Assessment of hunting pressure on Arctic-nesting shorebirds: first results from the Northeast of Russia

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Abstract. Conservation of Arctic migratory birds is based on a holistic approach that considers all habitats of a species within its annual life cycle. Hunting for Arctic-nesting shorebirds in the Northeast of Russia can negatively impact Arctic shorebird populations, especially endangered species. The Arctic Migratory Bird Initiative (AMBI) program was initiated by CAFF in 2015 to improve the conservation status of declining of Arctic migratory bird populations. BirdsRussia began a project to assess hunting pressure on the Arctic shorebirds nesting in the East Asian-Australasian Flyway in 2019 in Kamchatka. This is the first project focused on estimating hunting pressure on Arctic shorebirds in Russia. Its methodology is based on an anonymous survey of hunters. The result showed that about 45,000 shorebirds were hunted per year in Kamchatka, of which 37,000 are Whimbrel, about 1,600 of large and medium-sized shorebirds other than Whimbrel, and about 6,000 small shorebirds of different species. Hunters often do not distinguish between different shorebird species, and by mistake they shoot many birds of protected species; in addition, they often shoot mixed flocks. Such shooting threatens the endangered Spoon-billed Sandpiper and other protected shorebirds, such as the Far-Eastern Curlew, Bar-tailed Godwit and others.

1 Introduction

Arctic-nesting migratory birds are a significant component of both Arctic culture and ecosystem health. Many of them require special attention of researchers as they are rare and endangered species or game resources. The protection of Arctic migratory birds, as well as the issues of sustainable use of their resources (concerning game species) is complicated by the fact that Arctic birds use various flyways to move from Arctic breeding grounds to wintering grounds or stopover sites in lower latitudes. Flyways from breeding areas in the eastern part of Russian Arctic to wintering and stopover sites run mainly along the west coast of the Pacific Ocean and cross 22 Asian countries. The aggregate of these routes 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 accounts for the highest proportion of wetland bird populations, which are declining at an unprecedented rate especially shorebirds. Of the 63 populations of 52 shorebird species migrating along this flyway, 20 populations of 17 species may become extinct or approach extinction in the near future if no measures are taken [1, 2, 3].

Over the past 30 years, this problem has attracted the attention of many ornithologists and conservationists. The main reason for the decline in EAAF shorebird populations is the reduction of the main habitats: coastal and inland wetlands [4, 5]. Hunting is also perceived as a medium or high-level threat, but it is difficult to estimate its scale due to poor knowledge of the issue [6, 7].

The Arctic Migratory Bird Initiative (AMBI) was launched by CAFF in 2015 and aims to improve the conservation status and secure the long-term sustainability of declining in Arctic-breeding migratory bird numbers through flyway-level cooperation with Arctic and non-Arctic countries and partners. the AMBI works across the four major flyways to engage global partners to address bird and habitat conservation, including mitigation of harmful anthropogenic actions and hunting. AMBI Work Plan Goal 3 is to prevent illegal hunting and regulate the unsustainable legal harvest of Arctic migratory birds along the EAAF, with a focus on the Spoon-billed Sandpiper, Lesser White-fronted Goose, Bar-tailed Godwit, and other priority

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species. Action 3.1 initiates surveys of hunting pressure on Arctic-nesting shorebirds at stopover areas in northeastern Russia, including Chukotka, Kamchatka, Sakhalin and the mainland coasts of the Sea of Okhotsk [8]. Implementation of these activities started in 2019 by BirdsRussia in cooperation with the Northern Eurasia Wader Working Group. It is the first project aimed at the assessment of hunting pressure on Arctic shorebirds in Russia. The main aim is to identify the territories of the largest hunting pressure on shorebirds and to clarify the timing (season) of hunting them, primarily for the priority species of shorebirds (waders) of the East Asia-Australasia Flyway Partnership: Curlew Sandpiper, Red Knot, Great Knot, Far Eastern Curlew, Black-tailed Godwit and Spoon-billed Sandpiper. Special attention is paid to the Whimbrel, which is the most popular of wader for legal hunting in the Russian Far East, as well as to the most popular endangered species: the Far Eastern Curlew, Godwit, Spoon-billed Sandpiper, etc.

This paper focuses on the results of the first stage of this project in 2019 in Kamchatka. The results of the next stages – Sakhalin in 2020 and Khabarovsk Krai in 2021 – will be published later.

