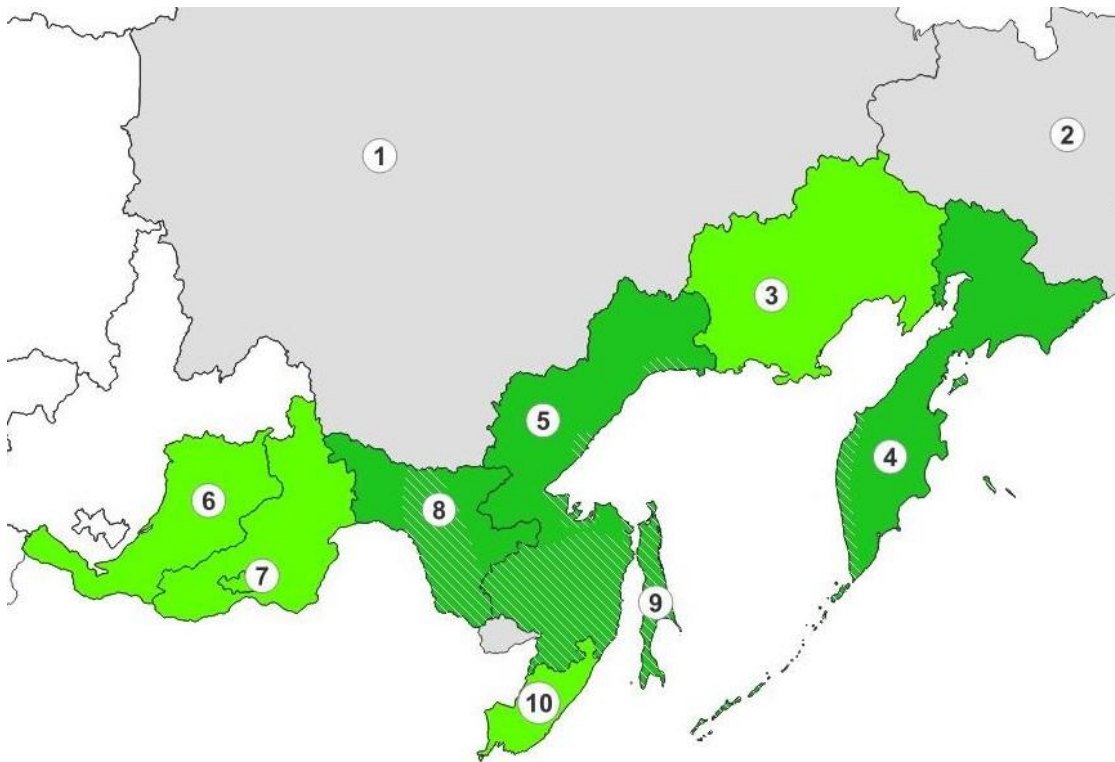


Figure 39. Main areas of Far Eastern Curlews shooting are indicated by shading.

1 – Yakutia Republic; 2 – Chukotka Autonomous Okrug; 3 – Magadan Oblast; 4 – Kamchatka Krai; 5 - Khabarovsk Krai; 6 – Buriatia Republic; 7 – Zabaikalsky Krai; 8 - Amur Oblast

3.5.2. LARGE-SIZED SHOREBIRDS

Whimbrel

Whimbrels in Khabarovsk Krai are predominantly shot during the autumn migration, mainly in the northern and northeastern districts (Table 8.). There are most intensively hunted near the coast of the Sea of Okhotsk (Figure 40). More than 40% of Whimbrels are harvested in the Okhotsky District. In addition, they are regularly hunted in Tuguro-Chumikansky, Nikolaevsky (Schastya Bay, Amur estuary), Ulchsky Districts (De-Kastri town). Our surveys also include data on their shooting in the centre and in the south of the region. Whimbrels are encountered and shot here much less frequently than on the sea coast, but the south of the region is the area where most hunters live.

