

Research Article

Population analysis and spring count of the number of geese in the Amur region (Russian Federation)

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Research relevance

Hunting for waterfowl is the most massive for amateur hunters in Russia. Hunting starts in spring and autumn, and the largest number of hunters take part in it, due to its popularity, low economic cost for hunters, as well as the possibility of using a hunting dog. In this regard, the role of counting waterfowl in autumn is important. The organization and conduct of accounting work should be carried out by hunting organizations annually, within certain calendar terms, and at a high-quality level.

Place of research

The Amur Region is located south of the Stanovoy Range, which separates it from Yakutia, to the Amur River and from the Small Khingan and Turan mountain ranges in the east, bordering the Khabarovsk Territory, to the upper reaches of the river. Nyukzhi (inclusive), after which the region of Transbaikalia begins. The length of the region from north to south is about 900 km, and from west to east - 1150 km. The surface of the Amur Region is mountainous and flat. The plains extend in the southeastern part - Zeya-Bureinskaya, the central part - Amur-Zeiskaya, and the northern - Verkhnezeya, the rest of the region's surface is mountainous. Plains cover about half of the region. The mountains are predominantly medium-

high. The most elevated ranges are Stanovoy in its northeastern part (up to 2414 m) and Dzhugdyr (up to 2107 m). The Zeya-Bureya Plain is located east of the river Zeya with Selemdzhoj on an area of around 4 million hectares. Two-thirds of the population lives on the Zeya-Bureya Plain, more than 86% of the sown area is developed, and most of the industrial enterprises of the region are located here. The climate of the Amur Region is sharply continental with monsoonal features due to the influence of the Asian continent and the Pacific Ocean. The impact of the mainland is manifested mainly in winter, and the ocean - in summer. Spring in the Amur region is dry, cold, and protracted, especially in the northern and northwestern mountainous parts [1].

Material and methods

Accounting work was carried out on 14 territories of the structural divisions of the Amur regional public organization "Russian Association of Public Associations of Hunters and Fishermen". Accounting time: from April 01 to May 18, 2022.

All types of geese migrating in the spring through the territory of the Amur Region were taken into account, according to the following methods:

1. Accounting for geese in aggregations at feeding places;
2. Accounting of waterfowl during the spring migration.



All who took part in the count: scientist's biologists, hunting biologists, 1 narrow scientific ornithologist, a teacher of biology and geography, as well as experienced field workers, and volunteer hunters - about 200 people with many years of experience in spring counting of waterfowl. 323 registration cards processed. 208 people took part in the bird count at 48 permanent field and forest sites Table 1.

The results of the work in the field were processed by an analytical group of biologists with careful analysis and the use of modern methods in the field of hunting and with a comparative analysis for previous years.

Accordingly, were made conclusions and given recommendations on the organization and conduct of accounting work of waterfowl, the protection and rational use of their populations.

Research results

For the first time in the last 10 years, the temperature regime in the second quarter of 2022 was significantly below the norm, with deviations of 7-9 °C on some days. The total amount of precipitation in most areas did not exceed long-term values, since during April there were 2-3 times heavy precipitation (depending on the place of our observation) and 5-7 days with heavy cloudiness. April was much cooler and windier than usual, especially in the second and third decades. Atmospheric processes took place against the background of the western transfer of air masses. After active cyclones and atmospheric fronts passed through the territory of the region, the weather conditions changed dramatically.

Precipitation in April and early May was distributed quite evenly over the territory of the region.

In most areas of the region, temporary snow cover was repeatedly set both in March, and April and also in May.

Many hunters no longer remember such a cold spring and were forced to take a more serious approach to prepare for the hunt, they used warm tents with heating, and stoves in cars for overnight stays, as well as thermal underwear, insulated places of sitting and hiding places. The 2022 hunting season, in terms of temperatures, turned out to be very cold.

Against the background of the zonal type of circulation, varying intensities of rain fell across the region. What led to the rise of almost all the rivers of the region? But in April and the first decade of May, the increases were insignificant and did not affect the hunting economy of the region.

Waterlogging of the soil occurred only in lowland areas and did not affect the start of agricultural work, what cannot be said about the low average of daily temperatures and the presence of snow cover on the fields in mid-April? Therefore, agricultural sowing began a little later than usual, which in turn had a positive effect on the birds, who did not experience a large factor of disturbance during this period in the fields of the Zeya-Bureya Plain. Hunters did not interfere with agricultural machinery to work in the fields.

