BirdsRussia

Kamchatka Branch of Pacific Institute of Geography of Far-eastern Branch of Russian Academy of Science

Working Group on Shorebirds of Northern Eurasia

Report for the EAAFP, Australian Government and CMS

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The first approach to assessment of hunting pressure on shorebirds in selected areas of the Kamchatka Peninsula, with special focus on the Far-Eastern Curlew

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

Contents

Introduction

Every year 50 million migratory shorebirds migrate from non-breeding areas in Southeast Asia and Australasia, to breeding grounds in Russia, China, Mongolia, Japan, Korean peninsula, and Alaska. The sum of these migration routes through 22 countries is defined as the East Asian-Australasian Flyway (EAAF). The EAAF is the most species-rich of the world's nine major flyways. In addition, the EAAF has the highest proportion of declining waterbird populations. Among 63 populations of 52 migratory shorebird species are using the East Asian Australasian in total, 20 populations of 17 species are found to be likely to reach or approach extinction in the near future if no measures are taken.

Over the past 30 years, this problem has attracted the attention of many ornithologists and conservationists. The main reason of the declines of shorebird populations is reduction of the extent and quality of the primary waterbird habitats: coastal and inland wetlands. Hunting, illegal and unsustainable legal harvesting is usually perceived as medium-high level threats together with the lack of conservation management at important sites. The Russian part of the EAAF has a comparatively very small human population; almost all habitats are undeveloped and remain in unchanged natural conditions. But over-hunting in key areas of bird concentrations during migrations can threaten shorebird populations.

Hunting on shorebirds in the Northeast of Russia (most northern part of EAAF) may negatively impact on the populations of several threatened species and all shorebirds on the flyway. However, due to the lack of information we cannot evaluate how significant is impact on shorebird populations.

The main aim of this project is to assess the effect of illegal and unsustainable legal hunting on shorebirds in the Northeast of Russia. The project focuses on EAAFP priority species of shorebirds: Curlew Sandpiper, Red Knot, Great Knot, Far Eastern Curlew, Black-tailed Godwit and Spoon-billed Sandpiper. Special attention is paid to Whimbrel and Far Eastern Curlew. Whimbrel is the most popular wader species for legal hunting in the Russian Far East.

Far Eastern Curlew is critically endangered species in Australia. In Russia, it is protected species, included in Red Data Book. We were aware that hunters shoot Far Eastern Curlews together with Whimbrels because of incorrect definition. In addition, Far Eastern Curlew and Whimbrel (as well as Godwits) are the most desired species for hunting among all shorebird species due to its large size.

The project is carried out by BirdsRussia in cooperation with Working Group on Shorebirds on Northern Eurasia. The project is planned to run for several years; its execution is supported from several funds, including Karl Kaus Foundation, EAAFP, and UNEP/CMS. Kamchatka Krai is a model region at the first stage of the project in 2019.

A special section and a round table "The influence of hunting on the population number of shorebirds" was organized by ornithologists working in the Russian Far East during the International Conference "Shorebirds studies in Northern Eurasia", Minsk, February 2019. At the round-table meeting, the best experts in the Russian Far East shorebirds exchanged their views and concluded that a special study to assess the impact of hunting on shorebird populations of the Russian section of EAAF is needed. Experts noted that so far there are many indications that illegal shorebird hunting continues to be widespread in different regions of the Russian Far East. However, reliable information from these regions is absent. Experts agreed that illegal and uncontrolled legal hunting on the Russian section of EAAF may have a serious negative impact on Far Eastern Curlew, Godwits, Spoon-billed Sandpiper, and probably some other shorebird species. As a result of the exchange of the views, experts came to the conclusion that, first of all, it is advisable to conduct special studies to assess the impact of hunting on shorebird populations on the Kamchatka Peninsula and Sakhalin Island. To be followed by surveys along Western Sea of Okhotsk and inland areas in Yakutia. The recommendations of the round table were included in the resolution of the conference (paragraph 8): "The conference invites all researchers with the necessary information to support the initiative of the BirdsRussia (ROSIP) and to get in

the joint project of ROSIP and the Working Group on Shorebirds on Northern Eurasia to assess the impact of hunting on migratory shorebirds in Siberia and the Far East."

The implementation plan of this project has been refined using expert opinions.

Project goal and objectives

The goal of the long-term project is to assess the press of shorebirds hunting in the Russian section of the East Asian-Australasian Flyway.

The main objectives of the first phase of the project in (2019 – Kamchatka) were :

– To reveal the territories of the largest hunting bag of shorebirds and specify the dates (season) of hunting there, first of all for priority East Asia-Australasia Flyway Partnership species;

– To make a first approximate assessment of the number of shorebird hunters and to identify the social groups of human population of Kamchatka involved in legal shorebird hunting and poaching;

– To give a first estimate of the approximate shorebirds harvest;

– To identify the key areas, where hunting pressure may threaten shorebirds in Kamchatka;

– To identify where else in Kamchatka the surveys should be implemented in the following years;

– To propose further activities to manage shorebird hunting and protect Far Eastern Curlew and other threatened species;

– To understand better methodology for future surveys in the other parts of the Russian Far East;

– To inform and educate hunters (in villages visited), citizens and decision makers about needs of shorebird conservation on the flyway;

– To try to reach out to locations where Spoon-billed Sandpiper satellite tags stopped working to understand and estimate the threats there.

Materials and methods

1. Generalization of knowledge about Kamchatka waders

We have summarized the information on the following points: distribution (Annex 1); terms of migration; directions of migration; number of waders during migration; places of concentrations during migration; breeding range; change in population number; conservation (different aspects including hunting).

2. Data analysis of Russian Bird Ringing Center from wader recoveries.

3. Shorebird harvest estimation with anonymous survey method.

This method is based on the waterfowl hunting estimation experience in the eastern part of Russian Arctic. It was developed by E.E. Syroechkovsky and K.B. Klokov and used in 1999–2006 to make an estimation of bird harvest in 22 villages of Chukotka and northern Yakutia located near the sea coast (Syroechkovsky, Klokov, 2010). We slightly changed this method in connection with the fact that, unlike waterfowl, shorebirds are not the main object of hunting. According to our methodology the survey of each village includes two steps.

First, an in-depth interview with 2–3 experts takes place to identify at a qualitative level the general picture of the way how shorebird hunting occurs at this place and how important it is for local hunters.

The interview that lasts about 1.5 hours includes a few dozen free-form questions on the following topics:

1. General information about the village population, number of hunters, possession of hunting weapon by the village residents and of transport that they use for hunting

2. Places where village residents hunt shorebirds on purpose as well as places where they hunt waterfowl. How often they harvest shorebirds during the waterfowl hunting.

3. An approximate estimate — from the expert's point of view — of the number of locals who take part in the shorebird and waterfowl hunting.

4. The ways how local hunters usually hunt shorebirds.

5. What shorebird species they know and can recognise in nature and which species they hunt.

6. Whether people from other places visit the village for hunting, how often and how many.

7. Whether the expert can note any trends (e.g. that in the last few years the hunting became more or less intensive, the number of hunters increased or decreased).

8. How strictly the rules and periods of hunting are followed in this area. Whether the hunters know which shorebird species are banned from hunting. Whether local residents possess unregistered weapons. How regularly inspectors and police control compliance with hunting rules.

As a result of the interview we learned about the bigger picture of shorebird hunting in the village. Then we started the survey using anonymous questionnaires.

Anonymous questionnaires were filled by hunters themselves. That is why it was made as short as possible because each extra question increases the possibility that the hunter would think the questionnaire is too complicated and would not want to waste time completing it. As shorebird hunting is not popular everywhere in Kamchatka, a special shorebird questionnaire could cause misunderstanding on the part of some hunters and refusal to complete it. That is why apart from the questions about shorebirds the questionnaire also includes questions on waterfowl hunting. The data received from these accompanying questions also has scientific value.

The questionnaire contained three groups of questions.

A. Questions on shorebird hunting

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

2. How many Whimbrels did you harvest in the last year?

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

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

5. How often are shorebirds (apart from Whimbrel) harvested by other hunters in your area, besides you (*OFTEN; REGULARLY; ACCIDENTALLY WHILE HUNTING OTHER BIRDS; NEVER)?*

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

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

The last question is aimed to identify whether hunters violate the terms of hunting.

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

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

The survey tools included:

A) A guide with questions for an informal in-depth interview.

B) An anonymous questionnaire

C) Coloured table with images of shorebirds. It contained the main species encountered in Kamchatka (Annex 2). The table was used both during in-depth interviews and as an annex to the anonymous questionnaire. After the interview the hunter could keep the table to use it as a field guide of shorebirds. Apart from the table, the hunters were also given stickers and postcards with images of shorebirds (Annex 3).

Survey organization

The study of waders' production in Kamchatka has never been conducted, but about 30 years ago, a study of waterfowl production was performed (Gerasimov & Gerasimov 1990; Gerasimov 1993).

The implementation plan of this project has been refined using expert opinions.

Planning the survey we took into account two conditions: necessity to primarily visit the villages where according to preliminary data the biggest number of shorebirds is shot during hunting and their transport accessibility.

We visited by car all the towns and villages of Kamchatka which are connected with Petropavlovsk-Kamchatsky by road with the exception of a few villages located in central part of the peninsula where it is not possible to hunt shorebirds.

It was much more difficult to survey remote villages which have not road connection with capital of the region as they can only be reached by plane or helicopter. The flights are rare and very expensive. But we still managed to visit some of them.

The localities of Kamchatka that we visited and the localities that we did not manage to visit are marked on the figure 1.

Sampling

Since it was not possible to create a random sample, we used two methods:

A) Asked hunters to fill out a questionnaire at the time when they visited the office of the hunting society in order to return a seasonal hunting permit. This method was mainly used in Petropavlovsk-Kamchatsky with the help of employees of the hunting society office.

B) The Snowball Method, when each hunter, filling out a questionnaire, gave the contact details of one or more other hunters. This method gives good results in small villages, where we received help from representatives of the hunting society in each village.

In total, after rejecting incorrectly filled out forms, we were returned 402 forms that were suitable for processing.

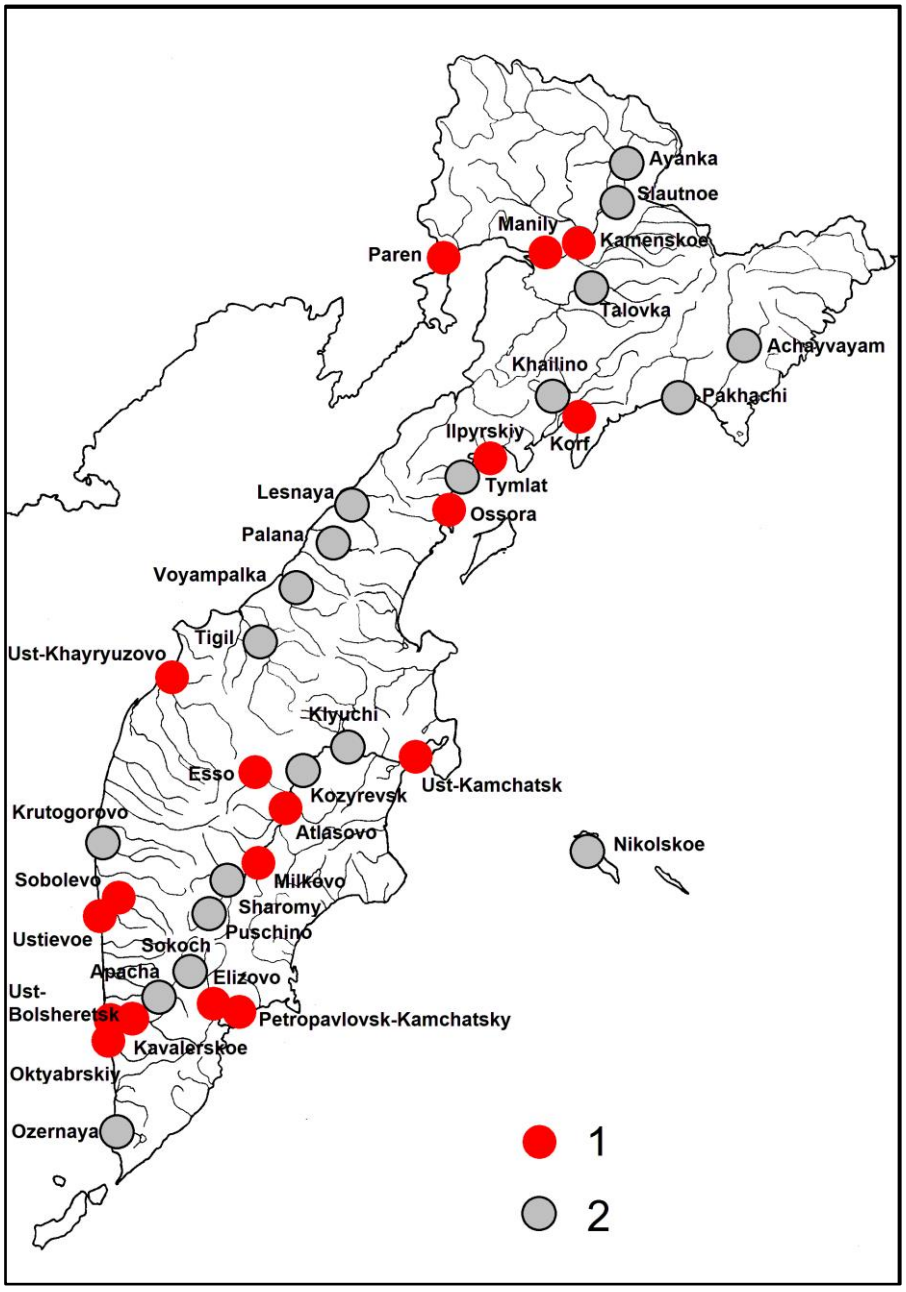

Fig. 1. Places where the survey was conducted:
1 – surveyed settlements and towns;
2 – not surveyed settlements

Extrapolation

The number of shot shorebirds was calculated separately for:

1) Whimbrel;

2) All other big- and medium-sized shorebirds except Whimbrel;

3) All small-sized shorebirds.

Average harvest values were calculated for 5 groups of districts of Kamchatka identified based on their geographical features and level of participation of local residents in shorebird hunting. Then the average harvest value in each area group were multiplied by the number of hunters that received a hunting permit in each of 5 area groups last year.

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Results

Generalization of knowledge about Kamchatka waders

Migration, number, breeding areas

Some data about migration of waders on Kamchatka were published in 1940–1970s but this knowledge was very limited and not included any number estimation (Averin 1948; Portenko 1964, Stenchenko 1965; Ostapenko et al. 1975). In 1980s two books were published: one about birds of Koryak Highland (Kistchinski 1980), another on nesting birds of Kamchatka (Lobkov 1980). Both books contained a lot of generalized information about the biology of waders, and for the first time the nesting density of some species were given for Kamchatka. In the same period materials about migration of Whimbrel were published including some information about bird number in different points (Lobkov 1980, Gerasimov 1988). Also first estimation about number of Great Knots and Red Knots migrated through Moroshechnaya Estuary was made (Gerasimov, 1980).

In 1975 counts of Anatidae during spring migration was started on Kamchatka (Gerasimov, 1977). In the future these works led to the expansion of research and the inclusion of other groups of birds (gulls, waders, grebes, divers, sea birds) in the counting work (Gerasimov & Gerasimov, 2014). Much attention has been paid to counting waders during migration since 1989.

Yu. N. Gerasimov returned to Kamchatka and became a researcher of Pacific Institute of Geography in 1989. Almost all counting of waders on Kamchatka during migration was made by him. The first count of the waders during southward migration was made in August 1989 on the estuary of the Moroshechnaya River (Huettmann & Gerasimov 2002). Next spring (1990) first count of waders was made during northward migration also on the Moroshechnaya Estuary (Gerasimov 1991).

