Formation of a “cold” winter of shorebirds and waterfowl in the source and upper current of the river Angara (South Baikal) and its causes

Yu Mel’nikov, A Kupchinskiy and V Fialkov
Baikal museum, Irkutsk Scientific Centre, Listvjanka, Irkutsk Oblast, Russia

E-mail: bm@isc.irk.ru

Abstract. On the basis of many years of research (1972-2019), the peculiarities of the formation of “cold” wintering of near-water and waterfowl in the source and upper reaches of the Angara river are considered. Despite the fact that it has been for a very long time studied, this issue has not yet received proper coverage in the scientific literature. Until now, there are different opinions about the reasons for its formation - sometimes very controversial, which requires a more complete analysis of the available materials. We found out that the formation of wintering is associated with delays in the departure of birds that have not accumulated a sufficient amount of plastic substances necessary for the continuation of migration. Late freezing source and upper course of the Angara river (mid-January - early February) allow birds to stay for a long time. Here, due to the huge mass of water heated in summer, which increases the temperature of the surface air layer in the late autumn and early winter periods, a thermal is refugium formed. However, by the time the birds are able to continue their migration, it becomes impossible. Permanent snow cover and very low air temperatures are in the surrounding areas established, and all lake systems freeze. This thermal refugium, into which birds, delayed with flight, gradually move, becomes an ecological trap, and the “cold” wintering itself is forced.

1. Introduction
The issues of biology of near-water and waterfowl birds of natural “cold” wintering grounds [1], in contrast to anthropogenic “cold” wintering grounds that form in large cities, are still very poorly studied [2-6]. The reasons for the formation of natural “cold” wintering grounds, often characterized by very harsh climatic conditions, have not yet been clarified. In this regard, the study of the Siberian natural wintering grounds of this group of birds, which form in very harsh environmental conditions, is of great scientific interest. Their study in the Baikal region has been going on for quite a long time (the first information was at the end of the XYII century received) [7], however, poorly developed research methods did not allow making certain conclusions about the reasons for their formation. And only in the second half of the 20th and the beginning of the 21st centuries, information was obtained that made it possible to solve this issue [8-16]. This paper analyzes the materials collected over a long period of time (most of the last century). The reasons for its formation in this area, which is by extreme winter conditions characterized, are also in sufficient detail considered.
2. Area of work, material and method
The source and upper course of the Angara river are a non-freezing section of the river, the existence of which is due to the rapid current and the suction of warm deep waters from the lake Baikal is in the upper part of its source [17]. The length of the section of open water currently reaches 14 km in mild winters, and in very severe winters it is reduced to 1.0–1.5 km [9, 17]. However, in severe winters, a series of wormwoods of various sizes is on its main area covered with ice formed, on which wintering birds also keep. Here is one of the largest “cold” wintering grounds for shorebirds and waterfowl of Eastern Siberia (in the most favorable periods up to 32.0 thousand individuals) [10]. In this regard, this wintering is a Key Bird Area (IBA), which has the status of the international level - A4 [18].

Angara is the only river flowing from the lake Baikal. The close proximity of a huge lake (23,000 km3) and the mountainous surroundings form a special microclimate at its source. Due to the thermal inertia of the lake water masses slowly warming up in spring and cooling down in autumn, the continental climate of this part of Eastern Siberia, which has a coastal character here, is significantly smoothed out [19-20]. In the upper section of the source, it is further by the impact of the Irkutsk reservoir reduced. Under normal conditions, winter begins here at the beginning of the first decade of December, and in the warmest winters only in its second decade. Its duration is about 4.5 months - until the third decade of March. At the beginning of winter, strong and long-lasting fogs (lasting for days) are characteristic, sometimes even at high wind speeds - up to 40 m/s and fairly severe frosts [19-20].