In general, the total number of Whimbrels shot in Khabarovsk Krai is considerably lower than on Kamchatka and Sakhalin. This is primarily due to the predominantly mountainous terrain of the coastal areas of the mainland coast of the Sea of Okhotsk. Birds during migration are distributed over a vast area of the region with few hunters.

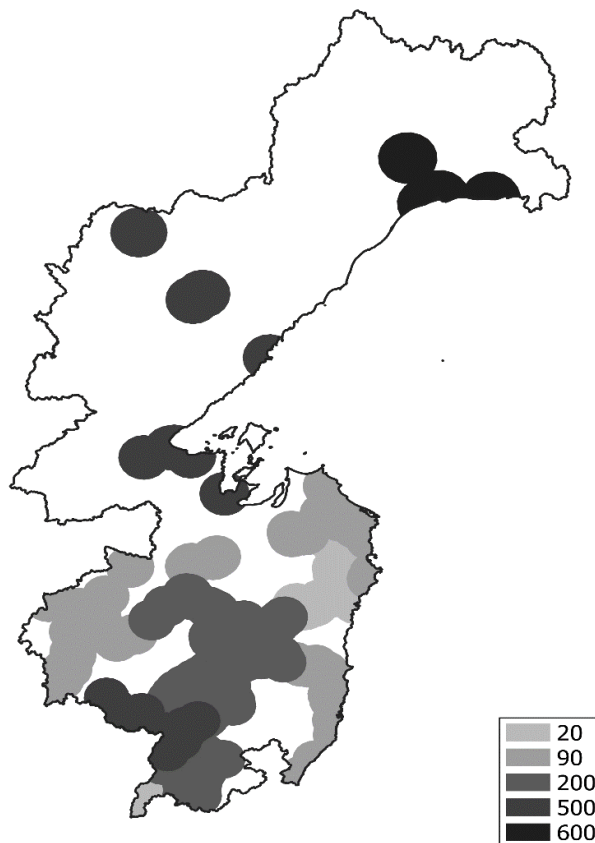


Figure 40. Number of Whimbrels harvested annually in Khabarovsk Krai (expert estimate). The total number of birds shot within the outline shaded by each colour is indicated

In the Amur Oblast, Whimbrels also occur on migration and are harvested by hunters (Fig. 41). The volume of shooting is low and ranges between one and several hundred birds per year. There is insufficient data in our study materials for a more accurate assessment.



Figure 41. Whimbrel shot in the Zavitskiy District of the Amur Oblast. Photo by A. Antonov

Other large-sized shorebirds

Shorebirds of other large-size species are shot in small numbers in the region. The Black and Bar-tailed Godwit, Common Greenshank, and Eurasian Woodcock are among the species that have been reported to us by hunters in the south of Khabarovsk Krai. Thanks to the materials of the Russian Ringing Centre, we know of a Long-billed Dowitcher shot here, but it is most likely an isolated case. The most common trophies are Godwits (mainly in coastal areas) and Common Greenshank with Redshank and Grey-tailed Tattler (mainly in the Amur River floodplain). The estimate of the total number of large-sized shorebirds (excluding Far Eastern Curlew and Whimbrel) given in Table 8, 9 represents an extrapolation from the survey data and is approximate. It can rather be viewed as an overall proportion of shorebirds of this size group shot in comparison to other shorebirds.