Such works was continued by Yu. Gerasimov during next years and covered many areas of the region (fig. 2). Stationary multi-day observations of spring migration of birds, including waders, were carried out during 16 seasons in 13 points of Kamchatka. On the West coast, such points were (from south to north): the mouth of the Opala river in 1994 (Gerasimov & Kalyagina 1995), the mouth of the Bolshaya river in 1993, 2008 and 2009 (Gerasimov 1998; Gerasimov *et al*. 2011), Levashova Cape in 2001 and 2007 (Gerasimov *et al*. 2011), Bolgaya Vorovaskaya River Lagoon in 2018, the estuary of the Moroshechnaya River in 1990 (Gerasimov 1991; Gerasimov & Gerasimov 1997); on the East the mouth of the Khodutka River in 1995 (Gerasimov 1999a); Khalaktyrsky beach in 2000 (Gerasimov 2001b); the mouth of the Vakhil River in 1991 and 1992(Gerasimov *et al*. 1998), mouth of Kamchatka River in 2011 (Gerasimov *et al*. 2012), Ilpyrsky Village in 2012 (Gerasimov *et al*. 2012) and Skobeleva Bay in 1998 (Gerasimov 1999b; 2002b; Lobkov *et al*. 2014). In the Central areas of the Kamchatka Peninsula – near Krapivnaya Village in 2003 (Gerasimov & Malinovskiy 2003a) and on the Kharchinskoe Lake in 1999 (Gerasimov 2000; 2001a).

In spring, the migration of waders is very fast. As a rule, we counted waders flying past the observation point during the entire spring migration throughout the day. We have summarized the counted waders without extrapolation. Therefore, we were able to get the total minimum number of waders that flew at various points in Kamchatka without any special calculations.

Long-term stationary observations of southward migration were made during 2 seasons (1989 and 2004) at the mouth of the Moroshechnaya river in (Huettmann & Gerasimov 2002; Schuckard *et al*. 2006), during 5 seasons at the estuary of the Bolshaya Vorovskaya River in 2014–2019 (Syroechkovsky *et al*. 2017; Gerasimov 2018a; Gerasimov *et al*. 2018a; 2019), at the mouth of the Penzhina river in 2002 & 2003 (Gerasimov 2003a, b; 2004; 2005a, b; 2006b); on the Bolshoe Lake in 2007 (Gerasimov *et al*. 2008). During southward migration mudflats counts during low tide were used.

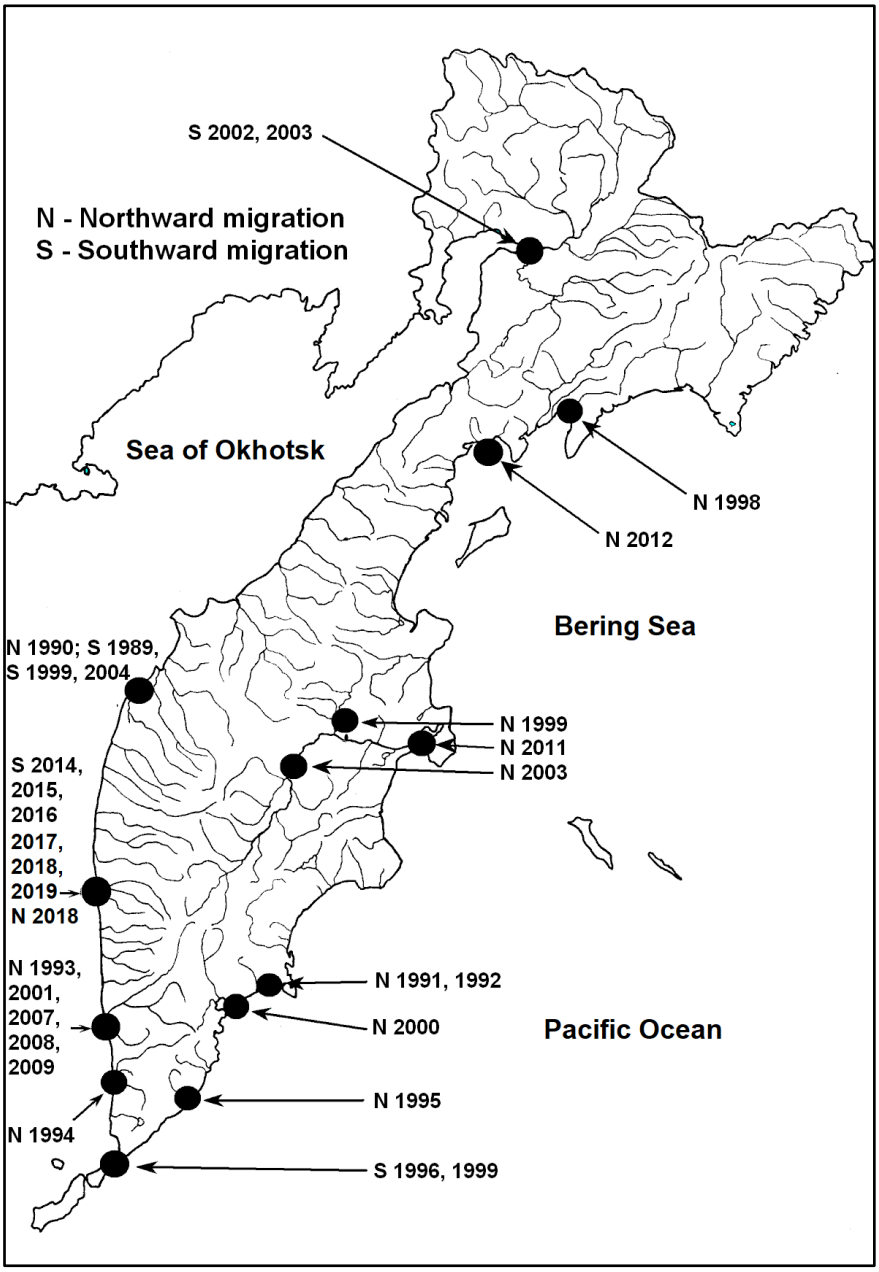


Fig. 2. Points of long-term observations of wader migrations by Yu. Gerasimov

Additional information on migration was collected during numerous short-term (2–4 days) visits to various regions of Kamchatka, including when performing ornithological research with another purposes.

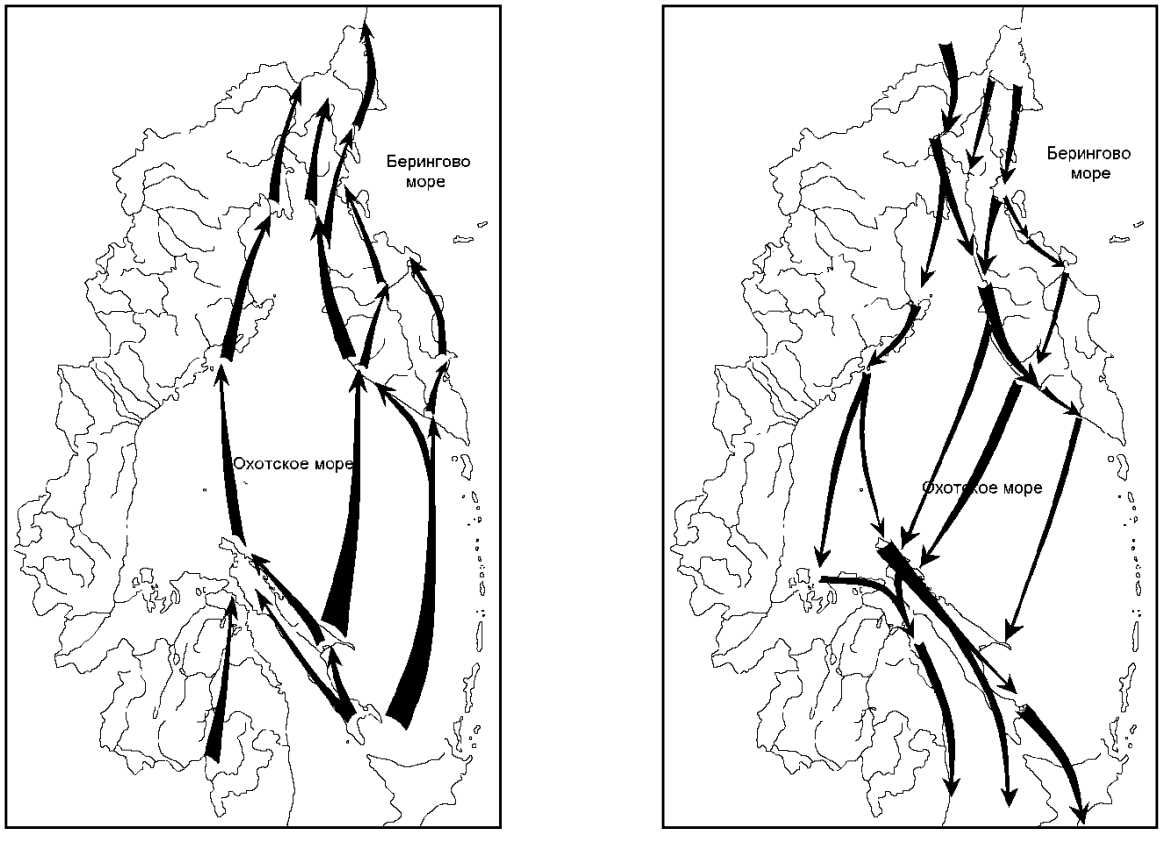
Except Yuri Gerasimov Team significant results on shorebird migration on Kamchatka was obtained by E.G. Lobkov on Lopatka Cape in 1986 (Lobkov 2003) and team of Dmitry Dorofeev during some years studies of shorebird southward migration in the estuary of Khairuzova and Belogolovaya Rivers (Kazanskiy & Shulezhko 2011; Dorofeev & Kazansky 2013; Dorofeev et al. 2016).

The volume of information obtained as a result of migration studies in Kamchatka is very large and has no analogues both in the Russian segment of the flight path and in the entire territory of Russia. In the sea of Okhotsk area rather big investigation of shorebird migration was made on Sakhalin also. Based on this information, an estimate of the number of migrating waders in Kamchatka was made (Gerasimov, 2006a; 2008; Gerasimov & Gerasimov. 2009; 2014). Updated estimates are shown in the table 1.

Table 1. Estimation of shorebirds number during migration on Kamchatka

Species	Number (individuals)	
	Northward	Southward
Pacific Golden Plover	2000	3000
Grey Plover	2000	3000
Mongolian Plover	3000	5000
Oystercatcher	700	1000
Red-necked Phalarope	10,000	20,000
Ruddy Turnstone	5000	2000
Dunlin	150,000	250,000
Red-necked Stint	100,000	150,000
Red Knot	3000	4000
Great Knot	40,000	60,000
Black-tailed Godwit	5000	8,000
Bar-tailed Godwit	10,000	15,000
Eastern Curlew	1000	1500
Whimbrel	70,000	100,000

Also reviews of the migration of waders in Kamchatka and Sea of Okhotsk Region were prepared (Gerasimov et al. 1997; Gerasimov & Gerasimov 2000a, c; 2001; 2002; 2006; 2010; Gerasimov & Huettmann 2006; Gerasimov 2011; Tiunov & Gerasimov 2018a, b, c; Tiunov et al. 2018; Tiunov & Gerasimov 2019a, b, c, d, e, f, g). Main routs of Dunlin migrations are showed on the figure 3 (Tiunuv et al., 2018). But this routs are the same or almost same and for some other (especially small) shore-bird species also.



A B

Figure 3. Main northward (A) and southward (B) migration routes of Dunlins in the Sea of Okhotsk region.

The banding of shorebirds on Kamchatka was started from 1989, mass banding – from 2014. About 15000 shorebirds was ringed and flagged in total. It allowed us to find out migration links of the shorebirds breeding and migrating through Kamchatka (Gerasimov 2009; 2014; Matsyna et al. 2016; 2018).

The study of distribution of shorebirds during breeding seasons covered even much more points on Kamchatka (fig. 4). Tens of review articles on nesting birds of different places in Kamchatka have been published. All of them contain information on wader nesting (Gerasimov & Malinovskiy 2003; Gerasimov et al. 2003; Gerasimov & Ostapenko 2006; Gerasimov & Gerasimov 2008; Bukhalova et al. 2010; 2012; Lobkov et al. 2014; Zavgarova et al. 2014…).

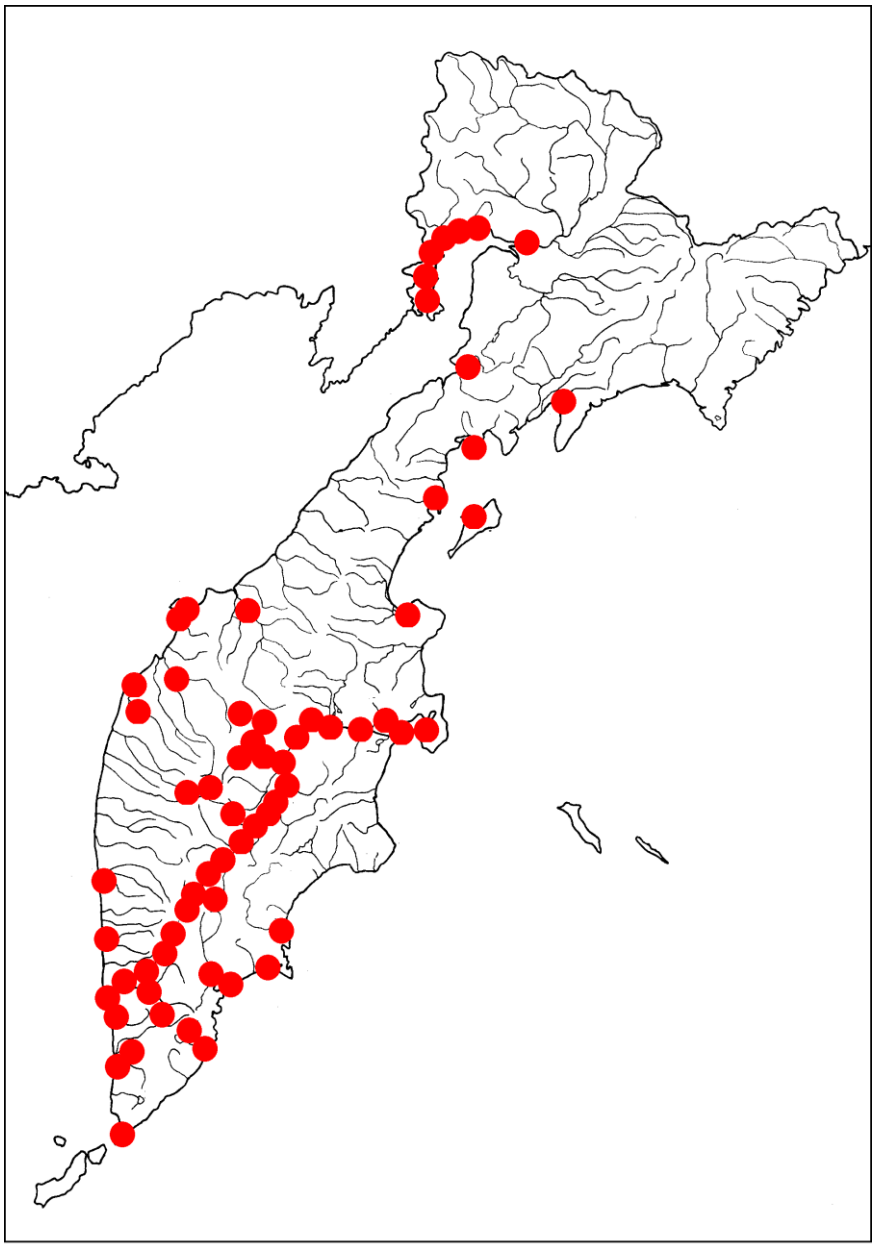


Figure 4. Points of study of birds of Kamchatka by Yu. Gerasimov

In total about 200 papers which contains information about shorebirds of Kamchatka were published by Yu. Gerasimov together with coauthors. As a result, the complete list of waders of Kamchatka was determined; the area of their distribution was clarified (Gerasimov et al. 1999a, b; Artukhin et al. 2000.