The average minimum air temperature in winter at the source of the Angara river are -19 ... -22 °C. During long inflows of cold air, in the rear of the passing polar cyclones there is a decrease in temperature to -43 ... -47 °C. At the same time the average temperature in January, as the coldest month, is -17.8 °C. The average freeze-up date on Southern Baikal earlier (the beginning of the second half of the XX century) was on January 7-9, and at the beginning of the XXI century, due to a strong climate warming - on January 14. The level of current climate warming in winter was very high. From 1968 to 2007, the average air temperature increased by almost 8.0 ° C, and now it is possible even more [21]. In the second decade of the current century, in some seasons, freeze-up on South Baikal was in the first five-day of February observed [11, 13, 19-20]. After the freezing of the lake, there is a sharp drop in air temperature [19-20] and during this period it no differs from the surrounding territories. Complete, at least fleeting, freezing of the source of the river Angara are very rarely - once every 200 years observed [22]. According to modern materials, it froze three times in 2.5 centuries and only with ice surges from Baikal. Ice fields, falling into the source of the river Angara completely blocked the river-bed and lingered here from one or two days to a week or more [17]. In this case, the preservation of wintering birds was by a series of floors in its upper reaches ensured.

Of great importance for the freezing of the source and upper reaches of the Angara river, as well as the severity of the weather, are by the Baikal winds influenced. The greatest strength is by “Mountain” reached [17]. In the cold period of the year, the average values of the “mountain” velocities throughout the entire water area of Lake Baikal are significantly higher than those of the prevailing winds of other directions - up to 40.0 m/s. In the area of the Larch Bay of Baikal (the source of the Angara River), the maximum frequency of this type of wind (82.0%) is observed, with streamlines of northwestern and western directions [17, 19]. After the construction of the Irkutsk hydroelectric power station, the wintering areas of waterfowl are a series of polynyas coming from the source of the river Angara to the village of Talziy and somewhat lower (very mild winters). The largest polynya is located at the source of the Angara river, from 1.0-1.5 km to 3.0-4.0 km, sometimes more. The area, shape and number of polynyas can vary greatly depending on the weather conditions of a particular year. At present, due to climate warming, the middle of the Irkutsk reservoir up to the village of Bolshaya Rechka remains free of ice for most of the winter period.

The use of several methods for counting wintering birds has shown that the results obtained on their basis are very noticeably different [4, 6, 8-10, 13-16, 22-23]. With regard to the improvement of accounting work, only two approaches have been preserved: accounting from the right bank, using a telescope [6, 14, 16], as well as from an air-cushion ship SVP HIVUS-10 with two hatches [13]. The results of the hovercraft survey give higher numbers and are methodologically more well substantiated.
In addition, they are in good agreement with previous foot surveys on ice [9], which give the most accurate results. Therefore, precisely, these methods were by us in this work.

To clarify a number of issues related to the formation of “cold” wintering of shorebirds and waterfowl in recent years, remote monitoring has been used, which makes it possible to conduct continuous observations over long periods of time [24-25]. In this regard, the accuracy of such observations increases dramatically, making it possible to avoid errors in the conclusions. In addition, remote monitoring using webcams is one of the most promising methods for observing animals that does not violate the natural background of their vital activity [24-25]. This allows the formation of large arrays of archived data that can be viewed and processed at any time and receive more accurate and complete information on the biology of the species under study.

In the work, both ground and underwater surveys were used in the depth interval from 5.0 to 200.0 m. Cameras were installed in the Larch Bay of Lake Baikal, in the immediate vicinity of the source of the river Angara. This made it possible to track the features of the formation of flocks of birds, as well as their movement between the bay and the source of the river Angara. With the help of underwater surveys, the abundance of food resources and their species structure were established. In addition, in a number of cases, it was possible to observe the direct feeding of diving birds, as well as the methods of catching fish with their specific species. When necessary, the standard statistical processing of the obtained information was carried out using parametric and nonparametric methods [26].

3. Results
It is currently believed that at the source of the river Angara in December gather all birds that have not flown to the south. At the same time, there is a lot of information about the formation of large concentrations of birds in the bays and bays of Lake Baikal in late autumn and early winter. The basis of the “cold” Angara wintering grounds for waterfowl (up to 95.0-97.0%) is the goldeneye Bucephala clangula, a species that widely uses in its diet various species of fish and lower crustaceans, obtained on the basis of diving (sometimes at a rather large depth - up to 14, 0 m). It should be noted that at this wintering site, only animal-eating ducks are found in large numbers (up to several hundred) (Goldeneye, Long-tailed Duck Clangula hyemalis, Goosander Mergus merganser and Red-breasted Merganser Mergus serrator), and other species are found in insignificant numbers or even single birds. Roughly in the same ratio, waterfowl at this time are noted in the coves and bays of Lake Baikal. This emphasizes that the specificity of feeding has a great influence on the formation of the species composition of birds that are here during the “cold” winter found.