2 Methodology

The methodology is based on the experience of estimating waterfowl hunting in the eastern part of the Russian Arctic. It was developed by E.E. Syroechkovskiy and K.B. Klokov and was used in 1999–2006 to estimate bird harvests in 22 villages of Chukotka and northern Yakutia near the sea coast [9]. We slightly changed this method in connection to the fact that, unlike waterfowl, shorebirds are not the main object of hunting.

According to our methodology, the survey of each village includes two stages. First, an in-depth interview is conducted with 2–3 experts to identify on a qualitative level the general picture of how shorebird hunting occurs at this place and how important it is for local hunters. As a result of the interviews, we learned about the general picture of shorebird hunting in the village.

The second step was the survey using anonymous questionnaires that were filled out by the hunters themselves. The questionnaire was made as short as possible, because every extra question increases the probability that the hunter would find the questionnaire too complicated and would not want to waste time completing it.

The majority of hunters do not distinguish species of shorebirds. Therefore, in anonymous questionnaires, we mostly do not use the names of shorebird species, but ask hunters to divide shot shorebirds into the following groups:

Whimbrel, which is very popular and well known to Kamchatka hunters

other large and medium shorebirds with the exception of Whimbrel

small shorebirds.

Next, we consider results related to Whimbrel and these two groups of species. In addition, we asked to list the species of shorebirds shot if the hunter knew them, but only 6% of respondents did so.

We visited all towns and villages of Kamchatka connected with Petropavlovsk-Kamchatsky by car, except for a few villages located in the central part of the peninsula, where it is not possible to hunt shorebirds. It was much more difficult to survey remote villages, which have no automobile 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.

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

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

Snowball Method, where each hunter, when 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 discarding incorrectly filled out forms, we got 402 forms suitable for processing.

Extrapolation. The number of shot shorebirds was calculated separately for:

whimbrel

all other big and medium shorebirds except Whimbrel

all small shorebirds.

First, the average hunting bag (the number of birds shot by a hunter) for each administrative district of Kamchatka was calculated. Then the districts were unified into five groups based on their geographical features and level of participation of local residents in shorebird hunting. Then the average hunting bag in each area group was then multiplied by the number of hunters, who had received hunting permits in each of the five area groups in the previous year.

3 Main results

	Area of Kamchatka					
	North	**West**	**East**	**Centre**	**South**	**Total**
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 for 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

Fig. 1. Number of surveyed hunters and % of hunters who shot shorebirds

	Area of Kamchatka					
	North	**West**	**East**	**Centre**	**South**	**Total**
Number of hunters	275	343	481	572	3244	4915
Average number of shorebirds shot by one hunter per year						
Whimbrel	2,06	23,21	15,85	0	6,45	8,86
Big and medium species other than 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 by all hunters						
Whimbrel	566	7960	7625	0	20928	37078
Big and medium species other than Whimbrel	143	662	18	0	791	1614
Small species	444	3454	214	0	1978	6090
Total	**1153**	**1207 6**	**7857**	**0**	**23697**	**44782**

Fig 2. Estimation of number of shot shorebirds

Below are the comments by species groups.

3.1. Whimbrel

Whimbrel is a very popular bird for hunting in Kamchatka among all waterfowl and shorebird species. According to our data, 55 % of hunters harvest Whimbrel in Kamchatka in 2019. The average bag of one hunter (total number of harvested birds divided on total number of hunters who received permissions) across Kamchatka made 8.9 Whimbrels.

The greatest number of Whimbrels is shot by hunters on the western coast of Kamchatka in the Tigilsky and Sobolevsky districts. The average hunting bag (birds per one hunter) for the year was 23.2 birds, and the total number of birds shot was about 8,000 Whimbrels. In the Tigilskiy district, located to the north of Sobolevsky, the average catch was slightly lower (18.4 vs 26.6, respectively). On the eastern coast of the peninsula (Ust-Kamchatsky district), the average bag per one hunter was 15.9 birds, while the northern districts shot fewer Whimbrels – an average of 2.0 birds per year.