The areas of nesting, migration, as well as the places of registration of vagrant shorebird species are shown in the figures in Annex 1

Monitoring breeding number of some breeding shorebirds was started on Kamchatka in 2000s (Gerasimov et al. 2016). Such work was important due to the global decline of many species of shorebirds on the East Asian-Australasian Flyway (Conklin et al 2014; Gerasimov et al. 2018b). Special attention was paid to the Far Eastern Curlew.

Conservation

Kamchatka at the end of the XX century differed favorably from many other regions of Russia by having a well-developed system of protected areas created in the 1960s – 1980s and aimed at preserving the most valuable natural objects. The most important part of this system was regional reserves (game refuges). Special attention was paid to the conservation of the most important habitats of waterfowl and shorebirds. The creation of a network of protected areas of regional significance in Kamchatka has played an important role in the conservation of migrating bird populations (Gerasimov & Gerasimov 2007). "Morochechnaya River" game refuge was most important for shorebirds conservation.

The most important places of concentration of waders on Kamchatka during migration were identified (fig. 5). This data was used to generate the shadow list of Ramsar wetlands of Kamchatka (Lobkov 2998; Gerasimov & Gerasimov 2000d; Gerasimov et al. 2000; 2916; Gerasimov 2002a). Estuary of Moroshechnaya River also was included in the list of Ramsar sites and also in Shorebird Site Network of East Asian-Australasian Flyway (Gerasimov & Gerasimov 1998; 1999; 2000b).

The degradation of the Kamchatka regional protected areas system began in the late 1990s. This was due to many factors: a decrease in the level of protection, mass poaching, reducing the territory of some reserves and etc. Particularly serious damage to the system of regional protected areas of Kamchatka was caused in the 2000s. Eight wildlife refuges were closed including "Moroshechnaya River". All Ramsar sites on Kamchatka lost real protected status. The destruction of the system of protected areas and the elimination of several reserves at once without preparation of justifications occurred only in Kamchatka from all regions of Russia (Gerasimov, 2013; Gerasimov & Gerasimov 2013).

In the early 2000s, in Russia regional Red Data Books received official status. This meant that the species listed in the regional Red Data Book are completely prohibited from shooting. Penalties were determined for the shooting of all these species. In 2006, Kamchatka ornithologists included 7 species/subspecies of waders in the Red Data Book of Kamchatka (Tokranov 2006; Gerasimov 2006c, d, e).

The number of wader species/subspecies included in the 2nd edition of the Red Data Book of Kamchatka was increased up to 11. We additionally included species that had a strong decline in numbers on the East Asian Australasian Flyway: Curlew Sandpiper, Great Knot, Red Knot and Bar-tailed Godwit (Tokranov 2018; Tomkovich & Gerasimov 2018a, b, c, d).

The inclusion of a species in the List of IUCN does not give a real conservation status in Russia. Therefore, the inclusion of the species in the Red Data Book of Russia or in the regional Red Data Books is a more important condition for its conservation. Also in Russia all species included in Red Data Book of Russia automatically should be included in the regional Red Data Books of the regions where these species live.

All birds that are not included in the Red Data Books are divided into 2 groups: hunting and non-hunting. Non-hunting status means that hunting this species is prohibited. However, only a relatively small penalty is provided for shooting non-hunting species.

Conservation status of shorebirds of Kamchatka in 2020 is showed in the table 2. Vagrant shorebirds species are not included in the Red Data Book of Kamchatka.

Table 2. Conservation status of shorebirds on Kamchatka in 2020

Species	Conservation status				
	I	**II**	**III**	**IV**	**V**
Oystercatcher *Haematopus ostralegus*	NT	+	+	–	–
Pacific Golden Plover *Pluvialis fulva*	LC	–	–	–	+
Grey Plover *Pluvialis squatarola*	LC	–	–	–	+
Common Ringed Plover *Charadrius hiaticula*	LC	–	–	+	–
Mongolian Plover *Charadrius mongolus*	LC	–	–	+	–
Solitary Snipe *Gallinago solitaria*	LC	–	+	–	–
Pintail Snipe *Gallinago stenura*	LC	–	–	–	+
Common Snipe *Gallinago gallinago*	LC	–	–	–	+
Long-billed Dowitcher *Limnodromus scolopaceus*	LC	–	–	+	–
Black-tailed Godwit *Limosa limosa*	NT	–	–	–	+
Bar-tailed Godwit *Limosa lapponica*	NT	–	+	–	–
Whimbrel *Numenius phaeopus*	LC	–	–	–	+
Far Eastern Curlew *Numenius madagascariensis*	EN	+	+	–	–
Spotted Redshank *Tringa erythropus*	LC	–	–	–	+
Marsh Sandpiper *Tringa stagnatilis*	LC	–	–	–	+
Common Greenshank *Tringa nebularia*	LC	–	–	–	+
Nordmann's Greenshank *Tringa guttifer*	EN	+	+	–	–
Wood Sandpiper *Tringa glareola*	LC	–	–	–	+
Grey-tailed Tattler *Heteroscelus brevipes*	NT	–	–	–	+
Common Sandpiper *Actitis hypoleucos*	LC	–	–	–	+
Terek Sandpiper *Xenus cinereus*	LC	–	–	–	+
Grey Phalarope *Phalaropus fulicarius*	LC	–	–	+	–
Red-necked Phalarope *Phalaropus lobatus*	LC	–	–	+	–
Ruddy Turnstone *Arenaria interpres*	LC	–	–	–	+
Spoon-billed Sandpiper *Eurynorhynchus pygmeus*	CR	+	+	–	–
Red-necked Stint *Calidris ruficollis*	NT	–	–	+	–
Long-toed Stint *Calidris subminuta*	LC	–	–	+	–
Temminck's Stint *Calidris temminckii*	LC	–	–	+	–
Curlew Sandpiper *Calidris ferruginea*	NT	–	+	–	–
Dunlin *Calidris alpina*	LC	–	–	+	–
Rock Sandpiper *Calidris ptilocnemis*	LC	+	+	–	–
Sharp-tailed Sandpiper *Calidris acuminata*	LC	–	–	+	–
Pectoral Sandpiper *Calidris melanotos*	LC	–	–	+	–
Great Knot *Calidris tenuirostris*	EN	–	+	–	–
Red Knot *Calidris canutus*	NT	–	+	–	–
Sanderling *Calidris alba*	LC	–	–	+	–
Ruff *Philomachus pugnax*	LC	–	–	–	+
Broad-billed Sandpiper *Limicola falcinellus*	LC	–	–	+	–

I – IUCN red list status (https://www.iucnredlist.org/)
II – Red Data Book of Russia
III – Red Data Book of Kamchatka
IV – Non-hunting species
V– Hunting Species

But the main problem here is that hunting officers (inspectors) usually do not pay attention if hunters additionally shoot some wader species that are not included in the list of hunting birds. In addition, hunters (not all) more or less know the species listed in the Red Data Book, but all hunters do not know which species of shorebirds are hunting and which are non-hunting.

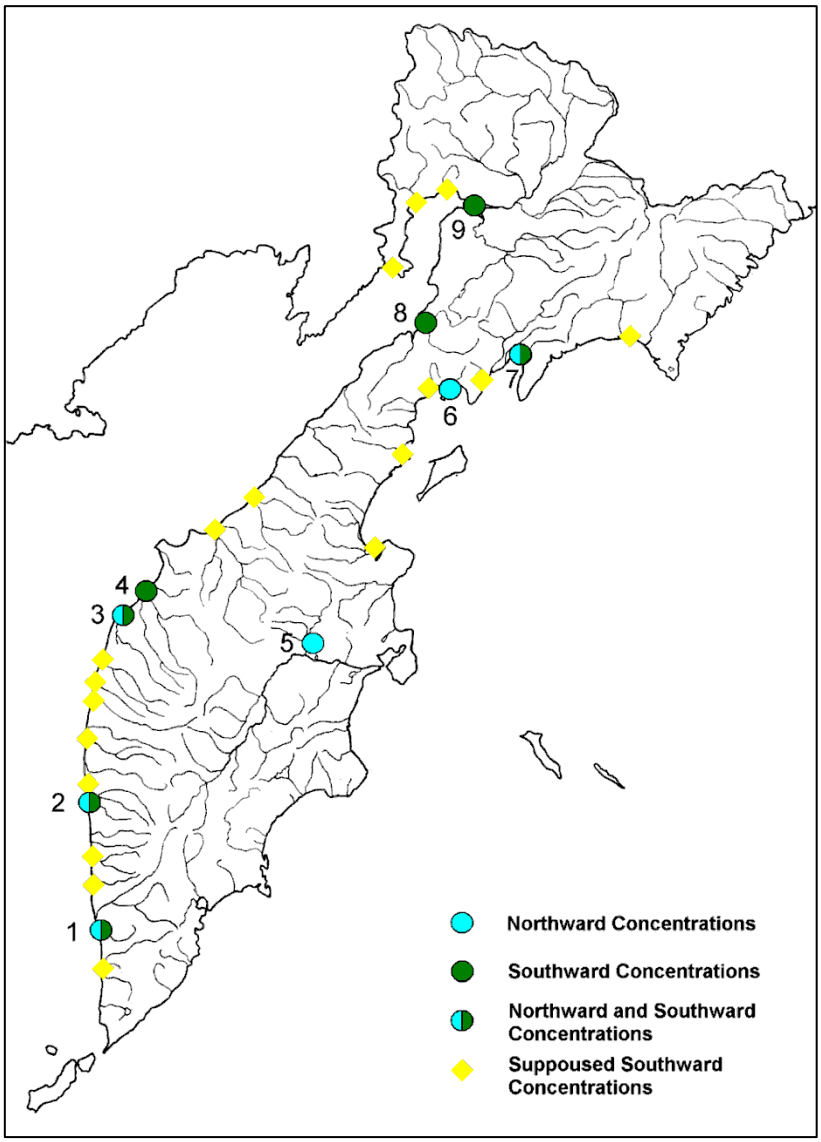


Fig. 5. Main staging place of shorebirds during northward and southward migration

Also some other point connected with shorebirds were studied and results were published (Gerasimov, 1994; Huettmann & Gerasimov 2006; Melville et al. 2014)

Data analysis of the Russian Bird Ringing Centre

The Russian Bird Ringing Centre stores all the data on the ring recoveries on the territory of Russia since 1959. For analysis we used data on six regions located on the Russian stretch of EAAFP: Chukotka, Kamchatka, Magadan, Khabarovsk, Primorsky and Sakhalin region (fig. 6). We only used the data that specified that the shorebird was shot or found dead, 302 recoveries in total.

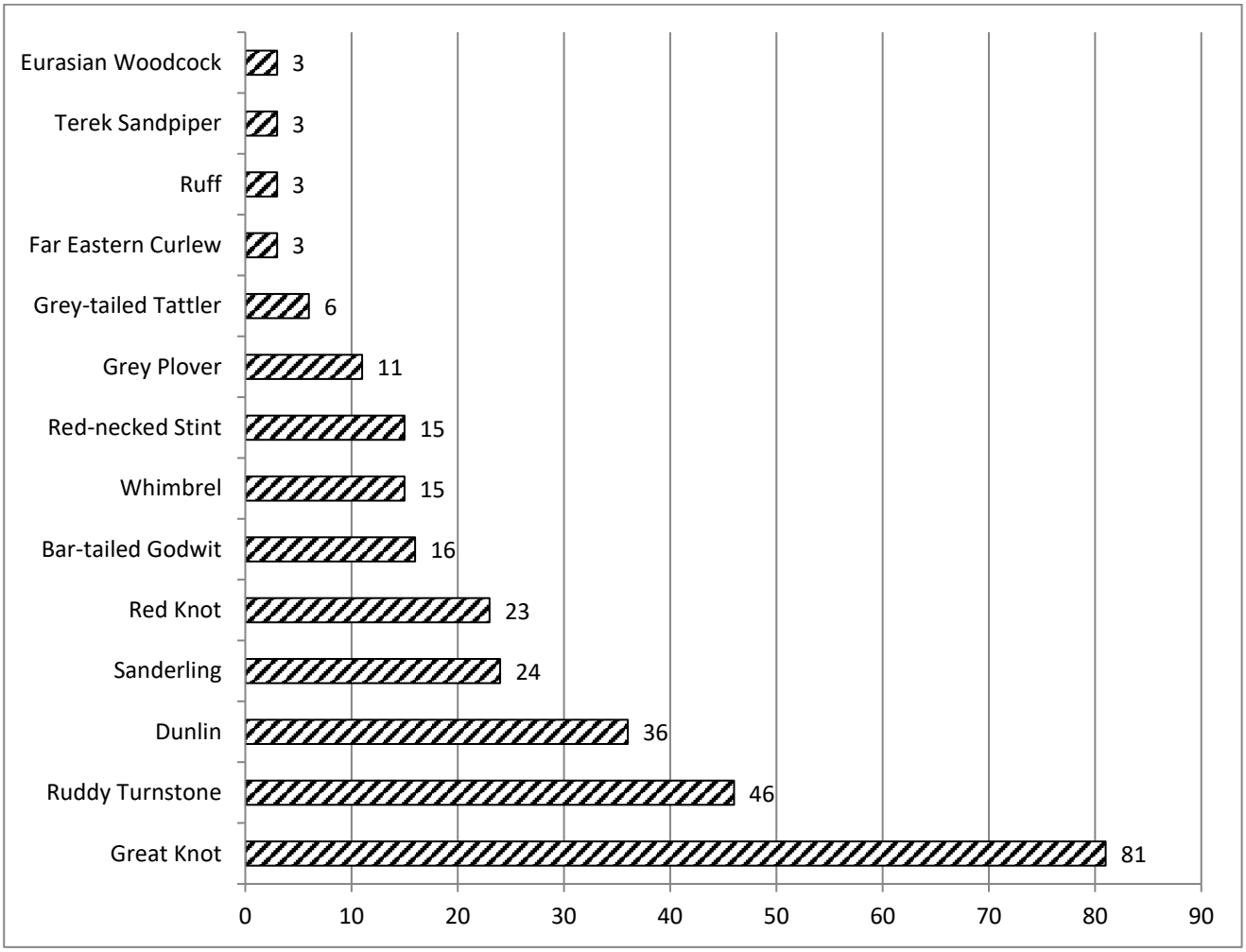


Figure 6 Number of recovered rings to Russian Ringing Center from Far East of Russia (main species)

We must clearly understand that the percentage of ringed waders shot does not correspond to the percentage of all shot waders, since it depends very much on the number of ringed birds of each species. For example, 15 Whimbrel rings and 16 Bar-tailed Godwits rings were returned to the USSR/Russian Ringing Center. But this does not mean that hunters shoot these species in approximately the same number. In fact, hunters shoot significantly more Whimbrels than Bar-tailed Godwits. But there are significantly more Bar-tailed Godwits ringed on the East Asian-Australasian Flyway than Whimbrels. That's why there are more ring returns from Bar-tailed Godwits comparatively with number of shot birds.

Significant number of ring recoveries of Ruddy Turnstones and Grey Plovers was due to the active banding of these species in the 1960s in the United States and the Russian Far East.

All recoveries of Ruddy Turnstone from northeast Kamchatka were received in 1960s and 1970s. This part of Kamchatka was known for large concentrations of Ruddy Turnstone during the northward

migration (Kistchinski 1980). We study that area in May – June 2012. The number of Ruddy Turnstone continues to be as high as in 1960s – 1970s, we observed big feeding flocks from hundreds Turnstone. However, during the all period of our observations during the month, we never noticed a hunt for medium- or small-sized waders there. There were no large-sized waders. It should be noted that poaching (duck hunting before the middle June – outside of the permitted time frame) took place there, since there was no control over the hunt completely.