Large clusters of diving ducks begin to occur as early as the second half of October, when the abundance of migratory ducks sharply decreases, most of which leave North Asia in September. Directly in the wintering area in the second half of the last century at the end of October, after the freezing of the main part of the shallow bays of the Irkutsk reservoir, there were from 7.0 to 10.0 thousand Goldeneyes, i.e. their number here was very close to the abundance at wintering (11.7-15.0 thousand birds) [9]. At the same time (early November) in the Kultuk Bay on the southern tip of Lake Baikal, as a result of aerial surveys, we recorded up to 2,000 ducks (mostly Goldeneye) [27]. On large clusters of Goldeneyes along the edge of the Selenga river delta at the end of October is indicated by N.G. Scriabin [15]. He believes that most of them fly off to the south, and some move to the wintering area at the source of the river Angara. In the mid-80s of the last century, we observed a very large number of diving ducks along the outer edge of the Selenga delta in the first half of November (from 5.0 to 8.0 thousand birds). T.N. Gagina are indicate on the no big winterings in differ plots lake Baikal [22]. Large autumn clusters of Goldeneye were also in the Barguzinsky and Chivyrkuisky bays of Baikal noted [8].

According to numerous observations, flocks of diving ducks on Northern Baikal gradually retreat to the south as the lake Baikal freezes coming from the north. Birds, gradually moving to the south on the western and eastern coasts of Lake Baikal, reach the places of the most mass concentration of birds - of the Selenga river delta and the source of the river Angara. These are areas with the most optimal conditions for birds to live in late autumn and early winter. Consequently, at the source of the river Angara gather, mainly, ducks that have not flown to the south and kept along the western coast of the
lake Baikal, since no one has registered bird migrations from the eastern coast to the western coast. We recorded at the same time departure from the source of the river Angara in an eastward direction to the opposite shore repeatedly (figure 1).

Numerous and long-term observations also confirm that in the small creeks and bays of the western coast of Lake Baikal in November and December, birds keep, which can also fall on the “cold” wintering at the source of the river Angara [9-11, 18]. However, a significant shift in the timing of departure of the last wave of migrants at the beginning of the 21st century could have made certain adjustments to the migration processes of birds (figure 2). The migration of the last wave of diving ducks currently passes, on average, 7 days later than in the second half of the 20th century (14.9 ± 0.84 and 22.2 ± 2.92 November, t_{13} = 2.4 > 2.16 = t_{13}; 0.05, P <0.05) [9, 11]. In 2013, was a very long and warm autumn observed. The last flocks of Goldeneye and Common Gull Larus canus, in which some birds of the Mongolian Gull Larus (vegae) mongolicus and the Vegae Gull Larus vegae were recorded, left the source of the river Angara in the first five days of December [11].

The first flocks of diving ducks appear along the coastal, shallower, edge of the western coast of the lake Baikal and Larch Bay (the source of the river Angara) at the end of October. It is very noteworthy that among them there are often small flocks (from 5-7 to 10-12 birds) of the White-winged Scoter Melanitta degla

Figure 1. Plots of large clusters, places of formation of "cold" winterings and movements of waterfowl on South Baikal in the late autumn and early winter periods. Source: Compiled by the Yu Mel’nikov.

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night. However, after the complete freezing of Lake Baikal, such departures caused bewilderment - where do the birds spend the night? On this occasion, many hypotheses were forward put [8-9, 11-12, 15, 22, 27-28], none of which received confirmation.

Figure 2. Late autumn migration and dynamics of departure of shore birds and waterfowl to spend the night in the lake Baikal at the source of the Angara river (1983-90). Conditional signs: 1 - the last migratory wave, 2 - dynamics of the departure of wintering birds to spend the night in the lake Baikal. Source: Compiled by the Yu Mel’nikov [11].

Most researchers were inclined to think about the overnight stay of birds in the snow and snowy hummocks. There were facts confirming the overnight stay of birds in such shelters, incl. and found by us [9]. However, there were very few such finds, in comparison with the number of wintering birds. The increase in the technical equipment of the researchers made it possible to survey all the potentially possible areas of Lake Baikal, suitable for the nights of birds. The finds of such overnight stays were rare. Traces were of overnight birds, left in hummocks after fresh snowfalls, usually recorded. Since the end of the 20th century, as the climate warmed, the departure of birds to Baikal gradually stopped. This indicated that it was caused by the very harsh conditions of overnight stays in the Irkutsk reservoir.