It should be noted comfortable hydrological conditions in April 2022, allowed many amateur hunters to use the usual equipment typical for the Amur Region (UAZ cars and Japanese-made jeeps) for outdoor recreation and waterfowl hunting.

The territory of the Amur Region is one of the key migratory territories for birds in the Far East and in the whole of Russia. The wintering grounds of the geese flying over the region are the land of Southeast Asia. The movement to the north during the nesting period occurs from the lower reaches of the Amur through vast agricultural fields along the river valley to the intersection with the Zeya River. Further, along the Zeya floodplain goes to Yakutia, crossing the Stanovoy Range to the Aldan floodplain. For migratory birds, this area is a significant place to stop for rest, feeding, or waiting out good weather conditions to fly.

The agricultural fields of the region have all the necessary conditions for rest and feeding for birds during this period. The main routes of passage and places of geese mass gatherings are concentrated mainly in the southeast of the Amur Region, where there are extensive wetlands, sandy sections of the Amur River, spring puddles, and agricultural land with the remains of agricultural crops: soybeans, corn, barley, wheat, oats. All this contributes to the formation of good fodder and protective conditions on the territory of the Zeya-Bureya Plain.

On the territory of the Amur Region, the spring migration of waterfowl is extended: from the end of March - the first days of April to the end of May (between 20.05-25.05). The spring migration of geese begins from the southern regions of the region, where the birds move along the Amur and Zeya to the north. One of the first mass species appearing on the migration is a polytypic species - *Anser fabalis*, which has 4 subspecies. Namely, representatives of the subspecies *Anser fabalis serrirostris* with a small amount of *Anser fabalis middendorffii*. At the end of April and until the end of migration,

Table 1: Number of processed cards.

Structural subdivision	Number of account cards
1. Arkharinskoe	18
2. Blagoveshchenskoe	27
3. Bureyskoe	18
4. Ivanovskoe	34
5. Tambovskoe	27
6. Magdagachinskoye	12
7. Mikhailovskoye	33
8. Konstantinovskoe	46
9. Octiabrskoe	23
10. Zavitinskoe	19
11. Zeyskoe	23
12. Seryshevskoye	14
13. Belogorskoe	12
14. Romnenskoe	17
Total for all hunting areas	323



other subspecies of the bean goose appear: *Anser fabalis fabalis* and *Anser fabalis rossicus*.

The main diagnostic features of these subspecies are the shape and size of the beak (size, color, shape of the beak and mandible), plumage color, size, and body weight of the bird. In the second half of the spring migration period, other species of geese are also observed. Monotypic species are the red-breasted goose, lesser white-fronted goose, and swan goose, represented by one nominal species.

In general, the presence of 8 species of geese from the subfamily Anserinae with different patterns of occurrence was recorded in the Amur Region: nesting species – *Anser fabalis serrirostris* and *Anser fabalis middendorffii*.

Such vagrant species are rarely observed: gray goose (*Anser anser*) and white goose (*Anser caerulescens*). Common migrants are *Anser fabalis rossicus* and the western taiga subspecies of the bean goose *Anser fabalis fabalis*, *Anser albifrons albifrons*, and *Anser erythropus*. Migratory species appear with very low abundance – *Branta bernicla*, *Branta ruficollis*, and *Anser cygnoides*, which are represented by nominal species.

The largest representatives of geese are the taiga subspecies of bean goose (5–6 kg), here the hunting process is most reckless and occurs in the first half of the migration period. In the second half, goose hunting is also present, but in smaller numbers. At this time, the goose is smaller in size within 3–4 kg.

Spring counts of geese are regular events that are carried out by hunting farms, biological departments, departments of universities, and amateur ornithologists. Based on long-term accounting data of spring migrations, the areas most visited by geese are Arkharinsky, Bureysky, Zavitinsky, Konstantinovskiy, Mikhailovskiy, Tambovskiy, Ivanovskiy, Blagoveshchenskiy, Oktyabrskiy. It is in these areas that a good forage base is located – many fields with crops of soybeans, corn, and cereals with the remnants of last year's harvest, as well as a developed network of small rivers, lakes, ponds, sowing fields with puddles for rest and overnight stays.

