Evaluation of the use of hunting potential in the Republic of Buryatia

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Abstract. The article considers the current state of hunting resources use in the Republic of Buryatia. The dynamics of abundance and production of the main species of commercial animals from 1990 to 2017 is analyzed. The low demand for some species leads to underutilization of the available potential. The greatest efficiency of hunting resources use is observed in relation to sable and musk deer. On the basis of data on the number, production of hunting animals and average market prices for products, the potential and annual use of hunting resources have been estimated. Hunting farms in the region are characterized by an extensive production method, based on the provision of lands for hunters on the rental basis. Share of expenses for the development of infrastructure and the implementation of biotechnical measures in hunting farms expenditure pattern is insignificant. The main directions of improvement of hunting resources use effectiveness are the measures aimed at increasing the number of hunting animals (biotechnical measures), combating illegal hunting, regulating the number of large predators. The use of hunting areas for recreational purposes and development of hunting tourism is promising.

1. Introduction

Hunting nature management makes possible rational use of hunting animals and implementation of measures for its protection and reproduction. Hunting allows to regulate number of wild animals. Hunting can provide people with meat, fur, leather and medicinal raw materials. According to estimates by Federal state budgetary institution "Tsentrhotkontrol" ("Control information and analytical center of hunting animals and their habitat"), the valuation of hunting animals living in Russia is 87 billion rubles, while hunting products and services account for 16 billion rubles [1].

The task of modern hunting management is the development of a system that provides for the increase in reproduction and intensification of the use of hunting animals through a set of measures (economic, environmental, organizational, and technical) [2]. Determination of the economic value of the hunting and fishing potential of the region makes it possible to evaluate the effectiveness of the use of hunting resources, to work out the main directions of development of the hunting economy. The purpose of this study is to analyze the use of hunting resources of the Republic of Buryatia, the definition of the main directions of effective development of hunting and fishing potential.

2. Models and Methods

The hunting resources of Buryatia are represented by 83 species of animals; ungulate animals are the most important – red deer, Siberian roe deer, wild boar and musk deer; for harvesting of industrial furs
– sable, squirrel, muskrat, Siberian weasels, ermine; in the group of feathered hunting – capercaillie, black grouse, hazel grouse, partridge.

Hunting areas as hunting animals habitat occupy about 80% of the territory of Buryatia – 28.0 million hectares. Lands are mainly taiga and forest-steppe landscapes. The use and control of hunting animals is carried out by hunting farms on fixed hunting areas and “Burprirodnadzor” (“Republican service for the protection, control and regulation of animal world objects use, referred to the objects of hunting, control and supervision in the field of environmental management”) on generally accessible hunting areas. 56.0% of hunting areas reserved for hunting farms [3].

The following groups can be distinguished among hunting animals: ungulates, fur animals, large predators, hunting birds. Hoofed animals are characterized by a stable state and increase in livestock since the 1990s: musk deer, red deer, roe deer, elk (Table 1). The average number of ungulates for the period under review (1990-2016) was 86.0 thousand individuals, ranging from 54.3 (1996) to 143.9 thousand (2016).

| Types of animals | 1990-1999 | 2000-2009 | 2010-2017 | 2017 |
|------------------|-----------|-----------|-----------|------|
| Elk              | 5,983     | 7,228     | 9,371     | 12,075 |
| Red deer         | 15,009    | 16,438    | 20,869    | 24,737 |
| Roe deer         | 25,430    | 37,496    | 42,083    | 42,074 |
| Boar             | 4,015     | 5,267     | 7,806     | 7,147 |
| Musk deer        | 16,205    | 10,420    | 26,411    | 47,690 |
| Reindeer         | 2,127     | 2,456     | 4,531     | 4,815 |
| Wolf             | 1,488     | 2,334     | 1,682     | 1,340 |
| Bear             | 2,218     | 3,671     | 4,772     | 4,284 |
| Sable            | 14,739    | 18,869    | 31,949    | 49,210 |
| Squirrel         | 216,507   | 220,161   | 164,583   | 199,782 |
| Fox              | 1,990     | 3,262     | 4,469     | 3,885 |
| Muskrat          | 86,710    | 85,292    | 103,901   | 90,907 |
| Ermine           | 11,899    | 14,069    | 9,294     | 10,795 |
| Siberian weasel  | 12,356    | 18,460    | 6,365     | 6,937 |
| White hare       | 77,910    | 68,770    | 53,063    | 64,715 |
| Lynx             | 1,293     | 962       | 1,353     | 2,220 |
| Wolverine        | 525       | 627       | 456       | 386   |

In fur animals there was a growth in the population of sable, fox, a decrease for Siberian weasel, and ermine. The main share of the sable population is concentrated in Severobaikalsky district – 29.0%, Bauntovsky district – 23.9%. Squirrel are common in Khorinsky district – 21.4%, Severobaikalsky district – 14.9%, Bauntovsky district – 10.5%. The main habitat of the muskrat is the Selenga river delta.