Table 3. Recovered rings to Russian Ringing Center from Far East of Russia (number of shot shorebirds)

No	Species	Regions						
		I	**II**	**III**	**IV**	**V**	**VI**	**Total**
1.	Far Eastern Curlew					1	2	3
2.	Whimbrel	1	11		3			15
3.	Bar-tailed Godwit	1	5	1	6	2	1	16
4.	Black-tailed Godwit				1	1		2
5.	Grey Plover						11	11
6.	Pacific Golden Plover						1	1
7.	Eurasian Woodcock				3			3
8.	Common Greenshank					1		1
	Big-sized shorebirds in total	***2***	***16***	***1***	***13***	***5***	***15***	***52***
9.	Ruddy Turnstone	19	22		3		2	46
10.	Great Knot	2	6	6	2	65		81
11.	Red Knot		2	6	5	10		23
12.	Ruff	1		1		1		3
13.	Common Snipe						1	1
14.	Long-billed Dowitcher	1				1		2
15.	Mongolian Plover				1			1
16.	Grey-tailed Tattler	1		3	2			6
17.	Common Redshank					1		1
18.	Terek Sandpiper				1	2		3
19.	Wood Sandpiper			1	1			2
20.	Pectoral Sandpiper	1						1
	Medium-sized shorebirds in total	***25***	***30***	***17***	***15***	***80***	***3***	***170***
21.	Sanderling				22		2	24
22.	Common Sandpiper					1	1	2
23.	Dunlin		5	1	21	2	7	36
24.	Red-necked Stint		2	1	6	1	5	15
25.	Long-toed Stint						1	1
26.	Broad-billed Sandpiper				1			1
27.	Spoon-billed Sandpiper						2	2
	Small-sized shorebirds in total	***0***	***7***	***2***	***50***	***4***	***18***	***81***
	Total	**27**	**53**	**20**	**78**	**89**	**36**	**302**

Regions: I – Chukotka, II – Kamchatka, III – Magadan, IV – Sakhalin, V – Khabarovsk, VI – Primorye.

Table 4. Recovered rings to Russian Ringing Center from Far East of Russia (% from total number of shot shorebirds)

No	Species	Regions						
		I	**II**	**III**	**IV**	**V**	**VI**	**Total**
1.	Far Eastern Curlew					1.1	5.6	1.0
2.	Whimbrel	3.7	20.8		3.8			5.0
3.	Bar-tailed Godwit	3.7	9.4	5.0	7.7	2.2	2.8	5.3
4.	Black-tailed Godwit				1.3	1.1		0.7
5.	Grey Plover						30.5	11
6.	Pacific Golden Plover						2.8	0.3
7.	Eurasian Woodcock				3.8			1.0
8.	Common Greenshank					1.1		0.3
	Big-sized shorebirds in total	***7.4***	***30.2***	***5.0***	***16.7***	***5.6***	***41.7***	***16.2***
9.	Ruddy Turnstone	70.3	41.5		3.8		5.6	15.2
10.	Great Knot	7.4	11.3	30.0	2.6	73.0		26.8
11.	Red Knot		3.8	30.0	6.4	11.2		7.6
12.	Ruff	3.7		5.0		1.1		1.0
13.	Common Snipe						2.8	0.3
14.	Long-billed Dowitcher	3.7				1.1		0.7
15.	Mongolian Plover				1.3			0.3
16.	Grey-tailed Tattler	3.7		15.0	2.6			2.0
17.	Common Redshank					1.1		0.3
18.	Terek Sandpiper				1.3	2.2		1.0
19.	Wood Sandpiper			5.0	13			0.7
20.	Pectoral Sandpiper	3.7						1.0
	Medium-sized shorebirds in total	***92.6***	***56.6***	***85.0***	***19.2***	***89.9***	***8.4***	***56.3***
21.	Sanderling				28.2		5.6	7.9
22.	Common Sandpiper					1.1	2.8	0.7
23.	Dunlin		9.4	5.0	26.9	2.2	19.3	11.9
24.	Red-necked Stint		3.8	5.0	7.7	1.1	13.8	5.0
25.	Long-toed Stint						2.8	1.3
26.	Broad-billed Sandpiper				1.3			1.3
27.	Spoon-billed Sandpiper						5.6	2.7
	Small-sized shorebirds in total	***0***	***13.2***	***10.0***	***64.1***	***4.4***	***50.1***	***30.8***
	Total	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**	**100.0**

Regions: I – Chukotka, II – Kamchatka, III – Magadan, IV – Sakhalin, V – Khabarovsk, VI – Primorye.

On the other hand, the data from the Russian Ringing center provided us with interesting information. Comparison of shot waders between different regions of the Russian Far East showed significant differences.

In Sakhalin and Primorye, the percentage of small waders that are shot is higher (50.1–64.1 %), while in other regions of Russian Far East this percentage is much lower (0–13.2 %). We assume that this is mainly due to the fact that big- and medium-sized sandpipers are less available for hunting on Sakhalin and Primorye than other regions.

We can remove Ruddy Turnstones and Grey Plovers from the calculations, since they were shot almost exclusively in the 1960s and 1970s. In this case, Kamchatka will differ among all regions in the predominance of shooting big-sized waders – 51.5 %. In Primorye in the same case the number of small waders shot increases to 72 %.

In Magadan and Khabarovsk regions, medium-sized species dominate among the recoveries of waders. This is due to the fact that hunters in these regions are able to shoot significant numbers of Great Knots and Red Knots and on Sakhalin and Primorye areas significant concentrations available for

shooting hunters are not formed. The number of rings recoveries of big-sized and medium-sized shorebirds is small in Magadan and Khabarovsk regions.

Also, information about the shooting of waders included in the Red Data Book of Russia is very interesting. This information is usually very difficult to obtain.

We have 3 recoveries of Far Eastern Curlew from Sakhalin and Primorye and 2 recoveries of Spoon-billed Sandpiper from Primorye (any information about Spoon-billed Sandpiper is extremely interesting for us). We have no doubt that the hunters who sent these rings from the shot waders did not understand that they shot waders from the Red Book of Russia. Otherwise, they would have hidden the fact of shooting prohibited species. Hence the problem of unsatisfactory knowledge of hunters is indicated. At the same time, the unsatisfactory knowledge of hunters allows us to get knowledge that is difficult to get in another case.

It is also interesting that we have information about the recoveries (shooting) of some shorebird species included in the IUCN list with the status "NT" and "EN": Bar-tailed Godwit, Black-tailed Godwit, Great Knot, Red Knot and Grey-tailed Tattler. Three of this species (Bar-tailed Godwit, Great Knot and Red Knot) included in Red Data Book of Kamchatka and should be included in new edition of Red Data Book of Russia.

If we simply consider the total number of rings from shorebirds received by the USSR/Russian Ringing Center (fig. 7), the information obtained is very small and cannot be explained correctly. Our knowledge of the situation with shorebirds on Kamchatka, including their shooting by hunters, accumulated over the past 30 years shows this.

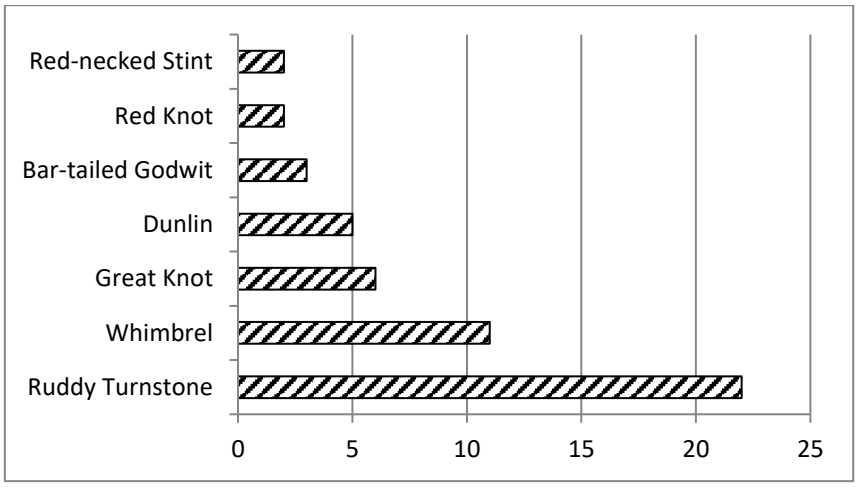


Figure 7. Number of recovered rings to Bird Ringing Center of Russian from Kamchatka

When analyzing recoveries of ringed waders from Kamchatka, we see their decrease from1960s to 1980s (fig. 8). The reasons for this are very clear to us. It was in the late 1980s and early 1990s that there was a sharp decline in shooting waders in Kamchatka (as well as for ducks), except for large-sized species. It was the time of the destruction of the Soviet Union, the economic situation deteriorated significantly, the cost of cartridges and, accordingly, the total number of hunting birds shot in Kamchatka significantly decreased.

Since the 1990s, the number of shorebirds returns has been increasing again. Unlike previous decades (1960s – 1980s), Whimbrels have become a significant part of them. We are sure that these changes were not due to the fact that hunters began to shoot Curlews more, but to the fact that the number of ringed Curlews has increased significantly.

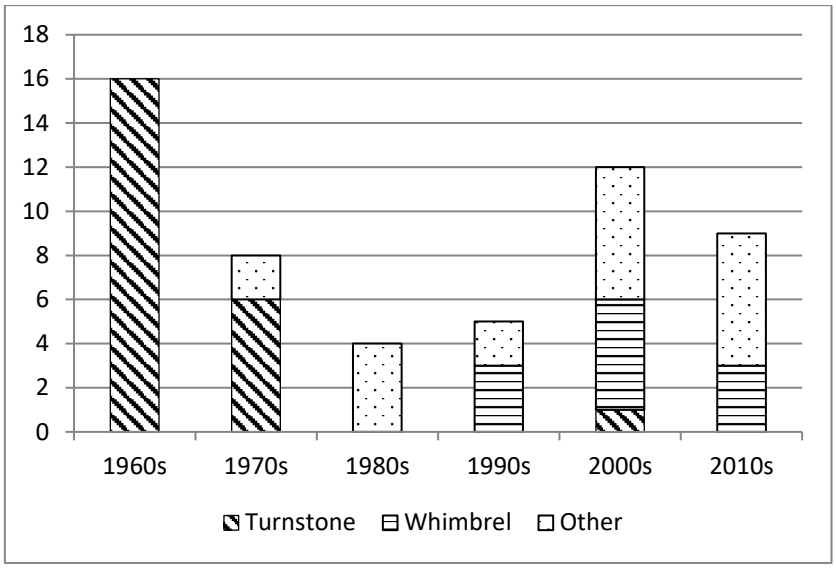


Figure 8. Number of recovered rings to Bird Ringing Center of Russian from Kamchatka

If we consider the recoveries of rings from shorebirds shot in Kamchatka in the 1990s – 2010s (fig. 8), they enough accurately show the existing shooting of shorebirds in the region at the present time. Large-sized waders make up 61.5 % of the shot waders, including 42.2 % Whimbrels and 19.2 % Bar-tailed Godwits. Medium-sized waders make up 27.0 %, small-sized shorebirds only 11.4 %. Places and dates of shorebird shooting correspond to our information on the terms and staging places shorebirds during migrations.

Table 5. Recovered rings to Russian Ringing Center from Kamchatka in 1990s – 2010s

Species	**Number**	**%**
Whimbrel	11	42.3
Bar-tailed Godwit	5	19.2
Great Knot	5	19.2
Red Knot	1	3.9
Ruddy Turnstone	1	3.9
Dunlin	3	11.5
Total	**26**	**100.0**

At the map we have contoured all the places where significant concentration of ring recoveries was identified as areas of intensive shorebird hunting.

Then we input to the same map locations all towns, settlements and villages in coastal zone of Russian Far East (fig. 9). The map shows where shorebird hunting places are located close to communities and where they are most likely connected to seasonal temporary fishing settlements.

The resulting map permits to plan surveys on the shorebird harvest estimation in all Far East regions.

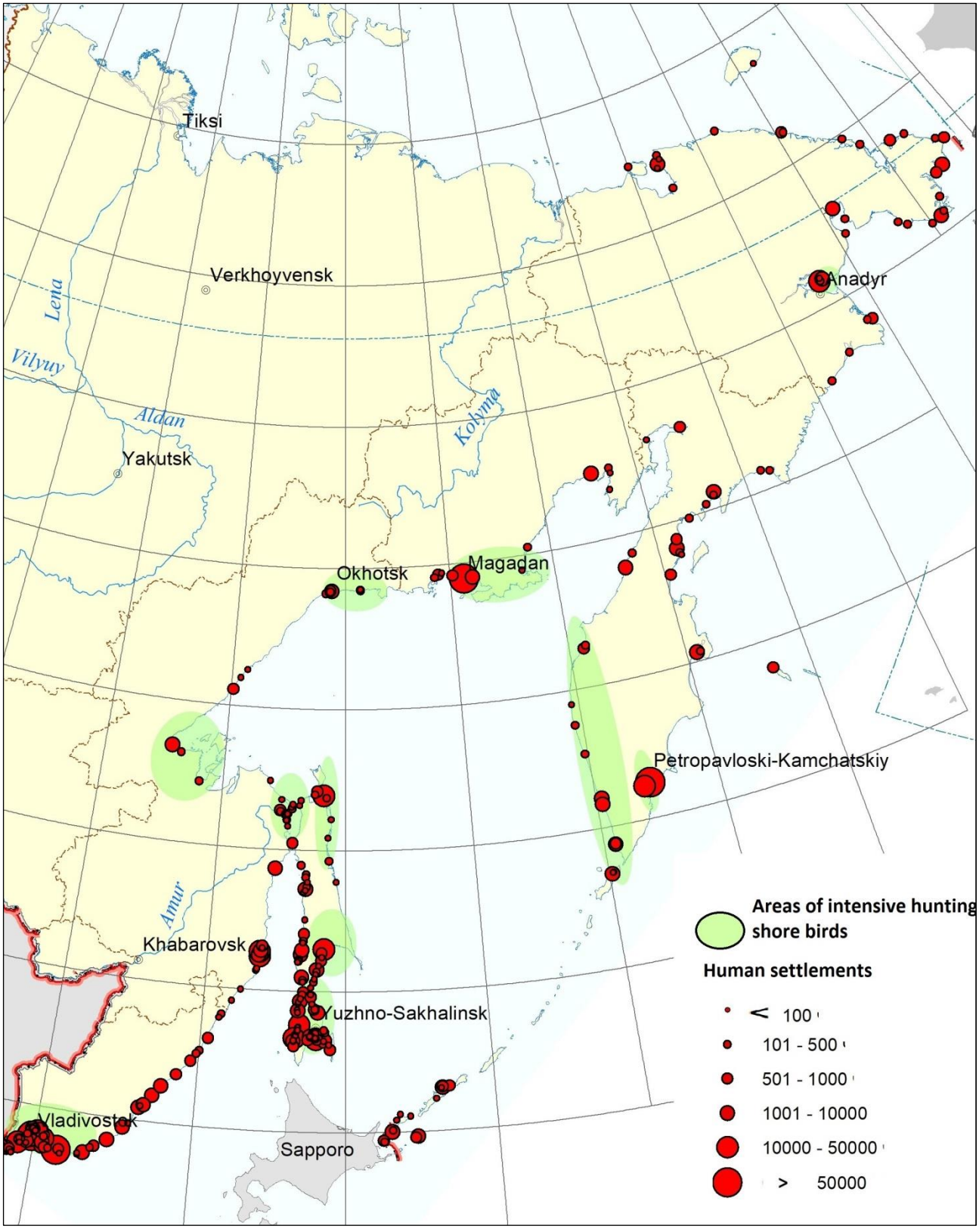


Figure 9. Human settlements located at the seacoast of the Russian Far East and main areas of shorebirds hunting identified from published sources and unpublished knowledge of Russian ornithologists

Number and distribution of hunters on Kamchatka

The latest official data on the number of hunters in the municipal districts of Kamchatka are available for the beginning of May 2016. The total number of hunters in Kamchatka was 19,164. It is about 6 % of the total population. The highest percentage of hunters was in Penzhinsky district – 19.8 % of the total population and Bystrinsky district – 16.0 % (table 6). In the northern parts of Kamchatka some hunters my not be registered. So total number of hunters on Kamchatka should be slightly higher and it is about 20,000.