In the central districts, Bystrinskiy and Mil'kovskiy, the Whimbrel, as well as other shorebird species, do not stop on their 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 population of Kamchatka is concentrated in southeast of Kamchatka in the city of Petropavlovsk-Kamchatsky, towns of Yelizovo, Vilyuchinsk and nearby settlements. The total number of hunters (with the seasonal permits) in Petropavlovsk-Kamchatsky and nearby towns is 3,244 people, which is 66% of all hunters in Kamchatka. For urban hunters, the best places for hunting Whimbrels are during their southward migration. The greatest number of their stopovers are located near the town of Ust-Bolsheretsk, in the southwest of the Kamchatka Peninsula. This 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 Whimbrel taken by one city hunter is not so high – 6.5 birds, because many hunters living in the city go hunting rarely. But since there are quite a lot of hunters in the city, about 21,000 Whimbrels are taken there, or more than half of the total number of Whimbrels taken in Kamchatka.

Our results show that the average hunter's bag mainly depends on their ability to reach out to Whimbrel autumn concentrations. The total number of the birds taken depends on the number of hunters as well. In the southwest of the Kamchatka Peninsula, both parameters coincide. In Sobolevsky and Tigil'sky districts (western coast of Kamchatka) there are a lot of Whimbrels, but there are comparatively few hunters. In the east coast, in the Ust-Kamchatka area, there are more hunters but there are fewer Whimbrel than on the western coast, and the average number of shot Whimbrels is rather high. And further North, in Penzhinsky and Olyutorsky districts, there are no good places to hunt Whimbrels, as there are few hunters either (Fig. 2).

As our calculations have showen, the total number of Whimbrels shot in Kamchatka is about 37 thousand per year. This is a very large number compared to published estimates [1, 2], where the total EAAF population of the Whimbrel is supposed to be about 55,000 birds. Considering that besides Kamchaka Whimbrels are also harvested in other regions, our results suggest that the flyway population estimate of 55,000 birds for Whimbrel is significantly lower than the reality. Published observations of Whimbrel concentrations in the several staging places [10, 11, 12, 13] and our long-term observations [14, 15] in Kamchatka also confirm this. We believe that hunters of Kamchatka have the greatest impact on the Whimbrel population on the flyway. But to verify this conclusion, we need to survey other parts of the flyway.

3.2 Far Eastern Curlew and Godwits.

According to the anonymous questionnaire survey, in 2019, 9.2% of hunters shot big and medium shorebirds in Kamchatka. The average of shorebirds taken by one hunter in Kamchatka was 0.5 birds per year. the total number of harvested shorebirds is estimated at 1,600 individuals. Their spatial distribution mostly overlaps with the spatial distribution of the Whimbrel bag. On average, according to anonymous questionnaires, there was 1 large shorebird of other species for each 22 Whimbrels.

However, interviews show that hunters often shoot large shorebirds, including Bar-tailed and Black-tailed Godwits when hunting Whimbrel. Some hunters do not know the correct name for these species, though many are 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 in the Kamchatka Red Book, also in part thanks to the efforts 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 between two species of Godwits). Information on protected status does not reach hunters.

According to the interviews and other our studies in recent years, the Far-Eastern Curlew is also harvested regularly, though it has been included in the Red Data Book of Russia for a long time.

Here we should distinguish between "proper poaching", when hunters do it on purpose – they shoot all large waders that have come close to them, and "accidental poaching", when hunters shoot Far Eastern Curlews by mistake. The main reason for the error is the fact that young Curlews have a shorter bill than adults (similar to the Whimbrel's bill), and they confuse these two species.

Black-tailed Godwit has rather many significant staging places on west coast of Kamchatka. We have the data, and we ourselves have observed illegal hunting on it before the beginning of the hunting season.

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 here may not have a significant impact on the size of the whole population.

3.3 Other big and medium shorebirds

Other big species include Grey Plover and Pacific Golden Plover. Both this species migrate late and do not make any concentrations during their southward migration. However, there is no doubt that they are shot by hunters in Kamchatka. Our expert estimates are that from tens to 2–3 hundred individuals of each of these species are shot per season.

3.4 Small shorebirds

Small shorebirds are not actually an object of purposeful hunting. Many of them are non-game species in Russia, which are not supposed to be shot. According to informal interviews, hunters do not shoot them very often.the main reason of hunting small shorebirds is often the absence of other game. It is easy to shoot some small shorebirds in a flock, when the birds are sitting at the edge of the water or fly by.

According to the anonymous questionnaires in 2019, 14.3 % of hunters shot small shorebirds. The average harvesting across Kamchatka was 2.2 birds per hunter per year. The total number of birds taken calculated by extrapolation was over 6,000. More than half of the birds were taken in the western regions (Sobolevsky and Tigil'sky districts), where the average hunter's harvesting per year was 10 small shorebirds. In the other regions it was less than 2 birds per year.