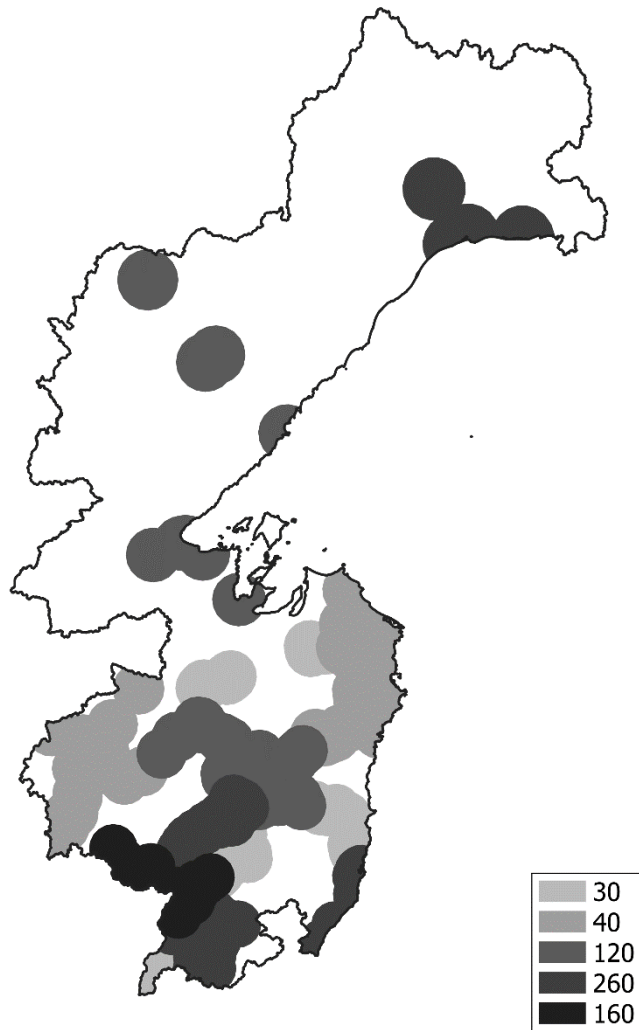


Figure 42. Number of large-sized shorebirds (excluding Far Eastern and Whimbrel) shot annually within Khabarovsk Krai (expert estimate)

The total number of birds shot within the outline shaded by each colour is indicated

Of particular concern is the possibility of the accidental shooting of one of the rarest shorebirds on the planet, a species endemic to Russia, Nordmann's Greenshank (*Tringa guttifer*). During surveys we did not receive any direct confirmation of such cases. Given the rarity of this species, it is very difficult to obtain information on its shooting. In the area of active research on the biology of Nordmann's Greenshank carried out in recent years (Pronkevich et al., 2021), no increased disturbance by hunters has been noted during the breeding season (V. Pronkevich, personal communication). However, we cannot rule out that Nordmann's Greenshanks may have been accidentally shot while shooting Common Greenshank or Redshanks on the coast of the Sea of Okhotsk in Khabarovsk Krai. Hunters do not distinguish between these species in the wild. Ongoing outreach and education to local communities in the Nordmann's Greenshank habitat area is therefore required.

3.5.3. MEDIUM-SIZED SHOREBIRDS

In this size group, Great Knot , Red Knot , Common Snipe, Terek Sandpiper, Ruff, Redshank have been reported as the most often harvested species. The first two species are shot most often by hunters shooting at dense flocks resting on the shores of the Sea of Okhotsk at high tide. Hunters use birds shot in this manner as bait to trap sable in winter and also consume shorebirds for food. Among the hunters interviewed in the Tuguro-Chumikansky District, 47% responded negatively to the question about shooting shorebirds. The remaining 53% had shot them regularly in the past three years. Of these, 41% shot 20-50 birds per season, and the majority, 59%, took between 50 and 100 shorebirds. Individuals reported a much higher number of shorebirds shot per season (500 or more). More than half of all shorebirds shot in the area (52%) belonged to the medium-sized group.