At the same time, a number of facts did not allow one to fully with this opinion agree. First of all, this concerned the general dynamics of the departure of birds to Lake Baikal. It gradually grew as wintering developed and stopped by mid-January (figure 2). By this time, normally all birds of these species reached southern wintering grounds. Their migratory activity completely ceased, although the possibility of moving between different wintering sites over sufficiently long distances remained. As is known, the migratory activity of birds is determined by the length of daylight hours [29] and this factor should act in migratory birds at any point in the area. Another factor no less important was by us in the course of night observations at the “cold” wintering identified. The birds that flew to Lake Baikal returned to wintering again at night [9]. The time interval between departure and return was about 3.0 hours. During this time, they could reach the passes of the Khamar-Daban ridge, which, due to extremely harsh winter conditions, is insurmountable for them during this period and back return. Consequently, the reason for the departure of birds to Lake Baikal in the late autumn and early winter periods is the increased migration activity and the desire to fly to the southern wintering grounds. Harsh winter conditions on the flight route returned the birds to the starting point of mass stops - “cold” wintering in
the source and upper reaches of the river Angara [30]. Undoubtedly, this wintering for shore birds and waterfowl is forced [12] and is due to the specific conditions of this region of Lake Baikal in the late autumn and early winter periods [30].

This conclusion is also by observations confirmed of another rather large group of birds that occur at this wintering in these periods - gull birds. In the second half of the 20th century, gull birds remained for “cold” wintering in much larger numbers - up to 300 individuals. Among them, the Mongolian Gull *Larus (vegae) mongolicus* and the Vegae Gull *Larus vegae* were sharply dominant, while the Common Gull was in insignificant numbers found (no more than 20-30 birds, usually up to 10 birds). However, already at the very beginning of the XXI century, their numbers began to decline sharply, and in the last years of observations (2015-2020) in the first half of November, no more than 10 birds were recorded (figure 3) [31]. In 2019-2020 by this time gull birds have completely left the source of the river Angara. The main reason for this is the very warm and long autumns. The birds, which did not have the opportunity to continue the flight and were delayed with the departure, during the warm period managed to collect the necessary amount of plastic substances necessary for the continuation of migration. They left the hibernation before the establishment of severe cold weather, frosty weather and permanent snow cover, which impeded normal migration.

![Figure 3. The general trend of changes in the abundance of wintering White-headed Gulls in the source and upper reaches of the river Angara at the beginning of the formation of "cold" wintering (late November - early December). Source: Compiled by the Yu Mel’nikov [31]](image)

The abundance of the most widespread species of the “cold” wintering - Goldeneye, in comparison with other waterfowl, is much higher. Therefore, there are always groups of birds that do not have time to accumulate the required amount of plastic substances in the available period and stay much longer at places of mass rest stops. They mainly form this “cold” wintering. However, the mechanisms of its formation in birds of different groups are essentially the same. This is by the general trend towards a decrease in the number of wintering waterfowl to date confirmed [13]. This pattern is due to the specificity of not only climatic conditions, but also the breeding conditions of birds in different parts of the area. Goldeneye is characterized by massive repeated reproduction on the mountain rivers of Eastern Siberia, caused by the high mortality of the first clutches as a result of strong floods in the middle of summer. The last broods rise “on the wing” very late (second half of October), which greatly increases the total duration of bird migration. Warm late autumns are favorable for the survival of these broods. They also create the prerequisites for massive delays of such birds at stopping places and additional replenishment of plastic substances before a large migratory rush to the south. In the specific conditions of the source and upper reaches of the river Angara, conditions are being formed, which are an ecological trap for late migratory birds and the basis for the formation of a forced “cold” wintering.
Special observations of the final formation of "cold" wintering in the source of the Angara river, usually falling on the period of complete freezing of the lake. Baikal (mid and second half of January and, as an exception, the first five days of February), help to clarify the details of its complete formation. Analysis of video archive data for the 2014-19 season at the source of the river Angara, shows that during the formation of a continuous ice cover in the Larch Bay of Lake Baikal, quite large openings remain in it. On many of them, Goldeneyes are kept in small flocks from 15-20 to 45-50 birds. Their total number can be estimated at several hundred birds (using extrapolation, no more than 300). At the same time, the departure of birds from the polynya at the source of the river Angara towards the lake Baikal is insignificant. These are single small flocks settling for feeding and resting in the immediate vicinity of the source. The final formation of the "cold" wintering of waterfowl falls on the period when the openings of the Larch Bay freeze (usually mid-January). Birds from small wormwoods gradually move to the source of the river Angara. In addition, a chain of polynyas of various sizes can be in the ice cover of the river Angara to the village of Taltsy traced. Some of them have an area of 1.0 to 3-5 km².