When reporting the number of small shorebirds shot in anonymous questionnaires, hunters never indicate species. In interviews, hunters noted that they shoot mainly flocks of small shorebirds. They never think about the species, which they shot. With such type of shooting, it is evident that for every bird shot, there may be an equal number of wounded birds. These birds will die later, and such birds are not mentioned in either hunter questionnaires or in our calculations. So, the number of small shorebirds shot can be estimated nearly two-fold as compared with the data of the questionnaires, and the total number of small shorebirds shot, both legally and illegally, can be estimated to be at least 10,000 individuals.

When we studied the migration of birds in Kamchatka in the late 1970s and during 1980s, we noted hunting of small shorebird as a common occurrence. Now it had decreased, as probably ammunition has become more expensive. This hypothesis still needs to be tested. In the 2010s, most legal hunters with licenses reported that they rarely hunt small shorebirds, or even medium shorebirds, preferring only Whimbrels. But our knowledge on poachers, particularly in commercial salmon fishing camps is still very limited. And in Kamchatka there are hundreds of salmon fishing stations with thousands of people exactly in the period of late summer and autumn migration. The study of this type of hunting should be the subject of a special additional research. They can shoot whatever they see, including critically endangered species such as Spoon-billed Sandpiper (SBS).

As this species is very rare, the probability of this fact is not great, though the number of shot small shorebirds is rather significant. It is very difficult to estimate it. We can talk about handfuls of Spoon-billed Sandpiper shot every year. The probability of SBS shooting in the northern part of the Kamchatka west coast is supported by the fact that signal transmission from three of the nine birds with radio transmitters stopped sending signal from this area [16].

4 Conclusions and recommendations

Arctic nesting migratory bird populations are declining significantly in several regions and a conservation approach at the level of major flyways is needed to improve the status of their populations.

Our study of Arctic-nesting shorebirds hunting is the first significant research in this direction. It allowed to get the first insight into shorebird hunting in Kamchatka. To obtain a complete picture along the northern end of the EAAF, it is necessary to conduct similar studies in all other regions of the Russian Far East and Russian Arctic. Just as well, hunting assessment and monitoring in Kamchatka should be continued in order to be able to track the hunting process and obtain more detailed data.

The results of our study showed that hunting shorebirds in Northeast of Russia (the northernmost part of the EAAF) can negatively impact Arctic shorebird populations, especially endangered species. Hunting of protected shorebirds is often the reason of low level of awareness of hunters and lack of ability to distinguish shorebird species. Awareness and education must be improved.

Hunting for small shorebirds in Kamchatka has declined significantly over the past 40 years, however it still remains an additional threat to the conservation of the rare protected species, including Spoon-billed Sandpiper. In some villages it could be high.

Although our study in Kamchatka filled a significant gap, the available data on shorebird hunting in the Russian Northeast is still quite insufficient to propose and substantiate an effective conservation program for Arctic shorebirds. Also, more research needed to expand knowledge of Kamchatka, particularly of the northern areas.

The methodology we used in Kamchatka gave acceptable results. It can be used in other regions of the Russian Far East and Arctic. However, for quantitative assessment of catch of rare species (for example, the Far Eastern Curlew), it must be supplemented with other methods.

Hunting control in Kamchatka, as in the entire Northeast of Russia, is weak. For shorebird conservation, special education efforts are needed among hunters and game managers. Since hunters often shoot protected waders due to their inability to identify species and lack of knowledge about the protection status. In addition, hunting inspectors cannot control this process because they also cannot identify many species of birds.

Mainstream Kamchatka hunters are really interested in knowing the species they harvest. But there is no place where they can learn it. The publication of a field guide of waders of the Russian Far East is essential for improving the level of knowledge of hunters and hunting officers.

Various educational activities to increase the level of knowledge of hunters and game managers can also be useful. These activities can be conducted together with hunting societies and regional hunting agencies. As we found out in the course of our research, hunting societies in Kamchatka are very open for such activities, but they have limited resources.

To effectively conserve shorebirds, we need significantly more data on hunting bag. First of all, we need information on other regions to get a complete picture along the entire flyway. Secondly, it is necessary to move from a one-time survey to year-to-year harvest monitoring.

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