Some hunters reported individual "lucky" hunts, in which they shot much more shorebirds. In the Nikolayevsky District of the Khabarovsk Krai we recorded a detailed description of one such incidental hunt in the Schastya Bay. On Baidukov Island two hunters, who were returning home in a boat with a motor, managed to quickly approach a large mixed flock of shorebirds resting on the shore. They managed to make only four shots, after which the birds flew away, and the men docked on shore and collected them in baskets. While processing the shot they started counting the birds, but after 360 birds they stopped counting. At the same time, about half of the birds were still in the basket. Thus, in only one of these cases about 700 birds were killed in a few seconds. We managed to obtain a photograph (Fig. 44) which shows part of the shootings of this hunt. It shows the processed carcasses of over 53 Great Knots. We remind that Great Knot is included in the latest edition of the Red Book of Russia.

Without exception, all interviewed respondents harvesting shorebirds usually shoot at flocks of birds, which certainly results in a high number of incidental and wasted victims. On several occasions we were able to find evidence of the use of shot shorebirds as bait in sable trapping. Most hunters who reported this practice indicated that they had done so in the past. Now they prefer other baits – grouse, muskrat, fish. But in places of mass stopovers of shorebirds, where with a few shots one can shoot dozens or even hundreds of birds at once, shorebirds are still used as bait nowadays. Birds are shot as late as possible in autumn, and frozen in their plumage until the winter sable trapping season arrives.

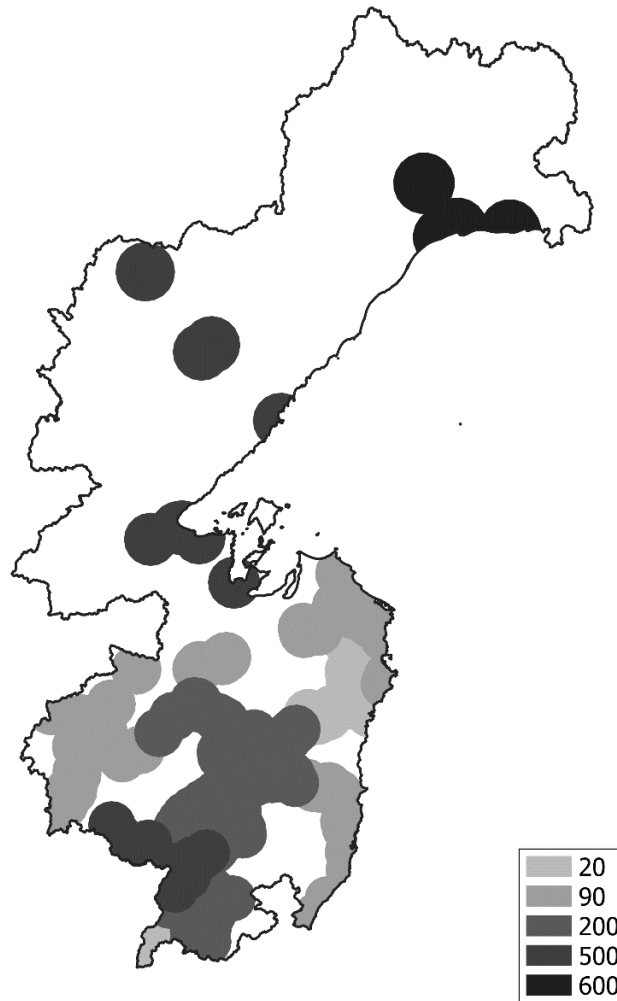


Figure 43. Number of medium-sized shorebirds harvested annually in Khabarovsk Krai (expert estimate). The total number of birds shot within the outline shaded by each colour is indicated



Figure 44. Great Knots carcasses (at least 53 birds) from more than 700 shorebirds shot in Schastya Bay during one short hunt