The main factors affecting the period of flight of anseriformes are climatic and weather conditions, and lack of areas flooded with water. Spring may come earlier than the average multi-year period by 10–20 days. This allows the birds to arrive earlier than usual, even in the central and northern areas of the region. Such cases are accompanied by periodic cooling and snowfalls, which cause a partial return to the more southern regions and to the Amur floodplain, where the birds wait out the bad weather. And on the contrary, during abnormally warm and long autumn.

Important factors include factors of concern: spring agricultural fires, early spring arable work, and other economic and technical activities taking place in the flyway areas. The reaction of birds to disturbance factors is accompanied by their dense location in the territories of nature reserves and sanctuaries, as well as in protected areas of the border floodplain of the Amur River.

As our long-term studies (more than 20 years) show, spring hunting for waterfowl does not have a significant impact on the number of geese in the Amur Region, due to low productivity and a low percentage of withdrawal. The only thing that deserves discussion is the anxiety factor that is present at this time, created, as a rule, by inexperienced hunters and ultimately further lowering the effectiveness of hunting and the mood of “real” experienced hunters who have been waiting for this moment all year.

Table 2 presents summarized data on the state of the goose population during the period of migration in the lands of the Amur Region.

According to an expert assessment of hunting biologists and ornithologists who took part in the census, the estimated number of geese that were on migration in the spring of 2022 is as follows Table 3.

Conclusions and recommendations

Due to the fact that at different times the same geese flew over and concentrated on the territory of different farms, the total number of the migratory population of geese in the Amur Region in 2022 slightly decreased compared to last year and can reach 75,000 individuals. Exactly this number, according to the accounting cards, after comparison by farms, taking into account time characteristics, that was (flew) through the hunting farms where accounting work was organized.

According to the information of hunters, the first individuals of geese in the southern regions flew to the Mikhailovskiy farm on March 12 in the amount of 20–25 individuals (observed by the accountant Vladimir Sergeevich Zakharchuk), to the Arkharinskoye farm on March 14, in the Bureya SP the first geese were seen on March 27 in the area of the village Bezozeroe.

In 2022, many accountants note the uneven span due to abnormal weather conditions at the beginning of the second

Table 2: Summary table of counting geese on migration through hunting areas.

Structural subdivision	Accounted for overflight
1. Arkharinskoe	Over 2500
2. Blagoveshchenskoe	Over 4000
3. Bureyskoe	Over 3500
4. Ivanovskoe	Over 6000
5. Tambovskoe	Over 7000
6. Magdagachinskoye	About 1000
7. Mikhailovskoye	Over 20000
8. Konstantinovskoe	Over 20000
9. Octiabrskoe	Over 7000
10. Zavitinskoe	Over 1500
11. Zeyskoe	Over 1500
12. Seryshevskoye	Around 1500
13. Belogorskoe	Around 1500
14. Romnenskoe	Around 1500
Total for all hunting areas	Over 78500

**Table 3:** Expert assessment of biologists and experienced hunters.

Hunting grounds	Individuals
1. Arkharinskoe	8000
2. Blagoveshchenskoe	6000
3. Bureyskoe	5000
4. Ivanovskoe	12000
5. Tambovskoe	12000
6. Magdagachinskoye	1000
7. Mikhailovskoye	14000
8. Konstantinovskoe	20000
9. Octiabrskoe	8000
10. Zavitinskoe	3000
11. Zeyskoe	1500
12. Seryshevskoye	3000
13. Belogorskoe	3000
14. Romnenskoe	2000
Total for all hunting areas	About 98500

quarter in the Amur region. So such a “mass passage” of geese was not observed, but several “waves of passage” were noted. The first wave began in early April and continued until heavy snowfall on April 5, when a stable snow cover covered all the fields of the Zeya-Bureya Plain. The second wave began on April 7 and did not last long – until April 10, but the goose flew quite actively across the south of the plain from China, and shifts of the species were also observed on the Khingan-Arkharin lowland (Arkharin district). The third wave began on April 12–13 and lasted until April 26, when heavy precipitation began again and snow fell even in the southern regions (the village of Vinnikovo). The fourth wave, quite active, began on the May holidays, and thus gave hunters a reason to enter into an active discussion about postponing the hunting period to a later period, namely to the May weekend.

According to the count of the number of geese at the feeding grounds in the spring of 2022, the first registration of birds was noted in mid-March (Mikhailovskoye farm). The highest concentration at feeding grounds in the Amur Region was noted in the Konstantinovskoye and Mikhailovskoye farms.