We have divided Kamchatka into 5 parts to generalize data about hunters and shot waders. We have combined Penzhinsky, Olyutorsky and Karaginsky districts into the Northern area (North); Tigilsky and Sobolevsky into the Western area (West), Ust-Kamchatsky District became Eastern area (East), Bystrinsky and Milkovsky united into Central area (Center), Elizovsky and Elizovsky Districts united together with Petropavlovsk-Kamchatsky City and Viluchinsk Town into Southern area (South) (fig. 10, 11).

Table 6. Number of legal hunters in different districts of Kamchatka (see fig. 10 & 11)

Districts	**Human population**	**Number of registered hunters**	**% of hunters from human population**	**Number of hunters received permissions in 2018-2019**	**% of hunters received permissions in 2018-2019**
Penzhinsky District	2230	441	19,8		
Olyutorsky District	4209	409	9,7		
Karaginsky District	3818	530	13,9		
Northern area	**10257**	**1380**	**13,5**	**275**	**20**
Tigilsky District	6897	780	11,3		
Sobolevsky District	2523	299	11,9		
Western area	**9420**	**1079**	**11,5**	**343**	**32**
Eastern area	**10362**	**1323**	**12,8**	**481**	**36**
Bystrinsky District	2425	387	16,0		
Milkovsky District	9921	1034	10,4%		
Central area	**12346**	**1421**	**11,5**	**572**	**40**
Elizovsky District	63533	3621	5,7		
Ust-Bolsheretsky District	7944	783	9,9		
Petropavlovsk-Kamchatsky City	181015	8016	4,4		
Vilyuchinsk Town	21478	1541	7,2		
Southern area	**273970**	**13961**	**5,1**	**3244**	**23**
Aleutsky Dustrict	637	71	11,1		
Kamchatka in Total	***316355***	***19164***	**6,1**	***4915***	**26**

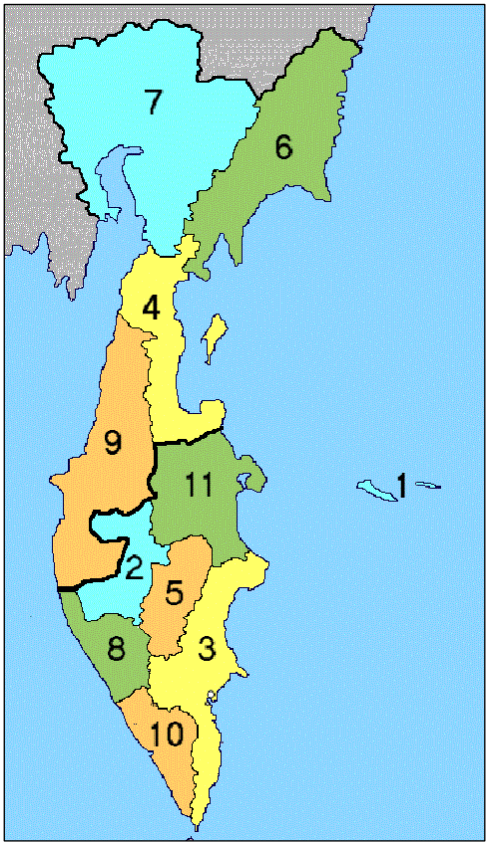


Fig. 10. Municipal Districts of Kamchatka: 1 – Aleutsky, 2 – Bystrinsky, 3 – Elizovsky, 4 – Karaginsky, 5 – Milkovsky, 6 – Olyutorsky, 7 – Penzhinsky, 8 – Sobolevsky, 9 – Tigilsky, 10 – Ust-Bolsheretsky, 11 – Ust-Kamchatsky

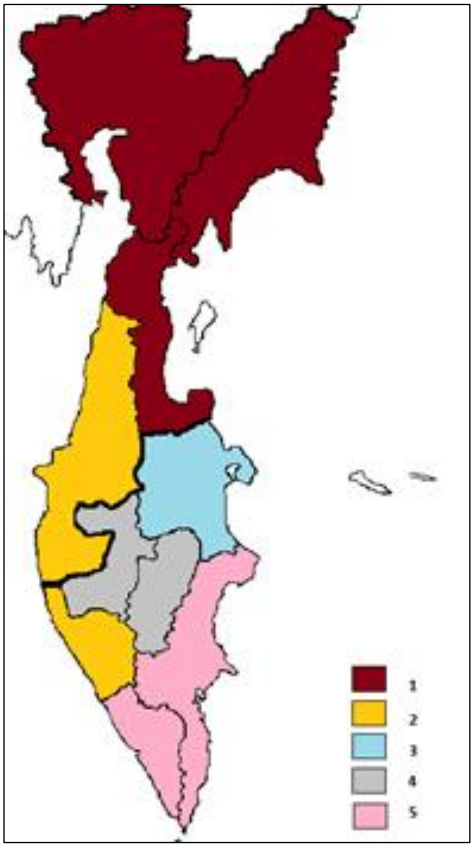


Fig. 11. Arias (groups of municipal districts) of Kamchatka: 1 – Northern, 2 – Western, 3 – Eastern; 4 – Central, 5 – Southern

To estimate the number of captured waders, in addition to the number of hunters, it is also important to know the number of hunters participating in the hunt in a particular year. We used seasonal hunting permits obtained by intending hunters each hunting season (table 7).

Table 7. Number of seasonal permissions, which hunters received for hunting of waterfowl, shorebirds and ptarmigans in hunter seasons of autumn 2018 and spring 2019

Group of species	Autumn 2018	Spring 2019
Ducks	3920	3624
Geese	3909	3617
Shorebirds	3395	0
Ptarmigan	2379	0

In addition to registered hunters, there are several other men who hunt illegally. According to our unofficial interviews, their numbers have declined significantly over the past decade, thanks to increased police control of guns. However, illegal hunting is still carried out in large volumes in remote villages by both local residents and visiting fishermen. This is due to the complete absence of both hunting control and even police control in remote villages.

Along the western coast of Kamchatka, many teams of hired employees who often come from other parts of the Russia deal with fishing. They use stationary nets, set in intertidal zone and in the lagoons and estuaries. They are most concentrated on the western and northeastern coasts of Kamchatka (Fig. 12, 13). The teams settle in the estuaries of big rivers. They are also involved in bird poaching. However, the scale of this poaching is very difficult to estimate.

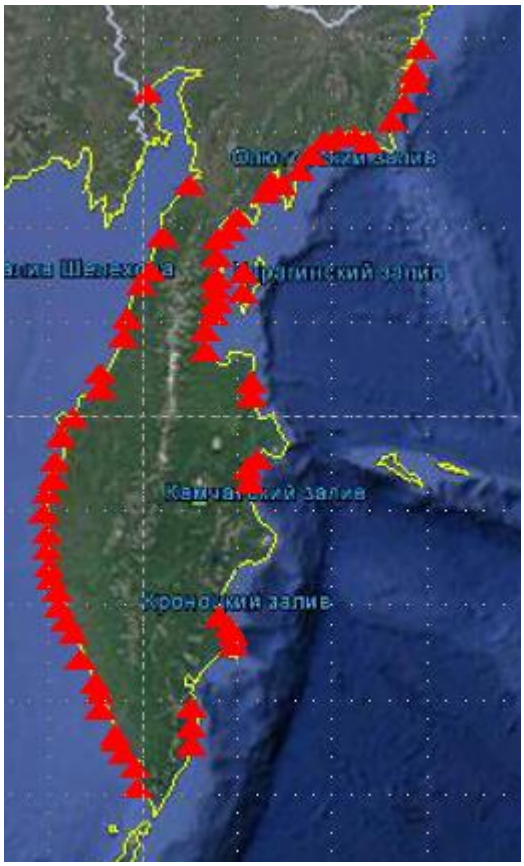


Figure 12. Location of stationary nets on Kamchatka

Figure 13. Stationary net and fish processing factory in Ustyevoe Village, West Kamchatka

Shorebird harvesting on Kamchatka

According to the survey results, most hunters do not distinguish between shorebird species and often cannot tell what species of shorebirds they have shot, especially when it comes to small shorebirds. All hunters know Whimbrel and part of them distinguishes between Whimbrel and Far Eastern Curlew). Some hunters know Godwits, but we never meet anybody who can distinguish Bar-tailed and Black-tailed Godwits. Also some hunters know Great Knots. Usually they use not official but local name. These hunters live in the Tigilsky district where big concentrations of this species take place in July and August. For example concentration up to 20 thousand Greate Knots are famous in the estuary Khairyuzova and Belogolovaya Rivers near Ust-Khayryuzovo Settlement.

None of the hunters can distinguish between small waders. It should be noted that despite the main part of hunters, some of them distinguish well the species of many big- and medium-sized shorebirds. We interviewed several of such hunters during our work.

We believe that the low ability of hunters to determine the species of waders is due to the fact that waders, especially small ones, are not interesting to them as hunting bag.

The main part of Kamchatka's hunters (including hunters of indigenous population) distinguishes very well all ducks and geese species, even rare ones. We have noted it many times over the 30 years of our investigations on Kamchatka. Our discussions with ornithologists working in other regions of Russia have shown that this is more common for Kamchatka hunters (this is also possible for other regions of the Russian Far East) than for hunters from the European part of Russia. Communicating with hunters, we noted that they are interested in the species of birds that they have shot. Sometimes, when they get a rare species, when they arrive home, they try to identify it using field guides or the Internet.

The main part of hunters does not distinguish species of shorebirds. Therefore, in anonymous questionnaires, we mostly do not use names of shorebird species, but ask hunters to divide the captured shorebirds into the following groups: A) Whimbrel, b) other big and medium-sized shorebirds except Whimbrel, C) small shorebirds. In addition, we asked to list the species of hunting shorebirds, if the hunter knows them, but only 6% of respondents did this. Next, we consider results related to Whimbrel and those two groups of species. The results are shown in tables 8 and 9.

Table 8. Number of surveyed hunters and % of hunters who shot shorebirds

	Area of Kamchatka					
	North	**West**	**East**	**Centre**	**South**	**All**
Number of anonymous questionnaires	107	60	55	14	166	402
% surveyed hunters	39.0	17.0	11.0	2.0	5.0	8.0
% of hunters who shot Whimbrels	21.2	96.6	100.0	0	51.2	55.1
% of hunters who shot big and medium shorebirds (except Whimbrel)	9.6	27.6	3.7	0	4.9	9.2
% of hunters who shot small shorebirds	11.5	34.5	22.2	0	7.3	14.3

Table 9. Estimation of number of harvested shorebirds

	Area of Kamchatka					
	North	**West**	**East**	**Cen-tre**	**South**	**All**
Number of hunters	275	343	481	572	3244	4915
Average number of shorebirds harvested by one hunter per year						
Whimbrel	2,06	23,21	15,85	0	6,45	8,86
Big- and medium-sized species except Whimbrel	0,52	1,93	0,04	0	0,24	0,53
Small species	1,62	10,07	0,44	0	0,61	2,23
Total number of shorebirds harvested per year						
Whimbrel	566	7960	7625	0	20928	37078
Big- and medium-sized species except Whimbrel	143	662	18	0	791	1614
Small species	444	3454	214	0	1978	6090
Total	**1153**	**12076**	**7857**	**0**	**23697**	**44782**

Whimbrel

Whimbrel is very popular birds for hunting on Kamchatka among all waterfowl and shorebird species. As we know, the Whimbrel is very popular as a hunting bag only in Kamchatka among all regions of Russia and, obviously, all regions of the world. Sakhalin may be another such region, but this point has not yet been studied. Whimbrel has 4 times less recoveries of rings from Sakhalin than from Kamchatka and does not have any from other regions of the Russian Far East, except for one from Chukotka in 1965. Hunters in other regions except Kamchatka and Sakhalin have a low opportunity to hunt Whimbrel.

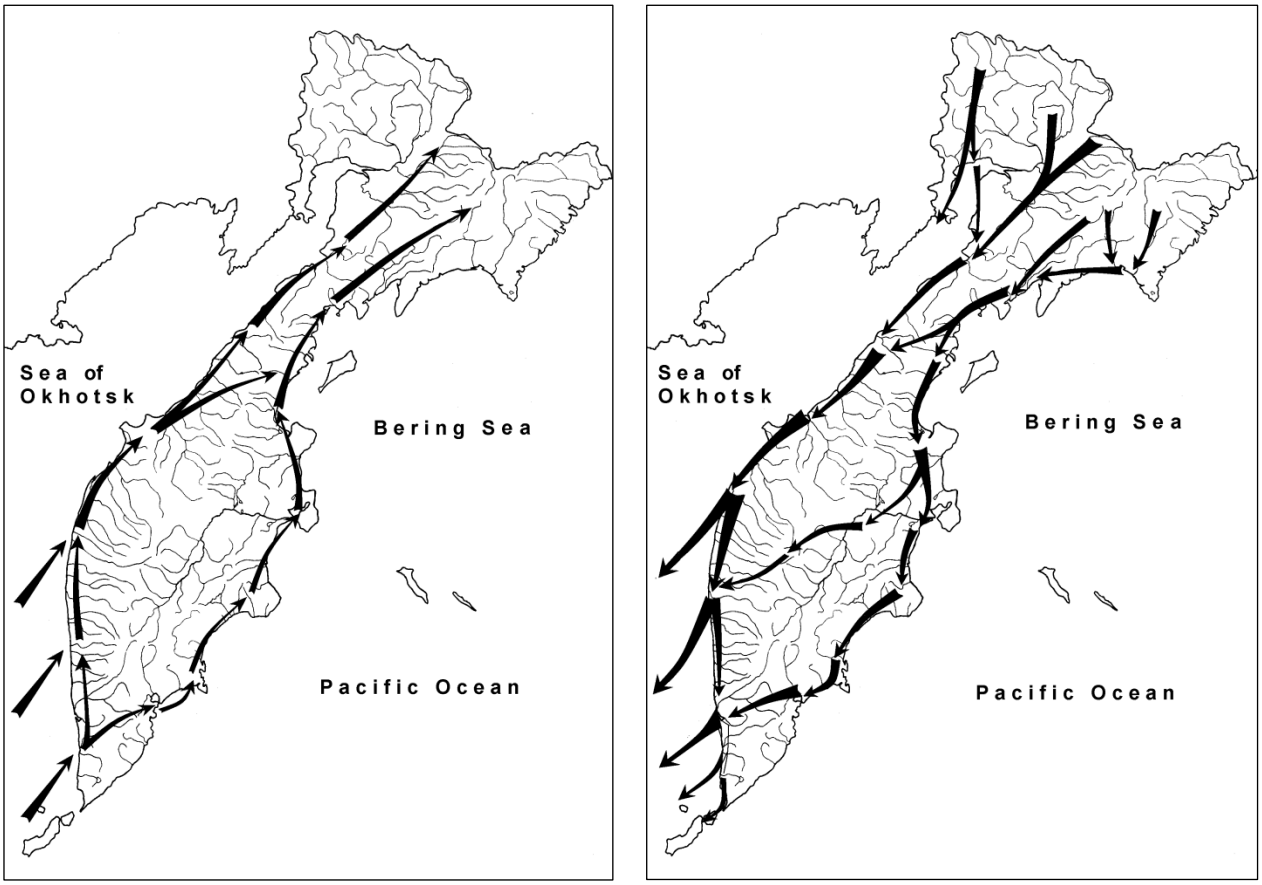
The autumn migration of Curlews occurs mainly in August, and the autumn waterfowl hunting season opens in September. This is the reason why there is a special season for hunting waders in Kamchatka. Hunting of waders on the Kamchatka Peninsula means hunting of Curlew. The other types are additional.