3.5.4. SMALL-SIZED SHOREBIRDS

Small-sized shorebirds are also shot. In Khabarovsk Krai, as in other regions near the Sea of Okhotsk that we surveyed, shorebirds are most frequently shot in flocks (Figure 46). In the Tuguro-Chumikansky District, more than one third of the hunters surveyed (37.2%) regularly shot small-sized shorebirds. In the total estimated volume of shorebirds shot in Khabarovsk Krai, small-sized shorebirds constitute a significant proportion (Table 8). Dunlin, Red-necked Stints and Mongolian Sedge constitute the bulk of the birds shot in this size group. As a rule, resting Spoon-billed Sandpipers feed in mixed flocks with these species. During surveys, hunters also called Broad-billed Sandpiper and Sanderling. Unfortunately, most of the known to us mass aggregations of shorebirds in the Okhotsky, Tuguro-Chumikansky and Nikolaevsky districts of Khabarovsk Krai are quite actively visited by humans, including hunters. Foraging grounds of migrating shorebirds are especially attractive in the valley bottoms of large rivers where currents carry a lot of silt and sand to the sea. Usually it is in these areas that the few settlements (Okhotsk, Inya, Vostretsovo, Chumikan, Tugur, etc.) are located.

We have also received reports of Wood Sandpiper and Common Sandpiper being shot. These species are more often harvested in inland areas of Khabarovsk Krai away from the coast, as well as in Amur Oblast. As they do not form numerous flocks, the hunting pressure on these species is much lower.

Spoon-billed Sandpiper

This rare species of shorebird, for which numerous active efforts are being made around the world to save it, is at great risk of being accidentally shot during its migrations on the shores of the Sea of Okhotsk. As recently as the second half of the 20th century, it was regularly encountered in Khabarovsk Krai. Thus, in the 1960-70s, it was not very rare near the Okhotsk town (Pronkevich and Morokov 2012). Every year several Spoon-billed Sandpipers were shot here along with other shorebirds. The Museum of Regional Studies of Okhotsk keeps two beaks of Spoon-billed Sandpipers shot here. The last known sighting of a small flock of several Spoon-billed Sandpipers in the Okhotsk area was made in the third decade of May 2005. The Khabarovsk Krai remains poorly investigated in terms of shorebirds but is undoubtedly important for migrations of this species. Known shooting locations of Spoon-billed Sandpipers in the region around the Sea of Okhotsk are noted in Figure 45.