Large predators have a significant impact on hunting and agriculture. The annual damage from wolves to agriculture of the Republic of Buryatia is more than 25 million rubles, for hunting, about 100 million rubles [4]. Currently, the number of wolves has decreased to 1,340 individuals, in the period from 1995-2005 production amounted to 300-400 individuals, in 2010-2016 – 650-750 individuals [3]. The decrease in numbers is due to an increase in monetary remuneration for shooting wolves, regional authorities allocate 5,000 rubles for a single wolf, and municipal authorities from 2,000 to 7,000 rubles. The number of bears since 2008 remains at a consistently high level – about 4,860 individuals. The increase in the number of bears on the territory of the republic is associated with the non-development of withdrawal limits, the high cost of a license. The main habitats of bears are Severobaikalsky district – 18.7%, Pribaikalsky district – 14.6%. The number of lynxes is 2,220 individuals; a decrease was observed from 1990 to 2000. Lynx lives in Bauntovsky district – 21.9%, Khorinsky district – 15.1%, Muysky district – 10.0% [3].
Upland fowl is represented by the capercaillie ordinary and stone, black grouse, hazel grouse, Daurian partridge and white grouse. According to the number of upland fowl, Bauntovsky, Pribaikalsky, Zakamensky, Dzhidinsky districts are distinguished. The reserves of this hunting group of birds, on average over a long-term period, are estimated by capercaillie – 74.0 thousand individuals, black grouse – 93.5 thousand, grouse – 360.8 thousand, white partridge – 107.3 thousand, Daurian partridge – 106.9 thousand. For waterfowl birds include river ducks (mallards, teal-whistles, teal-crackers, gray ducks) and geese (hummers, white-fronted goose). The main habitats of the waterfowl are the Selenga river delta, the mouth of the Upper Angara and the Kichera, the valley of the Barguzin river.

The number of most species of animals is subject to annual changes due to the influence of natural and anthropogenic factors. The main natural factors are the climatic conditions of the year (multi-snow winters, low temperatures), the condition of the food supply. The anthropogenic factors include illegal hunting, forest fires, deforestation, regulation of predators. In general, during the period under review, the number of most species of hunting animals is stable.

3. Results and Discussion

In the Republic of Buryatia, more than 6 thousand ungulates, about 110 thousand fur animals, more than 30 thousand hunting birds are harvested annually. In the hunting season 2015-2016 prey for ungulates amounted to 6,430 individuals, roe deer – 1,792, boar – 1,551, musk deer – 1,686, red deer – 680, reindeer – 490, elk – 231 [3]. The main areas of prey for ungulates were Bauntovsky district – 716, Severobaikalsky district – 620, Zaigraevsky district – 500 and Khorinsky district – 321 individuals. The mined meat of wild ungulates is mainly used for personal consumption.

The basis of the fur trade is sable, squirrel, muskrat, hare, Siberian weasels, and ermine. On average, 7.4 thousand sable individuals, 33.4 thousand squirrels, 9.0 thousand muskrats are harvested annually. The main areas of fur animals are Khorinsky district – 10,015, Severobaikalsky district – 9,686, Bauntovsky district – 8,527, Pribaikalsky district – 6,474 individuals (including sable – Severobaikalsky district – 2,351, Bauntovsky district – 1,721, Muysky district – 1,080, Pribaikalsky district – 986 individuals. The average annual level of sable harvesting in the 1990s was 2.7 thousand pcs., in 1985-88 – 5.8 thousand pcs., in 2010-2016 – 7.4 thousand pcs. [2, 3]. In recent years, there has been a decrease in demand for the furs of squirrels, muskrats, Siberian weasel, and ermine. Hunting of squirrels in the season 1990-1991 amounted to 173.9 thousand individuals, in 2015-2016 – 65.2 thousand individuals. A marked decline occurred in the production of muskrats, in 1990-1991 – 31.9 thousand individuals in the season 2015-2016 – 17.4 thousand individuals.

Hunting resources use efficiency is determined by the economic possibility of extracting resources, taking into account the reproduction of animal populations [5]. Each year, limits are set for the hunting grounds of the Republic of Buryatia, for a roe deer it makes 6.26% of the number, red deer – 4.29%, elk – 3.13%, musk deer – 4.79%, sable – 34.02%, lynx – 7.64%, bear – 10.53%, badger – 8.65%. Among commercial animals, the highest utilization efficiency is noted for such species as musk deer – 99.4% of the withdrawal limit, sable – 95.1%, elk – 88.2%. At the same time, taking into account poaching, these species account for excessive use pressure. Low efficiency of use is observed for a bear – 31.7%, for a badger – 28.6%. Decrease in demand for furs of squirrel and muskrat leads to underutilization of existing potential. Thus, for squirrels, the average share of exploitation is 70% of the autumn livestock, and production is 30%.