Main migrations routes during seasonal migration are showed on the figure 14. Northward migration takes place outside of the hunting season (late April – early May). This migration is going very fast and birds almost do not stop on the peninsula. Southward migration is very different from northward. During second half of July and first half of August birds concentrated in coastal tundra. This tundra with a lot of berries is the main feeding place for Whimbrel. Birds slowly moved along a cost and stops in many places on almost all West Kamchatka for some days.

The start of the hunting season for shorebirds in 20–25 August is the reason for the beginning of active migration and the main part of Whimbrels leave Kamchatka within a week. By September 1, when the hunting season for ducks and geese begins, there is rather small number of Whimbrels left on the Peninsula. Whimbrels partially move along the coast of Kamchatka to the south, but in different parts of the southern half of the coast of Western Kamchatka they leave it in a south-westerly direction towards Sakhalin (fig. 14.)

According to the anonymous questionnaires used in 2019, 55 % of active hunters shot Whimbrel in Kamchatka. The average bag of one hunter (total number of harvested birds divided on total number of hunters received permissions) over Kamchatka made 8.9 Whimbrels.

Hunters can imitate Whimbrel calls to attract birds to come closer. Also sometimes homemade decoys or decoys bought in shops are used.



A B

Figure 14. Main migration routes of Whimbrel in Kamchatka in second half of May (A) in August (B).

The greatest number of Whimbrels is harvested by hunters on the western coast of Kamchatka in Tigilsky and Sobolevsky districts (fig. 15). The average hunting bag (birds per one hunter) in a year was 23.2 birds, and the total number of shot birds was about 8 000 Whimbrels. In Tigilskiy district located further north than Sobolevsky one the average bag was a bit smaller (18.4 vs 26.6, correspondingly). On the eastern coast of the peninsula (Ust-Kamchatsky district), the average bag per one hunter was 15.9 birds, and in the north districts the Whimbrel is few, so hunters shot 2.0 birds a year, on average.

In central districts, Bystrinskiy and Milkovskiy ones, the Whimbrel as well as other species of shorebirds does not make any concentrations and even stops during southward migration, so nobody hunts them.

The main part of Whimbrels is harvested in the south and southwest of Kamchatka (Elizovskiy and Ust-Bolsheretskiy districts). More than 90 % of the human population of Kamchatka is concentrated on southeast of Kamchatka in the Petropavlovsk-Kamchatsky City, Elizovo Town, Vilyuchinsk Town and in settlements nearby. The total number of hunters (who received a seasonal permit) in the Petropavlovsk-Kamchatsky city and nearby towns is 3,244 people, which is 66 % of all hunters on Kamchatka. For hunters of the city, the best places for hunting Whimbrels, where during the southward migration the largest number of these birds stops, are near Ust-Bolsheretsk, in the South-West of the Kamchatka Peninsula. The area is connected with Petropavlovsk-Kamchatsky by a fairly good road. The trip by car from Ust-Bolsheretsk to the regional center takes three to four hours. The average

number of hunted Whimbrels for one hunter in the city is not so high – 6.5 birds because many hunters living in the city go hunting rarely. But as hunters in the city are rather numerous, about 21,000 Whimbrels are harvested there or more than half of the total number harvested on Kamchatka.

Our results shows, the average bag of a hunter mainly depends on the Whimbrel autumn concentrations. The total number of the harvested birds depends on the number of hunters as well. In the southwest of Kamchatka Peninsula, both parameters coincide. In Sobolevsky and Tigilsky districts (west coast of Kamchatka) there is a lot of Whimbrels but hunters are comparably few. In the east coast in the Ust-Kamchatsky district, there are more hunters but less Whimbrel than in the west coast, and average number of shot Whimbrels is rather high. And further to the north, in Penzhinsky and Olyutorsky districts, good places for Whimbrel hunting are absent as also number of hunters is few (Table 9).

As our calculations showed, the total number of Whimbrels shot in Kamchatka is about 37 thousand per year. This is a very large number and we believe this estimation is very close to the truth. But according to available estimates (Bamford et al., Conklin et al., 2014; Wetlands International, 2016.), the total population of the Whimbrel is supposed to be about 55,000 birds. We assume that the current estimate of the Whimbrel population is significantly underestimated, and we adhere to this point of view.

Published observations of Whimbrel concentrations in the some staging places (Lobkov 1980; 1986; Gerasimov1988; Huettmann & Gerasimov 2002; Schuckard et al. 2006; Gerasimov et al. 2019 …) and big volume of our observations allowed us to make a minimal estimate of Whimbrel on Kamchatka during southward migration in 80,000–100,000 birds (Gerasimov, Gerasimov, 2002; 2014).

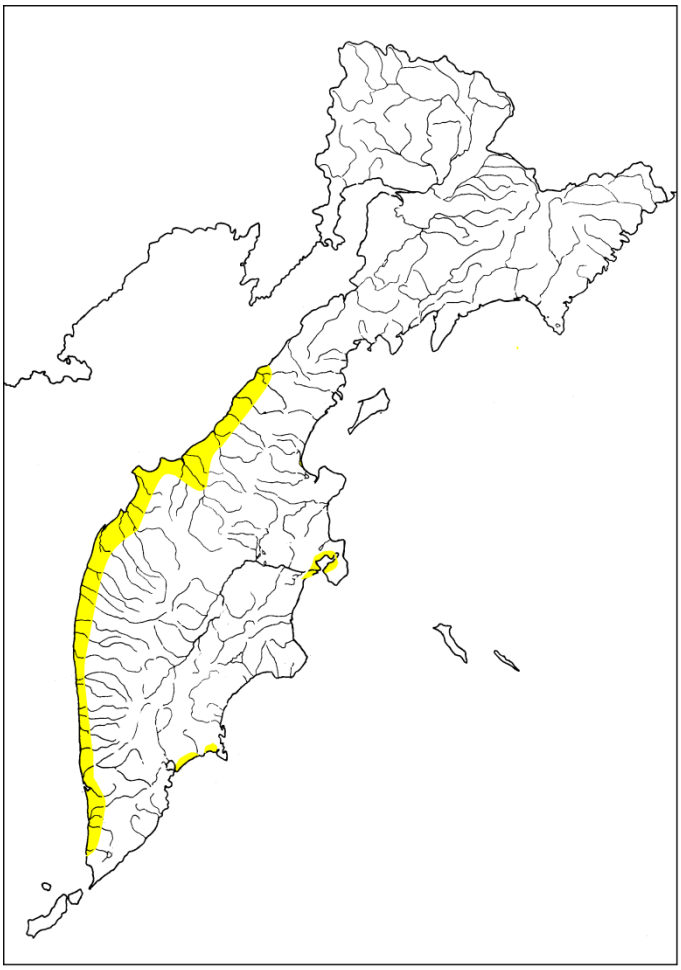


Figure 15. Main areas of Whimbrel hunting on Kamchatka

We can give some examples of the places where Whimbrels are concentrated in August. In 1989 during August we made special transect counts of waders on the spit of the Moroshechnyaya River (Tigilsky District). This spit is 20 km long and 1–1.5 km wide. Proceeding from our counting data we believe, that simultaneously on the spit up to 20,000 birds can be fed. In top of the spit we saw simultaneously flying up congestions up to 3 thousand individuals (Gerasimov & Gerasimov 1997; 1998; 1999; 2002). F. Huettmann made transect counts there in 1999 and estimated total simultaneously feeding number of Whimbrel on Moroshechnaya River spit in 26,000 (Huettmann & Gerasimov 2002).

On coastal tundra near Ustievoe Village (Sobolevsky District) about 5000 Whimbrels in one compact concentration (not one flock but fly up simultaneously) was observed on 11 August. Additionally one more concentration – about 500 birds was seen at some time on a distance about 3 km from our camp. On the previous day – 20August 2015, we observed about 3500 Whimbrels staying for roosting on mudflats near our camp (Gerasimov et al. 2015).

We have given the above information only for 2 sections of the west coast, where we ourselves worked. But this is only 2 very small sections of the coast with a length of 20 and 3 kilometers. The length of the Western Kamchatka plain is about 1000 km and we know that in August, concentrations of Curlews form in many places along its entire length (Lobkov 1986; Gerasimov 1988; Gerasimov & Gerasimov 2002). And these concentrations are formed at the same time, rather than moving from one area to another.

Number of Whimbrels during southward migration on east coast of Kamchatka is smaller, then on west coast. But there also some places of concentrations of Whimbrels are famous. At least 2000 Whimbrels was seen in one place to south of Ust-Kamchatsk (Gerasimov, 1988), up to 4500 Whimbrels were recorded in concentrations on the coast of Kronotsky Bay

Even more significant number of Whimbrel was recorded during observation of visible migration. We have many records of very active migration in different part of Kamchatka from different sources. But extremely intensive migration we observe in 2015 from our camp on the bank of Bolshaya Vorovskaya River Lagoon.

Migration started in the afternoon of 25 August (next day after opening of shorebird hunting season) when 28 thousand Whimbrels were flying past our study area during 5 hours; 30 biggest flocks contain 500–1100 individuals each. This number was equal to 51% of the estimated total population migrating on the East Asian-Australasian Flyway. Migration went in a south-westerly direction, flocks gradually moved away from the coast towards Sakhalin.

In total in August – September 2015 more than 32,000 Whimbrels (only passing migration which easy counted by simple summation) were counted nearby our observation point. Nighttime migration is very typical for Whimbrels in August – September. This means that in any case, we have not counted some of the birds. We believe that total number of Whimbrels migrated in our studied area in 2015 was at list 35,000 individual (more than 68 % from population estimates) was in that year.

There is no doubt that such a large percentage of Whimbrels from total flyway estimation cannot migrate through one point of west Kamchatka. We know that flocks of Curlews leave Kamchatka in the direction of Sakhalin on different parts of the coast from the center of the Peninsula to its southernmost regions.

In addition, some Curlews migrate not along of Kamchatka, but along the opposite – western coast of the Sea of Okhotsk. And we do not know any information about Whimbrel migration along the inland areas – to west from Sea of Okhotsk coasts.

In total we can assume that a more realistic estimate of the number of Whimbrels on Kamchatka during the southward migration is 120,000–150,000.

However, estimates of large numbers of Whimbrel moving through Kamchatka on southward migration (≥100,000) have not been supported by numbers elsewhere in the EAAF and the estimations remain the same (Conklin et al., 2014).

We are confident that our population estimates for Curlews are more accurate than those officially accepted for the East Asian – Australasian flyway.

We think. that in some cases, it is difficult to make a correct assessment of waders on wintering grounds, especially if the birds can be distributed widely in small numbers and in a large number of places.

We believe that hunters of Kamchatka are making the greatest impact on the Whimbrel population on the flyway. Harvest in Sakhalin, should be smaller by our opinion. The main reason is that Curlews migrate through Sakhalin quickly and do not stop much.

But on the other hand, over the past 40–50 years, there is no evidence of a decline in the number of migrating Whimbrels on Kamchatka. We do not have counting data for comparison, but the opinion of hunters is important for us in this case. We conduct extensive research on changes in the number of geese and ducks in Kamchatka from the 1970s to the 2010s, and we know that our counting data coincide with the opinion of hunters about changes in the number of geese and ducks in Kamchatka. But according to hunters, the number of Whimbrels in Kamchatka has remained approximately the same for the past 20–30 years.

We can also confidently conclude that any real restrictions on waders hunting in Kamchatka are currently impossible. Therefore, we cannot include this item even in the recommendations of this report.

This is our belief due to the current situation with bird conservation in Russia and Kamchatka. One of the authors of this report is a member of the Hunting Council (also the Councils for Rare species and Protected areas of Kamchatka) founded by the Government of Kamchatka, and he often participates in discussions of various issues related to the conservation of bird species.

Far Eastern Curlew and Godwits

According to the anonymous questionnaire survey, in 2019 9.2% of hunters shot big and middle-sized shorebirds in Kamchatka. The average bag per one hunter over Kamchatka was 0.5 birds a year. An estimate of the total number of the harvested shorebirds was 1600. Their spatial distribution on the whole is similar to the spatial distribution of the Whimbrel bag. On average, there is 1 large shorebird of other species was shot for each 22 Whimbrels, according anonymous questionnaires.

However, as the interviews show, hunters often shoot large shorebirds while hunting the Whimbrel, including Bar-tailed and Black-tailed Godwits. Some hunters do not know the right name of the species, though many of them are quite aware of them. Officially, the Black-tailed Godwit is a game bird while Bar-tailed Godwit used to be a game bird until 2018, and from 2019, it was included into the Red Book of Kamchatka within the activity of the authors of this report. However, it is still being shot – 6 % of anonymous questionnaires reported cases of Godwit harvesting (usually hunters do not distinguish two species of Godwits).

According to the interviews and our studies in last years, the Far-Eastern Curlew can also be harvested occasionally, though it included to the Red Data Book of Russia.

Here we should distinguish between “real poaching”, when hunters cannot stop and shoot large waders that have come close to them at the distance of the shot, and "accidental poaching", when hunters shoot Far Eastern Curlews by mistake, taking them less than allowed for shooting Whimbrels. The main reason for the error is the fact that young Curlews have a shorter bill than old ones, and they confuse these 2 species. This does not justify hunters, since these 2 species differ not only in the size

of the beak. We can confidently say this, since we have discussed the difference between the two species with hunters several times when we saw far Eastern Curlews in their prey.

Unfortunately, based on these interviews, we cannot estimate the volume of hunting for the Far Eastern Curlew. Hunting for this species was noted in 1% of anonymous questionnaires, but it should be noted that many hunters could not distinguish this species from the Whimbrel, and other hunters did not want to report information, because they knew that they had shot a prohibited species.

There is a very important point for the conservation of the Far Eastern Curlew in Kamchatka. The Far Eastern Curlew has earlier southward migration periods compared to the Whimbrel and, accordingly, its migration occurs mainly before the beginning of the waders hunting season. This is very important and is obviously the main reason for the stable number of the Kamchatka population in comparison with other regions of Russian Far East as well as al East Asian-Australasian Flyway.

In the case of Godwits, both species are listed in IUSN list as “near threatened”. But the actual situation with population decline is different. The Bar-tailed Godwit is reduced more than Black-tailed Godwit. Therefore, the Bar-tailed Godwit was included in the Red Data Book of Kamchatka and obviously will be included in the new edition of Red Data Book of Russia, while the Black-tailed is not.

Also, the status of these species is different for Kamchatka. The Black-tailed Godwit is a common breeding species for Kamchatka and we have no evidence of its decline. The other, Bar-tailed Godwit is only migrating species through the peninsula, and as we know, his number decliner is much bigger. Both of these species are shot in Kamchatka, but in a not so big number. The Black-tailed Godwit migrates, like the Far Eastern Curlew, relatively early (fig. 16).