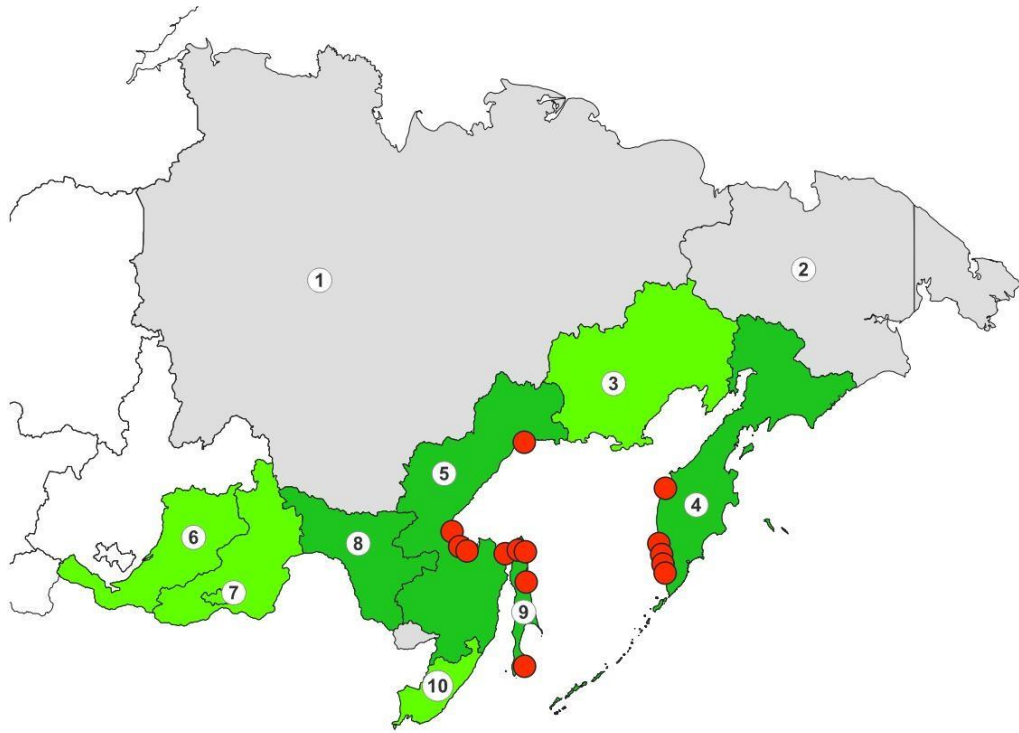


Figure 45. Known Spoon-billed Sandpipers shooting locations around the Sea of Okhotsk

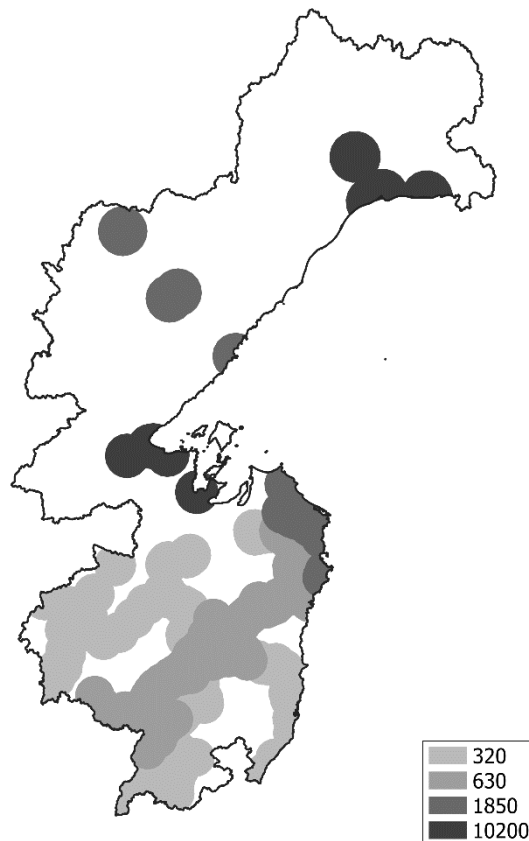


Figure 46. Number of small-sized shorebirds harvested annually in Khabarovsk Krai (expert estimate).
The total number of birds shot within the outline shaded by each colour is indicated

3.6. MAIN THREATS TO SHOREBIRDS IN Khabarovsk Krai and Amur Oblast

3.6.1. ILLEGAL SHOREBIRD HUNTING

Traditionally, illegal hunting is the hunting of animals without official permits, in protected areas, or outside specified hunting seasons. In Khabarovsk Krai, illegal hunting of shorebirds mainly consists of harvesting species that are prohibited or not permitted for harvesting. According to the survey, the species most hunted here are the Great and Red Knots, Dunlin, Red-necked Stint and Mongolian Plover. The Great Knot, which forms dense flocks in coastal areas of the Sea of Okhotsk in relatively high abundance during short migration periods, is the preferred and most frequent trophy. The Great Knot (*Calidris tenuirostris*) and two Red Knot (*Calidris canutus*) subspecies *Calidris canutus piersmai* and *C.c. rogersi* are listed in the latest edition of the Russian Red Data Book (2021). These species are being severely impacted by extensive anthropogenic transformation of key coastal habitats in south-east Asia. Therefore, their mass harvesting in stopover areas of the coast of the Sea of Okhotsk is undoubtedly a significant contributor to the overall depressed abundance of these populations.

Violation of the permitted hunting season dates is also common, especially during the summer months. Most hunters, when in the wild, always carry a gun as a defence against bear attacks. They may also use these weapons for hunting birds. It is difficult to estimate the number of such cases, as we have no reliable information about it. The biggest concern is the hunting of Far Eastern Curlew in breeding grounds in June-July, as well as shooting of flocks of Great Knots and other shorebird species migrating with them in July-August.