The beginning of migrations is associated with the subspecies *Anser fabalis serrirostris* with a small number of subspecies *Anser fabalis middendorffii*.

Despite the weather conditions, in general, the passage was massive, and the accountants noted large accumulations of geese in Mikhailovskoye, Konstantinovskoye, Oktyabrskoye, Ivanovskoye, and even Zavitinskoye (near the village of Boldyrevka) areas.

In good weather, a stable pattern of migration of geese was observed throughout the period of April until May 10. During this period, most of them are concentrated in the Arkharinskoye, Konstantinovskoye, Mikhailovskoye, Tambovskoye, and Ivanovskoye farms. The period of mass passages was in the period from the beginning of April to the first days of May (01.04 – 01.05. 2022).

At this time, in some places, the number reaches up to 25–30 thousand individuals or more (Tambovskoye, Ivanovskoye, Konstantinovskoye). The smallest number of geese during this period was noted in the Zeya and Magdagachinskoye farms. To the north, the mass arrival of geese at this time is just beginning. In the Magdagachinskoye and Zeya farms, no mass migration was observed until the end of April, the goose “went” in May.

At the end of April and until the end of migrations (from 25.04 – 20.05), besides *Anser fabalis serrirostris* and *Anser fabalis middendorffii*, subspecies of the bean goose appear: *Anser fabalis fabalis* and *Anser fabalis rossicus*. Their share is quite noticeable and for the period of their presence reaches up to 25%. In general, the share of bean goose for the entire period of passage averages 70%. At the same time, other species of geese appear white-fronted goose, white-fronted goose, white-fronted goose, swan goose, and gray goose, which, in general, reach up to 3% of the total number, mainly due to the number of white-fronted geese.

Information on duck counts during the spring migration in 2021 is as follows. The first ducks appear in the last days of March, mostly mallards. From mid-April, the teal cracker also appears.

Mass passages of different types of ducks fall on the period – the end of April to mid-May. The number of passages is uneven.

Mass passages of ducks end on May 10–15, and single migratory flocks are observed in the northern regions until May 20.

Anatidae in the Amur region are distributed fairly evenly, they are not attached to certain places and water bodies, unlike goose birds.

The following factors should be attributed to the features of the passage of geese in the spring of 2022:

- The beginning of the flight began within the annual observation period, in some areas with a delay of (3–7 days);
- After the first birds there was a significant break in migration;
- In March, the birds kept to large rivers, mainly the Amur;
- Overnight stays of geese in March were mainly on the territory of China;
- Due to the very cold and long spring of 2022, geese were observed in the south of the region until May 23, including on the Zeya-Bureya plain;
- The flight of the bean goose was quite massive and very extended in time (from 12.03 to 23.05);
- The passage of the white-fronted goose was not massive, but nevertheless, its share sometimes reached 25–30% in late April–early May.



- Due to the peculiarities of accounting in 2022 (weather conditions and several extended waves of migration), there was a decrease (possibly underestimation) in the number of species, but nevertheless, over the past 15-17 years, there has been a steady upward trend in the number of geese on migration in the region.

The opening of hunting for geese in the south, and geese and drakes in the north was a positive factor for the hunting economy of the Amur region. "Simple" hunters got the opportunity to relax in nature and get the long-awaited trophy. Goose hunting does not cause significant damage to the population of birds migrating through the region. This is confirmed by long-term (more than 20 years) observations of the migration, as well as accounting work and questionnaires from hunting workers, biologists, ecologists, and ordinary hunters.

Regarding the postponement of hunting to the beginning of May, it should be noted that the expert opinions of biologists, hunters, rangers of farms, and ordinary hunters differ in many respects, but this is a discussed issue for any region of the Russian Federation. In our opinion, there are several factors that must be taken into account when organizing mass hunts in the Amur region:

1. The mass arrival of birds, providing a chance to catch a bird (it is very difficult to get a goose, many hunters cannot get the desired trophy for years);
2. The Amur region belongs to the region with a high degree of "burning" in the spring (this factor must be taken into account);

3. Beginning of spring-mass agricultural work (mainly for soybeans).

The hunting farms of the Amur region have learned to analyze these factors and are able to determine the most favorable conditions for spring hunting and provide Amur hunters and nature lovers with a spring holiday, as well as support their economy and replenish the regional budget with tax deductions Figure 1.



Figure 1: Happy hunter with dog friend and coveted geese trophies.

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