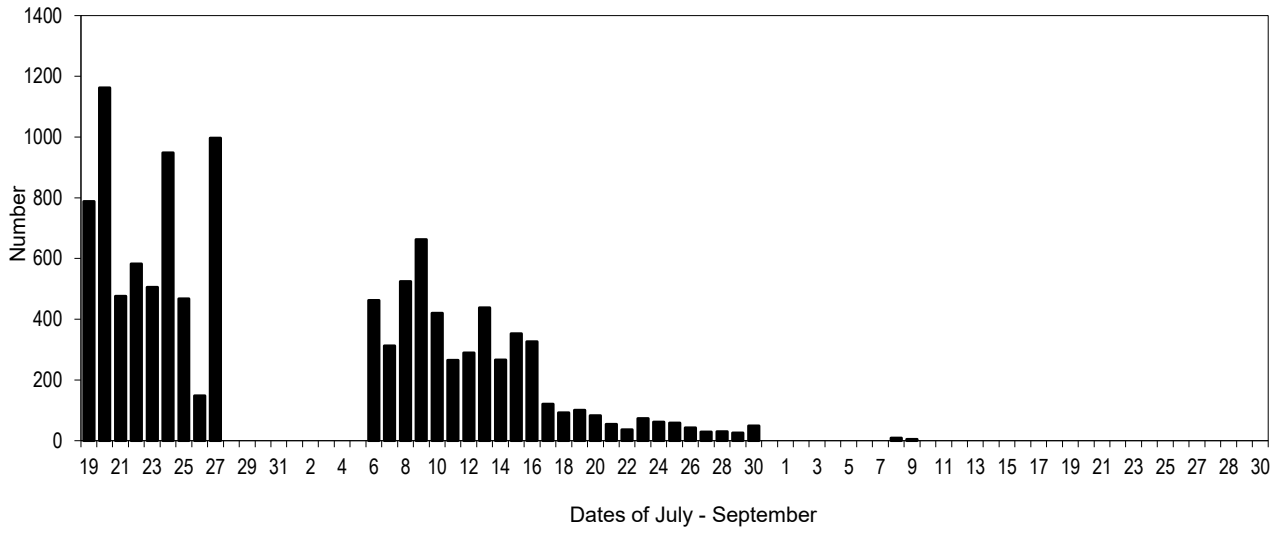


Fig. 16. Daily count of Black-tailed Godwit on mudflats and sand spit of Bolshaya Vorovskaya River in July – September 2015 (Gerasimov et al. 2015). Counting from July 28 till August 5 was not made.

Black-tailed Godwit has rather many significant staging places on west coast of Kamchatka. We have data on poaching for this species, and we ourselves observed illegal hunting of it before the beginning of the hunting season. In 1986, on the South-Western coast of Kamchatka, some hunters had black-

Tailed Godwits that accounted for up to 25 % of the total number of waders shot (Lobkov 2003). But in General, the situation with the conservation of this species in Kamchatka is quite good. We have no information about the decline of the breeding population.

Bar-tailed Godwit makes very long non-stop flights during seasonal migrations. We assume that only a relatively small part of the population of Bar-tailed Godwits visits Kamchatka during migration, and therefore hunting on this species cannot have a significant impact on the size of whole population. We know 3 staging places for this species during southward migration: Rikkiniky Bay (Lobkov 1998), Khairyuzova-Belogolovaya Estuary (Kazanskiy & Shulezhko 2011; Dorofeev & Kazansky 2013; Dorofeev et al. 2016) and Moroshechnaya Estuary (Gerasimov & Gerasimov 1997; 1998; 1999; 2002).

Rikkiniky Bay almost inaccessible to hunters as the nearest settlements is too far. Moroshecnaya River Estuary is more or less accessible for hunters and poachers (70 km to south from Ust-Khayryuzovo Settlement). But this area (In 1974–2009 it was a reserve – game refuge) famous by big number of Bean Geese and they are much more important game for hunters and poachers. Therefore it is unlikely that they pay much attention to hunting Godwits there. But Khayryuzova-Belogolovaya River Estuary should be point where many Godwits both species are shooting because Ust-Khayryuzovo Settlement located in the same area. In 2018 Bar-tailed Godwit was included in Red Data Book of Kamchatka. But shooting all species of shorebirds including protected is continued in that area.

Other big- and medium-sized shorebirds

From other big species we can note Grey Plover and Pacific Golden Plover. Both this species migrate late and do not make any concentrations during southward migration. However, there is no doubt that they are shot by hunters in Kamchatka. We expect from tens to 2–3 hundred shot birds per season.

In case of medium-sized shorebirds only Great Knot has importance for hunters on Kamchatka. This species has main staging place same as for Bar-tailed Godwit: Rikkiniky Bay (Lobkov 1998), Khairyuzova-Belogolovaya Estuary (Kazanskiy & Shulezhko 2011; Dorofeev & Kazansky 2013; Dorofeev et al. 2016) and Moroshechnaya Estuary (Gerasimov & Gerasimov 1997; 1998; 1999; 2002).

As we know, Great Knots are shot only in one point in Kamchatka in significant number – in the estuary of Khairyuzova-Belogolovaya Rivers where very significant concentrations – up to 20,000 are known (Kazanskiy & Shulezhko 2011; Dorofeev & Kazansky 2013; Dorofeev et al. 2016). In 2018 Great Knot was included in Red Data Book of Kamchatka. Shooting of Great Knots as well as other species of shorebirds including protected is continued near Ust-Khayryuzovo, But the number of birds shot is not very significant, much less than in the 1970s – 1980s.

Small-sized shorebirds

There are many species of small-sized shorebirds, and they are not actually objects of purposeful hunting. According to informal interviews, hunters rarely shoot them. Main reason of hunting small-sized shorebirds is absence of other game. It is easy to shoot some small shorebirds in a flock of birds sitting at the edge of the water or flying by.

According to the anonymous interviews in Kamchatka in 2019, 14.3 % of hunters shot small-sized shorebirds. The average bag in all Kamchatka was 2.2 birds a year for one hunter. The total number of harvested birds calculated by extrapolation was more than 6000. More than half of the birds were

harvested in western districts (Sobolevsky and Tigilsky districts), where the average hunters bag per year is 10 small shorebirds. In the other districts it was less than 2 birds per year.

Reporting on the number of harvested small shorebirds in the anonymous questionnaires, hunters never mentioned about species. In the interviews hunters noted that they shoot only a flocks of small-sized shorebirds for getting bigger number of birds. They never think about species, which they shot. With such type of shooting, there are some birds, which was wounded for each harvested and these birds are died later. These birds are not mentioned in the questionnaires by hunters and in our calculations. So, the number of shot small shorebirds may be assessed two-fold as compared with the data from the questionnaires, and the total number of shorebirds of small-sized species shot both legally and illegally may be evaluated as many as 10,000 individuals at least.

When we studied the migration of birds in Kamchatka in the late 1970s and during 1980s, we noted the hunting of small shorebird as a common occurrence. But now the situation with this type of hunting on Kamchatka has changed. In the 2010s, the majority of hunters report that they never hunt small shorebirds, or even medium-sized shorebirds, but prefer only Whimbrels. But this applies only to official hunters and we do not know the situation with poachers using guns for entertainment. This applies primarily to personnel working on stationary nets.

It is worth noting that shooting the flocks of small shorebirds hunters may kill the Spoon-billed Sandpiper. As this species is very rare, the probability of the fact is not great though the number of shot small shorebirds is rather significant. It is very difficult to estimate the probability as it goes only about probable yielding of several birds. But still, the likely killing of the Spoon-billed Sand-pipers in the northern part of the Kamchatka western coast is supported by the fact that signal transmission from three of the nine birds with radio transmitters stopped in this area. The birds may be supposed to have been shot in this area during stop on migration

Probability of Spoon-billed Sandpiper to be shot at flocks of small shorebirds in other Far-Eastern regions of Russia was mentioned by Yu. Arkhipov, V. Pronkevich, Z. Reviakina and other ornithologists working in another regions of Russian Far East. They knew shooting practice in the areas where Spoon-billed sandpiper regularly seen during autumn migration at Sea of Ohkotsk coasts.

But we should note that small-sized sandpipers are probably more often harvested in Sakhalin and Primorye than on Kamchatka. Obviously, this is due to the lower possibility of harvesting big-sized shorebirds in those regions. This is very consistent with the data of ring recoveries from Russian Bird Ringing Center from the small-sized shorebirds. So information about two Spoon-billed sandpipers with rings shot in Primorye came to Russian Birds Ringing Center.

It should also be noted that all small-sized sandpipers that form flocks on sea coasts (mainly Dunlin, Red-necked Stint and Mongolian Plover) are prohibited for shooting on Kamchatka in accordance with the hunting rules. All of them included in the list non hunting birds.

Illegal hunting of shorebirds

Our research, including those carried out in the past years, shows that the situation with illegal hunting of waders in different regions of the Russian Far East and in different regions of Kamchatka may be different significantly. Here are some examples.

Paren' Village – northwest coast of Penzhina Gulf of the Sea of Okhotsk, Penzhinsky District

There is currently no regulation of hunting in this area of Kamchatka. In June 2019, we had the opportunity to communicate with most of the local hunters. A total of 10 hunters live here and all belong to the indigenous Koryak ethnicity. Hunting for them is important for getting additional food. The most important hunting object is moose. From birds geese is very attractive for them, hunting for ducks is also popular. No Whimbrel migration there as well as other big-sized shorebirds species. But

number of shorebirds stopped in August – September on coastal mudflats is very high. Hunting in this place continues all around year any time when geese and duck accessible, even on breeding birds. But damage for bird populations is small as population of men is very small. Only one hunter shoots waders on mudflats. All the other hunters know about it, but they never take part.

Manili Settlement –mouth of Penzhins River, Penzhinsky District

This settlement is rather big for Kamchatka with airport and some police control but hunting control outside of the settlement is absent completely. Some tens hunters both indigenous (mostly Koryaks) and Russians live there. We use questionnaire and had special talks with local hunters in June 2019, but we made special investigations of shorebirds during southward migration in July – September 2002 and 2003 (Gerasimov 2003a, b; 2004; 2005a, b; 2006b). This area of Kamchatka is known for very successful goose hunting. The local population even pays little attention to duck hunting. Concentrations of shorebirds on mudflats are present there, but they are not available for hunting. Some hunters sometimes shoot shorebirds but in small number. We think it is not small-sized shorebirds (Dunlin and Red-necked Stints) but larger species that local hunters consider small. For example it could be Ruff and Spotted Redshank. This species is rare migrants on the Kamchatka Peninsula, but more or less common breeders on north of Kamchatka regions. No Whimbrel or Godwits migration there.

Ilpyrsky Village, Northeast coast of Kamchatka region, Karaginsky District

In Soviet Union time it was rather big settlement with human population about 2500 persons. Hunting for shorebirds was very active at that time. Ruddy turnstones stop there in a very significant number and in 1960s – 1970s many hunters shot them. Soviet Union Ringing Center received some recoveries of Ruddy Turnstone rings from that area. We worked in Ilpyrskoe Village in the spring of 2012 and had many opportunities to discuss the hunt with local people and observe it. The ornithologist has lived there continuously since 2012 and collects information on birds and hunting them. Now human population of that place has only about 150 persons including 12–15 hunters both indigenous Koryak and Russian nationality. Police and hunting control is completely absent and there are no restrictions on hunting for the local population. In the spring, they continue to hunt ducks until the beginning of June – almost one month after finishing of hunting season. But we do not have any evidence of hunting waders in this village. This may happen sometimes, but very rarely.

Ust-Khairyuzovo Settlement, West Kamchatka Tigilsky District (personal information from Dmitry Dorofeev)

Active hunting of waders, both legal and illegal, takes place. Actual time for both legal and illegal hunting is mainly determined by its officially established terms, as poachers do not want their shots to be heard during the "no-shooting" period. However, hunting with gun dogs, spaniels and retrievers is allowed from July 25 to November 15, and other types of hunting – from August 18 to October 31. In fact, as soon as one type of hunting is declared open, i.e. from July 25, all hunters start shooting all species of birds. And both legal and illegal hunters mainly shoot Whimbrel and Bar-tailed Godwit. These species endure most hunting pressure. Migration of adult Black-tailed Godwits and Great Knots takes place before the hunting period starts, so for these populations the hunting pressure is biased to juvenile birds because they migrate later. There is no hunting for small-sized shorebirds, as big-sized shorebirds stop in this area in large numbers.

Bolshaya Vorovskaya River Lagoon and adjacent areas, West Kamchatka Sobolevsky District

We worked in this area 6 seasons for study southward shorebirds migration in July – September 2014–2019 and 1 season for study northward migration in April – May 2018. Ustyevoe Village located just near our studied area and Sobolevo Town 20 km inland. Also this area connected by road with Petropavlovsk-Kamchatsky City – it is about 500 km distance.

Hunting for Whimbrels is very popular among the local men, as here before the beginning of the hunting season, large concentrations of Whimbrels are formed – more than 5000 on a relatively small

part of the tundra. Police control is available, but hunting control is very weak. However, Whimbrel hunting is almost completely absent before the start of the official hunting season. There is no hunting even in the earlier period of permitted hunting with dogs. Obviously this is due to an informal agreement between the hunters. The fact is that after the start of the hunt, the main part of the Whimbrels leaves this area within 1–2 days due to strong trouble. And hunting here can be very successful only for 1–2 days. Later Whimbrels arrive in this area is advanced, but they are few and hunting them is not as successful. This means that if some hunters start the season earlier than the official start, then for other hunters this hunt will be less successful.

Black-tailed Godwits are also an interesting target for hunting in this area, but most of Black-tailed Godwits leave Kamchatka before the beginning of the hunting season. Bar-tailed Godwits visit the area in very small numbers. We observed poaching of Black-tailed Godwits near our camp only 2 times in one of our seasons. This happened on the spit, where Godwits make a flock and stop for feeding and not on the tundra, where Whimbrels do concentration.

Hunting for small waders we noted in this area only once, when the hunter shot at a flock of feeding Dunlins and Red-necked Stints. He got some birds, including those flagged by us, and several other birds were injured. It should be noted that other local hunters, with whom we discussed such type of hunting, treated it negatively. Hunters living in this area have great opportunities to hunt geese, ducks and Whimbrels in big number, as hunting is quite successful. Therefore, these hunters are very picky and do not even shoot some types of ducks, as they consider them tasteless.

Southwest Kamchatka, Ust-Bolsheretsky District

We worked this area during many years since 1978. In addition to the local population, many hunters from the Petropavlovsk-Kamchatsky City come here to hunt (about 250 km enough god road). Police control is rather good. This is also one of the areas where hunting control is present from time to time. The presence of poaching depends on the distance to settlements. Illegal hunting before the start of the season happens, but is not regular. Local hunters have the opportunity to visit the best wetlands located more far from settlements. A significant part of the hunters who came from the city have not very good conditions for hunting. They sometimes shoot small- and medium-sized waders in the absence of other game. Some hunters (especially in places where the Whimbrels do not stop) purposefully shot other medium-sized waders. Fans of such hunting often know the names of shot waders. They could correctly identify the Common Greenshank, Spotted Redshank and some other species they had shot. Hunting for small waders is not widespread, as there are not many convenient places for such hunting.

Ust-Kamchatsk Town, East Coast of Kamchatka Ust-Kamchatsky District

We worked this area in April – May 2011 and in July – September during some seasons. Town has connection with Petropavlovsk-Kamchatsky City by enough good road, but distance is rather big – about 800 km, therefor not so many hunters arrived. This area has relatively good police and hunting control. There is almost no hunting near the city until the beginning of the season. Hunters prefer to shoot Whimbrels, perhaps also shoot a small number of Pacific Golden Plovers, which stop here in August – September in a noticeable number. Hunting to ducks is also very good hire. There is almost no hunting for small-sized waders, and there are no concentrations of small waders.

This area, according to our observations, is one of the best areas in Kamchatka for proper implementation hunting rules. Local hunters know that the Far Eastern Curlew is prohibited for shooting. But it was here that we noted the shooting of several juveniles Far Eastern Curlews. Presumably the hunters got them by mistake, because they told us that they were guided by the shorter bill of Whimbrel. And Juvenile Far Eastern Curlews also have a relatively short bill, rather shorter than a long one like adult birds.

Other regions of Russian Far East

We have some information about the illegal hunting by local population in other regions of the Russian Far East. Ornithologists Z. Reviakina (pers. comm.) noted it in Sakhalin, and V. Arkhipov (2017) – in the Magadan region.