According to our findings, the main type of illegal hunting of shorebirds in the Amur region seems to be associated with the shooting of Far Eastern Curlews. Not all hunters are aware of the conservation status of this species, as this information is practically not disseminated among them. An effective and probably the only way to inform hunters about the importance of protecting Far Eastern Curlew and many other species of shorebirds is the work of conservation NGO. Financial and personnel resources of state organisations in the sphere of nature protection and hunting regulation remain extremely limited. Their staff has neither the time nor the desire to deal with these important issues.

3.6.2. ECONOMIC ACTIVITY IN THE STUDY AREA AND HABITAT TRANSFORMATION

Economic activities in Khabarovsk Krai, like those in other Far East regions, have developed in several stages. The last active period of large-scale transformation of natural landscapes was at the end of the 20th century. After the collapse of the USSR, economic development of the region slowed down for several decades, but now it is gradually gaining pace again. The most significant natural transformations in the study area for shorebirds have been construction activities associated with the transformation of river valleys, including the creation of the large Bureyskoye reservoir.

Overall human pressures on the most important for shorebirds coastal areas of the Okhotsk Sea in the Okhotsky and Tuguro-Chumikansky Districts of Khabarovsk Krai remain relatively stable. Population numbers have not changed considerably in recent years. Another important site for shorebirds on the Sea of Okhotsk is Schastya Bay, located north of the mouth of the Amur River. This area used to be the location of a whale (beluga whale) catching station. After its closure, shorebirds inhabiting this area became less affected by human activities. Shorebirds were regularly hunted and harvested in significant numbers by the regular fishermen who lived in the area. Currently, work is underway to establish a protected area in the Schastia Bay, as this territory is important for the reproduction of the Nordmann's Greenshank. The establishment of a protected area here would be a major step in protecting key shorebird habitats in the Russian Far East.

In the last decade, there has been a noticeable increase in human activity on the coast of the Sea of Okhotsk near the Shantar Archipelago – in Nikolay and Konstantin Bays and Ulbansky Bay. Here tourism infrastructure is being actively developed (<http://fetravels.ru/tours/shantari>), polymetal deposits are being exploited (<https://www.polymetalinternational.com/ru/assets/growth-projects/kutyn/>). At the same time, the population is growing, and as a consequence, hunting and poaching are developing. A comprehensive environmental expedition that worked here in 2016 prepared materials for the creation of a protected area in Akademiya Bay of the Sea of Okhotsk, but over the years it has never been established.

4. RECOMMENDATIONS FOR THE PROTECTION OF SHOREBIRDS

1. Shorebirds are most affected by hunting in the coastal areas of the Sea of Okhotsk close to human settlements. Most shorebirds are hunted here by a relatively small number of local hunters. Shorebirds are used as inexpensive bait for sable traps as well as being consumed as food for dietary variety. Therefore, the most promising strategy for protecting shorebirds would be to conduct regular awareness-raising activities among local people in the Okhotsky, Ayano-Maysky, Tuguro-Chumikansky and Nikolaevsky Districts of Khabarovsk Krai. The best solution would be to develop a special integrated project combining research, education and conservation components.
2. Creation of new protected areas in the most important places of mass migration for shorebirds – Ulbansky Bay and Schastya Bay – is of great importance for the protection of shorebirds. Creation of a united protected area including Schastya Bay and Baikol Bay in the north of Sakhalin is very promising. The areas adjacent to the Amur estuary are used by shorebirds as one key stopover site. An in-depth study of this territory will make it possible to assess its contribution to the maintenance of the migration strategy of many shorebird species along the EAAF.
3. Considering the rather high level of shooting of Far Eastern Curlew in Khabarovsk Krai and Amur Oblast, a special information campaign on the need to protect this species should be developed. This work should be conducted jointly with the regional agencies that organise and control hunting. Unfortunately, a lot of their employees are not aware either about the size of penalties for hunting rare and protected species, nor about the list of species forbidden for shooting shorebirds. We found that the majority of hunters in relation to the Far Eastern Curlew fall into two groups. The first are unaware of its conservation status and harvest the birds accidentally or incidentally. The second group regularly and deliberately shot them, often ignoring the conservation ban and without fear of liability.
4. It is highly desirable to continue the work on production and dissemination of special informational posters demonstrating the species diversity of shorebirds along the EAAF. This information, not otherwise available to hunters, greatly increases their awareness of the fact that most shorebird species are not allowed to be hunted and many of them are included in Red data book. Shooting them not only causes painful harm to nature, but also entails serious financial liability. This is important for the protection of shorebirds.