To determine the hunting resources economic value of the Republic of Buryatia, a methodology was used to estimate the direct value of the potential of hunting resources and the actual annual use. The cost of hunting resources was calculated on the data basis on products obtained from hunting animals – meat, furs, medicinal and technical raw materials and market prices for them. The main suppliers of hunting products in the region are “Hunting and Furs of Buryatia” LLC, “Rash Folken” LLC, as well as many hunting farms and hunters send products to other cities – Moscow, St. Petersburg, Irkutsk. Sable skins and musk deer preputial gland are in the greatest demand. The average prices of local suppliers in 2016 were: sable pelts – 5,000 rubles,
squirrels – 50-100, muskrats – 100, ermine – 250, Siberian weasel – 250, lynx – 12,000, fox – 500, wolf – 1,500, musk deer – 900 rubles per 1 gr., bear bile – 300 rubles per 1 gr.

As a result of the calculations, the cost of the hunting and fishing potential of the Republic of Buryatia is estimated at 3,075.5 million rubles, ungulate animals account for 2,106.8 million rubles, fur animals – 537.4 million rubles, feathery hunting – 431.3 million rubles. At the cost of hunting resources, Bauntovsky district is allocated – 770.6 million rubles, Severobaikalsky district – 402.6 million rubles, Muysky district – 275.4 million rubles, Pribaikalsky district – 197.0, Zakamensky district – 170.4, Khorinsky district – 167.3. According to the density of the cost of hunting resources per 1 hectare of land, the Ivolginsky district can be noted as 291 rubles, Zaigraevsky district – 241, Dzhidinsky district – 165, Kizhinginsky district – 143.

The total cost of production, legally harvested by hunters and hunting farms in Buryatia in the season 2015-2016 can be estimated at 188.4 million rubles, which is 6.1% of the hunting and fishing potential. Thus, the production of ungulates accounted for 84.1 million rubles, fur and medicinal raw materials – 92.3 million rubles, hunting birds – 12.0 million rubles.

The existing potential of hunting resources is used in commercial and amateur hunting, in which up to 10 thousand hunters participate annually [4]. Hunting and fishing industry are represented by 59 hunting farms. At present, the hunting farms of the region mainly use an extensive production method based on the provision of hunting lands for hunters for production, while the potential of natural productivity of commercial lands is underused [2]. Since the early 1990s the number of people employed in the hunting economy has decreased by 5 times and now there are 176 people. Infrastructure development and carrying out biotechnical measures currently occupies an insignificant share in the cost structure, which is largely due to the low profitability of the industry. So, in 2017 the expenses of hunting farms in the region amounted to 40,070.4 thousand rubles, 10.9% of which was spent on biotechnical measures, and 1.4% on infrastructure costs [6]. In general, in Russia, the cost of these activities is 25.5%, for biotechnical measures – 17.9%, for infrastructure creation – 7.6% [7]. Low costs associated with low profitability of the industry. The significant hunters’ costs are: state duty payments, hunting permits (hunting license) and other expenses for weapons, equipment, transport, etc.

The importance for the economy of the region from the use of hunting resources is not only limited to the extraction of commercial products. The use of hunting areas for recreational purposes, development of hunting tourism is promising. Many hunters consider recreational component of hunting activity as important. According to the calculations of researchers, the economic effect of tourism is 3 times higher than the commercial production [8]. For the purpose of hunting tourism, the Russian and foreign tourists visit the Republic of Buryatia.

4. Conclusion
The number of hunting animals from 1990 to 2017 are characterized by positive dynamics. Commercial resources are significantly influenced by such factors as natural and climatic conditions, the condition of food supply, the number of large predators, illegal harvest, and the state of forest fund (illegal logging, forest fires).

The existing hunting and fishing potential of the Republic of Buryatia is currently in demand, but there is need to improve the efficiency of use. The greatest efficiency of using hunting animals is characterized in relation to musk deer, sable, low demand for some species leads to under-utilization of existing potential. Every year only 6.1% of hunting and fishing potential is used by hunters and hunting farms. The development of hunting tourism, the formation of leisure is promising.

The main directions of increasing the efficiency of using hunting resources are carrying out biotechnical measures, combating illegal hunting (poaching), regulating the number of large predators (wolves, bears). Hunting and fishing potentials are not used enough due to the weak development of hunting farms. The development of market tools to increase profitability, technical capabilities and infrastructure facilities farms are necessary.
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