"Local people often practice hunting compact fly by flocks of shorebirds in spring and in autumn. The flocks are shot near the water edge, during tide flows when the flocks gather on small islands and sand spits in the river estuaries, just sitting or feeding. The shorebirds are rather easily taken at this time, so hunting is efficient. People spoke of dozens of shorebirds killed by one shot.

This hunting was also said to be popular during the salmon fishing run, in July-August, when almost all the population is busy fishing in river estuaries and on sea spits rather far from settlements and shops. Some people said that shorebirds hunting are a good way to make the menu consisting mainly of fish in summer more diverse".

Our informal interviews showed that such thing happen in Kamchatka, but rather seldom. We believe that shorebirds harvest in Sakhalin may be even higher than in Kamchatka. There are much more hunters and better roads along the whole island. But shorebird harvest was never estimated there and this is one of the important next aims. Very small existing information from literary sources is not making picture clear.

* * *

The number of illegally shot shorebirds, as well as their legal shooting, depends on several reasons. The first is the location of the settlements in relation to the migration routes of each shorebird species and their concentrations, since most residents hunt no further than 20 km from the home. The number of gamed shorebirds also depends very much on the availability of other more valuable hunting objects, such as ducks, in each particular place. In addition, a large number of shorebirds are probably shot by those men who come from other places. Especially it could be fishermen from teams that arrived for getting salmon using fixed nets in coastal areas far from villages. Several hundred fishing teams annually fish on the Western and North-Eastern coasts of Kamchatka. These teams are engaged for fishing salmon, which determines their location in the coastal zone. As a rule, fishermen in such teams have guns, at least one per team, which is necessary to ensure safety from bears, to drive seals away from nets, and so on. They don't shoot shorebirds on purpose, but sometimes they shoot ducks and big-sized shorebirds or a flock of small shorebirds. The collected birds are used for food. During such hunting, there are many injured birds, which then die.

Illegal hunting of shorebirds in the places of their mass migration stops are mainly motivated by the following.

1. Hunters shoot the protected species of shorebirds while hunting other bird species that are allowed for hunting. Many hunters do not distinguish between hunting and non-hunting birds.

2. Fishermen shoot shorebirds during fishing as they are tired of feeding on fish. This kind of poaching often occurs in far-away and isolated areas, where any police and hunting control absent.

3. Sometimes hunters shoot a flock of small-sized shorebirds if he have no other options to get better game.

4. About 30–40 years ago, shot of shorebirds, including small ones, were widely used as bait for traps for sable and other fur animals. Hunting small shorebirds for food were used by indigenous people. However, both of these reasons gradually disappeared, mainly due to the rise in the price of gun cartridges. Our surveys have shown that such cases are currently rare.

Factors limiting legal and illegal shorebird hunting

1. The terms of intensive fishing, which is of great importance for local people, coincide in Kamchatka with the terms of hunting shorebirds. Therefore, a significant number of hunters cannot spend much time hunting shorebirds.

2. The high cost of gun cartridges leads to a preference for larger birds.

3. Many hunters in Kamchatka have the opportunity to shoot geese and ducks. Therefore, from waders they like only Whimbrel, because this bird is most delicious of all game birds.

Factors contributing to illegal shorebirds hunting

1. Weak control over hunting due very low number of hunting officers.

2. Low level of biological education of hunters and even some hunting officers/game managers. Main part of hunters and even main part of hunting officers could not identify some of protected shorebirds species.

3. The location of fishing camps in the stopovers of shorebirds and big number of guns in the hands of fishermen, who use guns to protect nets from seals and to protect themselves against bear.

4. In the last 10–20 years, the opportunity of hunters to buy/rent all-terrain vehicles and good boats has increased significantly. Many technologies had developed and people got more money. This allows them to visit remote areas where there is no hunting control much more often.

Conclusions

1. Our study of shorebirds hunting is the first big research in this direction carried out both in the Russian Far East and throughout Russia. It allowed getting the first idea of shorebirds hunting in Kamchatka. To obtain a complete picture along the northern end of EAAF, it is necessary to conduct similar studies in all other regions of the Russian Far East. Hunting assessment and monitoring in Kamchatka should be continued in order to be able to monitor the hunting process and to get more detailed data.

2. The shorebirds populations (breeding and passing) of Kamchatka are studied much better that other region of Russian Far East. It includes breeding range, term of seasonal migrations and routs, number of birds in staging place, breeding density and so on.

3. Analysis result of the recoveries of rings from shot shorebirds received by Russian Banding Center during 1990s – 2010s demonstrate that shooting of big-sized shorebirds prevails on Kamchatka, medium-sized – in Magadan and Khabarovsk area, and significant hunting of small-sized shorebirds take place on Sakhalin and in Primorye. The shot of species included in Red Data Book, which have highest level of protection, registered on Sakhalin (Far Eastern Curlew) and in Primorye (Far Eastern Curlews and Spoon-billed Sandpipers).

4. The human population of Kamchatka is about 320,000, of which about 20,000 or 6% of the total population are hunters (official and unofficial). About 5,000 hunters regularly receive seasonal permits and take part in bird hunting, including 3,400 people who participate in shorebird hunting. Real numbers of shorebird hunters might be considerably higher.

5. In total 402 hunters were surveyed using anonymous questionnaires, 55% of them hunted Whimbrels, 9% – other big-sized shorebirds, 14 % – small- and medium-sized shorebirds.

6. In total about 45,000 shorebirds were estimated to be hunted during one year. It includes 37,000 Whimbrels (including unknown number of young Far Eastern Curlew), 1600 other big- and medium-sized shorebirds (mainly Black-tailed Godwits and Bar-tailed Godwits) and 6100 small-sized shorebirds. Small sized were likely underestimated and may make up to 10 thousands.

7. Hunting for Whimbrel is very popular in Kamchatka and the special hunting season exists for it. We believe that we obtained in result of calculations the number in the 37,000 shot Whimbrels very close to the existing number.

8. There is no doubt that the current estimation of the population of 55,000 Whimbrels on the East Asian-Australasian Flyway is a very low. In the past 40 years of our research on Kamchatka, we made a minimum estimation on southward migration in 80,000–100,000. We have repeatedly reported our estimates of Whimbrel population, including in published sources in English. Now after estimation of hunted shorebirds we assume that the estimate of 120,000–150,000 Whimbrels during southward migration on Kamchatka is more realistic.

9. There is no evidence of a decline in the number of Whimbrels over the past 20–30 years despite very active hunting and a large number of birds being shot.

10. Significant numbers of Far Eastern Curlews (FEC) may be between shot Whimbrels. Hunters know that this species is protected, but except poaching, some hunters shoot them by mistake. Also young FEC are mistaken with adult Whimbrels as they have shorter bill.

11. Also some other species which has IUCN red list status “endangered” or “near threatened” (Bar-tailed Godwit, Black-tailed Godwit, Great Knot, Red Knot and Grey-tailed Tattler) is regularly hunted on Kamchatka in some places. Bar-tailed Godwit, Great Knot and Red Knot included in new edition of Red Data Book of Kamchatka (it was the result of our activity) and prohibited for hunting now, but Black-tailed Godwit and Grey-tailed Tattler continue to be officially hunting species.

12. Hunting for small-sized shorebirds on in Kamchatka has declined significantly over the past 40 years and is now less popular. But it still remains an additional threat to the conservation of the Spoon-billed Sandpiper and in some villages could be high. Some of these places are known but some still not.

13. Hunting for protected shorebirds is often the reason of low knowledge of hunters and their inability to distinguish between shorebird species. Awareness rising should be improved.

14. Although our study in Kamchatka filled a significant gap, the available data on shorebirds hunting in the Russian Far East is still completely insufficient to propose and justify an effective shorebird conservation program.

15. The methodology used by us as in Kamchatka had demonstrated good results. It can be used in other regions of the Russian Far East. However, for a quantitative assessment of the harvesting of Far Eastern Curlew, it should be supplemented with other methods (see section “Recommendations for future work”).

Recommendations for conservation

We consider only those recommendations that can actually be realistically implemented. We also consider only recommendations that can be implemented at the regional level and that do not require changes in Federal legislation, which may be hard to organize and take too long.

1. For shorebird conservation special education activity for hunters and shorebird officers is much needed. Since hunters often shoot protected waders because of their inability to identify species and hunting inspectors cannot control this process because they also do not distinguish between many species. Main part of Kamchatka hunters are really interesting to know species which they harvesting. But there is no place where they can learn.

2. The publication of a field guide of waders of the Russian Far East is really very important for improving the level of knowledge of hunters and hunting officers. Both hard copy and on the web it should be useful. As 90% of Kamchatka hunting areas do not have internet connection hard copies of field guides would work better. Other education activity for rising of level of knowledge of hunters and hunting officers can be also useful. This activity can be conducted together with hunter societies and regional hunting agency. As we learned during our research of the hunting society on the Kamchatka are very open to such activities. But they have limited resources.

3. It is necessary to make efforts to restore the Moroshechnaya River game refuge in order to preserve some shorebirds populations: Oystercatcher, Black-tailed Godwit, Bar-tailed Godwit, Grate Knot. Spoon-billed Sandpiper also was recorded there in significant number. In 1994 the territory of this game refuge became a part of Ramsar site “Moroshechnaya River”; in 1996 the estuary of Moroshechnaya River was included in the East Asian-Australasian site network. Until now this wetland remains the only one official shorebird site in Russia. The reserve (game refuge) was canceled in 2009 by local authorities and now poaching is going on there along with salmon fishing.

4. Hunting control in Kamchatka, as well as in the all Russian Far East, is weak. We can recommend increasing hunting control in all areas of Kamchatka. But such a recommendation is not feasible and therefore useless. Therefore, we can advise to focus on some selected areas. For example to chose one area that is critical for the conservation of threatened waders and where hunting control can really be improved. This is Estuary of Khayryuzova and Belogolovaya Rivers – important staging place for Eastern Curlews, Black-tailed Godwits, Bar-tailed Godwits, Great Knots and Red Knots. Spoon-billed Sandpipers also stop here.

5. Effective conservation of shorebirds requires significantly more harvesting data. First of all, we need information on other regions of the Far East in order to get a complete picture along the entire flyway. Secondly, it is necessary to move from a one-time study to hunting monitoring. Thirdly, it is necessary to fill in the remaining gaps, as detailed below.

Recommendations for future work

1. Survey with existing methodology of other Far East regions of Russia that can take at least three more years. First of all, it is advisable to survey Sakhalin Island where, based on information from ring recoveries and assessment of ornithologists working in this region, a large number of shorebirds, including protected species, are harvested. Another territory where a lot of shorebirds are also shot is Tuguro-Chumikansky district and some other districts of Khabarovsk region. It could be done second year. In the last year, the Magadan and Primorsky region can be surveyed. Surveys can be also being combined different way but we see at least 3 seasons more ahead to get more complete picture of shorebird shooting in the Russian Far East.

2. Special study is needed to find out what number of Far Eastern Curlew, as well as Bar-tailed and Black-tailed Godwit is harvested by hunters during Whimbrel hunting. This way we can evaluate how many young FEC are taken along with Whimbrels. Interview and anonymous questionnaire methods are not suitable for it, watching hunters during the hunt is required. In Kamchatka this task can be accomplished by 2–3 ornithologists along with other studies.

3. To continue the work started in Kamchatka to check and confirm the received estimates of shorebird harvest. At the same time the number of anonymous questionnaires should be increased in order to receive more precise estimates and expand the survey areas. It is advisable to make an additional survey of (1) northern parts of the peninsula, (2) Karaginsky and Olyutorsky districts in particular; where there is rather intensive southward shorebird migration on the Eastern coast and in spite of small sampling high numbers of waders was recorded in hunting bag. In addition, there are places in Olyutorsky district where radio transmitters on three Spoon-billed Sandpipers stopped working. Unfortunately, due to the lack of time and funds we did not manage to survey them in 2019. It is advisable to do this in coming years.

In addition, it is desirable to further study Ozernovsky village in the very south of Kamchatka (Ust-Bolsheretsky district), which was not surveyed due to its remote location. There is an intensive autumn migration of shorebirds in the area of this village and many shorebird ring recoveries were sent from there in Soviet times. To complete the picture, it is also advisable to survey Nikolskoe village in the Bering island (where two rings of shot Bar-tailed Godwit were recovered) and located near to South Kamchatka northern group of Kuril islands (being administratively Sakhalin Region it is managed through Kamchatka).

4. Although a significant numbers of questionnaires were obtained from the northern districts of Kamchatka in 2019, an additional results confirmation is required as according to the interviews a significant part of hunters in a number of northern villages hunted without a permit and was not covered by our study.

5. To reduce negative effect of hunting on Far Eastern Curlew and other protected shorebird species it is advisable to:

1) Conduct a campaign to raise awareness of hunters and inspectors who do not know and are not able to distinguish between different shorebird species. Hunters should get information on the population status of endangered species to form their motivation to protect them. They should also learn to recognise them in flight to prevent accidental harvest. This work can be conducted together with hunter societies and regional hunting agency.

To raise awareness of hunters and inspectors, it is advisable to prepare and publish a guide of Kamchatka shorebirds. This idea has already been discussed years ago but still has not been fulfilled. Both hard copy and on the web it should be available. As 90% of Kamchatka hunting areas do not have internet connection hard copies of field guides would work better.

2) It is advisable to more precisely identify places where hunters hunting Whimbrel can accidentally harvest Far Eastern Curlew and other protected species, as well as time periods in autumn, when it is more likely to happen. Depending on the result of these studies, we will suggest either to create small protected areas in these places or to adjust the shorebird hunting periods. The analysis of ornithological knowledge and the map should be produced. May be in the form of simple GIS project.

3) The results of surveys should be published and also promoted via various media. All Russian target audiences have no idea on the scale of shorebird shooting in Russia at related conservations and management issues. To make them known to Russian speaking audience. On next stages of the project preparation of publications, information dissemination and awareness raising should be one of tasks.

6. In order to promote any shorebird conservation project — such as hunting period adjustment or protected area creation — it is necessary to raise awareness of decision-makers in Kamchatka. Currently they have little information and motivation to protect shorebirds, although some shorebird species are included in the Kamchatka Red Book.

7. We should explore how to work with legislation, which would help to regulate shooting of shorebirds both on national and regional level. There is no concept yet. And many questions to sort out.

8. As soon as we will develop the project more (may be in year or two) and as the new Russia National Red Data Book is officially settled in early 2020 we should run a workshop to help answer questions mentioned above and develop a strategy. The idea to run such a workshop was proposed by WCS-Russia using their base in Ternei in Primorskiy Krai. They can co-fund it. We should start discussing this.

9. Evaluation of threats in locations where Spoon-billed Sandpiper satellite tags stopped working in North Kamchatka should be a subject of special expeditions with separate budget and well selected team. Studying this and collecting mass information on hunting on big geographical scale does not work. Due to logistic in these remote areas, it should be a separate mission.

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Photos

Welcome to Ust'-Kamchatsk the poster is saying – "paradise for hunters"

Kamchatka hunter and his harvest

Kamchatka hunters are well equipped and passionate about their hobby/lifestyle (shooting from moving transport is legally forbidden)

Freshly shot by Kamchatka hunters

Unlucky Whimbrels

Gray-tailed Tattler is among other waders shot in Kamchatka

Good weekend harvest of hunters – mouth of Bolshaya River, 2019

Many Kamchatka hunters shoot dozens of shorebirds in one hunting trip, 2019

Some Whimbrels in Kamchatka are consumed straight in the field

Plastic decoy used by local hunters to attract birds (for sell in Petropavlosk-Kamchatskiy)

Training younger generation of Kamchatka shorebird shooters

A flock of medium sized shorebirds in the vicinity of Ust-Khairyuzovo – hunters occasionally aim to shoot in flocks like that when sow them on mudflats. Many birds would be killed with one close shot but even more wounded.