Ice situation at the source of the river Angara can change significantly several times during one day. Surge ice from the Baikal side closes the bay, and strong winds along the river valley Angara ice back to Lake Baikal push, completely revealing the Larch Bay. During such periods, a large number of birds keep along the coastal fast ice along the entire edge of Listvenichny Bay, diving under the ice while feeding. Birds are throughout the entire open part of the bay found, but active feeding is only at the coastal edge observed. Obviously, the great depth of the bay impedes the successful feeding of birds that get food, mainly in shallow waters along the coast. Ice surges are by the concentration of birds in the ice holes accompanied. However, the mass migration of birds from the wormwood to the open section of the source of the river Angara, as well as along the river valley Angara is observed at this time not.

4. Discussion
"Cold" wintering of near-water and waterfowl at the source of the river. Angara is the largest in Eastern Siberia and in some seasons the number of birds here reaches 32.0 thousand [4, 9-10, 18]. Despite the long-term study, some issues of the ecology of birds that are here during wintering need additional development found. In this case, the cinematic method is extremely promising, the possibilities of using which were considered at the beginning of the last century [32-33]. The basis of modern analysis is the method of multiple working hypotheses [34]. It allows by enumerating working hypotheses to approach the solution of the problem gradually. For our problem, such working issues include the features of its formation in the late autumn and early winter periods. As a result of long-term investigations, it was shown that this wintering is formed due to a wave of late migrants, consisting mainly of re-breeding birds [11]. They are based on one of the most widespread species of waterfowl in Eastern Siberia - the Goldeneye [8-9, 13, 15, 18].

The data obtained indicate that the nature of the formation of wintering, compared with the second half of the 20th century, has not practically changed. However, there is a rather significant shift in the timing of its formation to a later period. The final formation of wintering can be considered the time of freezing of the deepest parts of Lake Baikal opposite the source of the river Angara. Undoubtedly, the birds that did not fly to the southern wintering grounds are gradually accumulating in small coves and bays of Lake Baikal. They move along the coast of the freezing Lake Baikal to the source of the river Angara. A fairly large number of Goldeneyes (up to 2000 and more birds), noted in the area of the Kultuk Bay, most likely gradually moves to the delta of the river Selenga, since a well-defined flight of birds along the southwestern coast of Lake Baikal has never been observed.

The statement of N.G. Scriabin [15] on the movement of Goldeneyes from the edge of the river delta Selenga, where several thousand birds accumulate in late autumn, at the source of the river Angara is not substantiated and currently has no confirmation. Such a massive arrival of waterfowl in late autumn or early winter from the eastern side of Lake Baikal to the source of the river Angara have never been observed. At the same time, the last large migrating flocks of Goldeneye (up to 3.0-4.0 thousand birds)
and Common Gulls (up to 100-120 birds) along the river Angara were recorded in a very warm autumn of 2013 in the first five days of December [11]. In addition, at this time for shore birds and waterfowl are by massive movements only in migration directions characterized, in this case to the south. These birds, undoubtedly, continued their migration in the southern directions and the physical and geographical conditions of Western Transbaikalia at this time allow for such a passage.

The huge water mass of Lake Baikal, having over the summer warmed up and accumulated a large amount of heat, very slowly releases it into the environment, noticeably warming the adjacent territories. This phenomenon is quite typical for the Irkutsk reservoir, although warming here is to a much lesser extent expressed. However, the warming influence of Baikal can be along the river valleys open to its side traced, at a distance of about 40 km, which clearly enhances the effect of the influence of the Irkutsk reservoir [21]. As a result, a large thermal refugium with positive air temperatures is here in the late autumn and early winter periods formed [11, 18–20, 30–31]. In comparison with the adjacent territories, it is often 5–8 °C higher here, and sometimes even more [19–20, 31]. It is interesting that the warming effect of a large water mass can be along the river valley traced the Angara are below the dam of the Irkutsk hydroelectric power station, but here it is noticeably smaller in comparison with the territories located near Lake Baikal [14–23]. The warming effect of Lake Baikal ceases after its complete freezing. In this regard, subsequent wintering conditions can be very harsh and sometimes catastrophic for birds [4, 9].