5. RECOMMENDATIONS FOR FURTHER RESEARCH

1. Continued research into the effects of hunting on shorebirds in remote northern Khabarovsk Krai will provide the missing material for understanding the importance of this sector of the Okhotsk coast for shorebirds and their protection. This is one of the least ornithologically surveyed parts of the mainland coast, where important shorebird concentrations during autumn migration are situated and hunting pressure is expected to be high. Okhotsk and its environs and the settlements of Chumikan and Tugur in Uds kaya Bay should be regarded as key study areas.

2. It is also important to gradually extend the started and successful project on shorebird hunting pressure study to other regions of the Russian Far East, namely the Magadan Oblast and Primorski Krai. Continental and coastal areas of the Magadan Oblast are extremely important as breeding areas for a number of key species of shorebirds for our study – Far Eastern Curlew, Whimbrel, Great Knot. They also play an important role in the migrations of some of the most hunted shorebird species – Dunlin, Red-necked Stint, Turnstone and others.

3. Coverage of the vast continental regions of the Far East – Republic of Sakha (Yakutia), Buryatia Republic, and Zabaikalsky Krai, where shorebirds are also hunted, will complete the research picture. The specificity of these territories differs significantly from the Okhotsk Sea region not only in the list of shorebird species and in the quantitative proportion of their number, but as well in hunting traditions and the intensity of shooting of different species and groups of shorebirds.

6. OUTREACH AND EDUCATION ACTIVITIES FOR THE CONSERVATION OF RARE SHOREBIRD SPECIES AMONG HUNTERS AND STAFF OF REGIONAL HUNTING AGENCIES

As we previously established in 2019 and 2020 when surveying Kamchatka and Sakhalin, the ability of hunters to recognise the species of the birds they harvested is at a very low level. This year we confirmed that the situation is not better in Khabarovskiy Krai and Amur oblast'. There is indeed a strong deficit of accessible literature and information sources allowing hunters to improve their educational level on ecology in Russia. What is more important is that this is not stimulated or requested by any state regulatory mechanisms. Individual examples of education and testing the knowledge of hunters were encountered in several hunting organisations of Khabarovskiy Krai but they could be considered an exception from common practice.

Last year, summing up the survey of Sakhalin oblast', we reached a conclusion that it is necessary to design and distribute a poster in full colour with images and information on shorebird species highlighting the information on the protected species. We designed such a poster by the start of the fieldwork and received a print run of 500 copies. The print run is not big but unfortunately, we did not have an opportunity to distribute more copies during field work. Using the posters during interviews provided us with huge practical support and inspired hunters to give a more detailed interview and take it more seriously. The management of regional hunting agencies positively welcomed our offer to collaborate in the effort to distribute such posters and other display materials. These offers could be successfully used in the future. Many hunters made a surprising discovery when they learned that hunting many shorebird species is forbidden and were duly impressed with the amount of fines for harvesting them indicated on our poster.

Besides the information poster, we also printed small-sized pocket cards illustrating rare shorebird species and a QR-code with a link to an online questionnaire published on the Internet. This allowed us to receive additional information.

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