The biological aspects characteristic of wintering species and contributing to the formation of wintering grounds of this type are due to the specific characteristics of the breeding of shore birds and waterfowl in the conditions of the mountain-floodplain water regime [11]. For this regime is by strong but short spring floods and several summer floods characterized, sometimes in the form of floods. They are formed due to the intense melting of snowfields and glaciers in the mountains as a result of prolonged hot weather or intense precipitation. As a result of strong flooding of mountain river valleys, as well as rivers with mixed feeding, a large number of clutches perish in their lower reaches and birds are forced to start re-nesting, the possibility of which remains in pairs whose nests died in the first half of incubation [35].

Chicks from such (compensatory) clutches “get up on the wing” very late and do not have time to accumulate a sufficient amount of plastic substances (fat) necessary for a long flight by the time of mass migration. In this regard, they are characterized by short migratory rushes with frequent stops for rest and replenishment of energy resources necessary for the continuation of migration [11, 29]. In late autumn in the valley of the river Angara birds find favorable conditions for replenishment of energy resources, combined with acceptable temperature conditions. The latter fact is quite important for birds, since by this time all small lake systems in river valleys are completely frozen.

A relatively small number of birds gathering for a “cold” wintering in the source of the river Angara from the nearest small coves and bays of the lake Baikal, are unable to continue their migration southward due to insignificant reserves of energy resources. This is by trial shooting of birds in the Irkutsk reservoir confirmed and along the valley of the river Angara in November. Birds that remain for the winter, in most cases, have a low body condition (no more than 3 points), which does not allow them to make a long migratory rush southward [11, 30, 35]. In addition, as special studies show, individuals with insufficient fatness have suppressed migration activity.

In this regard, the valley of the river Angara attract late migrants and contribute to their long delays here at feeding and resting places. In addition, birds that have not accumulated a sufficient amount of energy resources to continue their migration are by low migratory activity characterized [11, 29]. They stay for a long time in such areas (at least 15-20 days) and by the time they are physiologically able to continue migration, it becomes impossible. Snow lies in the surrounding areas, all lake systems freeze and very low air temperatures are established [11, 30]. Thus, the thermal refugium at the source of the river Angara, where birds, delayed with flight, gradually move, become an ecological trap, and the “cold” wintering itself is forced [11-12, 18, 30-31]. Most likely, the overwhelming majority of “cold” natural wintering grounds for shore birds and waterfowl in Siberia and the Far East are of the same type.
This pattern of formation of “cold” wintering grounds is typical for all species of birds of any ecological group, which linger with a flight to the south.

5. Conclusion
Thermal refugium in the source and upper reaches of the river Angara, provides long rest stops and replenishment of energy resources of migratory birds. At the same time, in the conditions of the early winter period, it is an ecological trap for birds that have lingered with flight. The high mortality of nests as a result of floods in the middle of summer and a sufficiently large number of repeated (compensatory) clutches provide the appearance of a sufficiently large number of late broods that do not have time to accumulate a sufficient amount of plastic substances that ensure non-stop flights of birds to the southern wintering grounds. The high population density of Goldeneye, one of the most numerous species in Eastern Siberia, provides a fairly high abundance of late migrants, which form a characteristic migratory wave in November. It is well on the main migration routes of the span fixed, one of which is the river Angara. At the source of the river Angara, a highly productive area is being formed, the existence of which is completely determined by direct contact with the lake Baikal. It provides good conditions for rest and feeding of late-flight species of animal-eating birds. That is why during the period of completion of the formation of wintering, a large number of birds gather here, the nesting areas of which cover the entire taiga zone of Eastern Siberia. This is what determines the high number of birds wintering here.

Thus, the formation of "cold" wintering in the source and upper reaches of the river Angara is determined by the high specificity of the natural and climatic conditions of this area of Lake Baikal and the peculiarities of the nesting biology of waterfowl in the conditions of the mountain-floodplain water regime of the mountain rivers of Eastern Siberia.

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