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Lazovsky State Nature Reserve (Russia)

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Abstract

A brief information about the Lazovsky State Nature Reserve is presented. The history of foundation, relief, climate and nature of the Reserve are described.

Key words: nature reserve, biodiversity, flora, fauna, rare species

Primorye has a high level of a biological diversity within the Far East ecoregion and the highest level in comparison with the other Russian regions. A determinative element of the nature of the Primorsky Krai is the Sikhote-Alin mountain range, which stretches for 1,100 km from the Peter the Great Gulf in the south up to the estuary of the Amur River in the north. Mountain ecosystems are always defined by the great number of species of flora and fauna. The Sea of Japan has a great influence on the climate of the Reserve.

The Lazovsky Reserve is the second largest reserve in the Primorye territory and it is also an example of the mountain ecosystem of the Ussurian liana pine-broad-leaved forests of the eastern slopes of the southern Sikhote-Alin [1, 2] (Fig.). It possesses the highest level of the flora diversity among all reserves in the Far East: about 1,284 species of the vascular plants grow there making up to 64 % of the vascular plant flora of the Primorsky Krai whereas in the other reserves this percentage varies within 32–47 %.

The basic features of the southeastern Sikhote-Alin are a mountain relief and a monsoon climate. These features determine the variety and uniqueness of the ecosystems that could be met in this region. The combination of nemoral and boreal natural complexes with a multitude of the endemic Manchurian species together with boreal Okhotsk, Eurosiberian and also subtropical species is typical for this ecoregion.

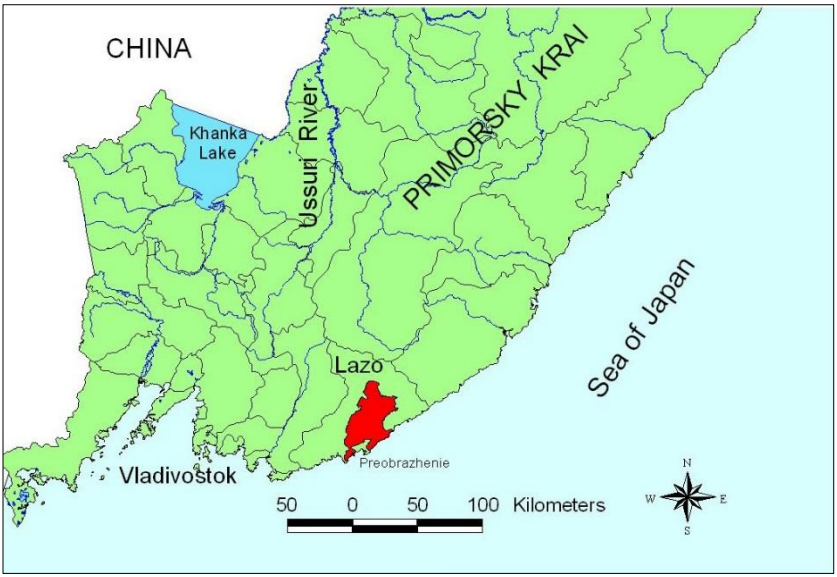

Fig. Location of the Lazovsky Reserve in the Primorsky Krai.

Resources of flora and fauna in a combination with a complex structure determine a high degree of the specific and coenotic diversity of the forest ecosystems. In addition many endemic and rare species of the animal and plant kingdoms (which are included into the Red Data Book of Russia and in the IUCN Red List) present here. For example the density of the Amur Tigers in the Lazovsky Reserve is the highest in the range of this subspecies' habitat. The tiger population is stable there for the last 15 years though in adjacent territory the density of the tigers is considerably lower and its quantity is subject to fluctuations.

The Lazovsky Reserve has a complicated and rich history. In spite of a sparse population of pioneers in this territory, a legalization of the Reserve was carried out with great difficulties and in several stages. From the beginning of the 1928 the Yuzhno-Ussuriysky ("Sudzukhinsky") Refuge (zakaznik) with total area of 70 thousand hectares was founded on a part of the current territory of the reserve. The Lazovsky ("Sudzukhinsky") branch of the Sikhote-

Alinsky Reserve was organized in February of the 1935 and it was declared independent in the 1940. The Reserve was organized with the purpose of conservation and study of the natural ecosystems of the liana pine-broad-leaved forests of the southern Sikhote-Alin and for protection and restoration of populations of valuable and rare animals living there (such as Goral, Sika deer and Sable).

In January of the 1946 a new territory was added to the Reserve and its total area reached 339 thousand hectares. Subsequently the area of the Reserve was reduced. In 1970 the Sudzukhinsky Reserve was renamed to the "Lazovsky State Nature Reserve of L. G. Kaplanov", after the director of the Reserve, a talented zoologist who was killed by poachers in 1943. In the 1989 the reserve territory was increased by 3.5 thousand hectares and the buffer zone was authorized. In the 1999 the reserved territory was increased by 986 hectares as well. By the Resolution of Executive Committee of Deputies Council of the Primorsky Krai of July 21, 1989 № 236 in some ground sites adjoining to the territory of the Reserve a protected zone by the area of 15,978 hectares has been created. The Regulation of this zone was approved by the Resolution of Executive Committee of Deputies Council of the Lazovsky District of September 21, 1988 № 251, which determined the limited routine of nature management in the protected zone of the Reserve.

The buffer zone is established for abatement of direct and indirect impact of the human activity to the core area. The conservation of biodiversity in the buffer zone is primarily directed to the conservation of the core area. All kinds of activity allowing to preserve biological diversity and to carry out principles of sustainable nature management are acceptable here. Besides the introduction of traditional forms of using (an agriculture, hunting and fishing), it can be an establishment of eco-educational activity and tourism development centers. At present an active work to establish a buffer zone around the rest part of the Reserve including marine zone is being conducted. As a result of this activity the buffer zone will be created along the entire border of the Reserve which will favorably affect the conservation of the core area.

The current territory of the Reserve is 120,998 hectares and the buffer zone is 15,978 hectares in area. It consists of land part (120,948 hectares) and two islands (50 hectares). In 2014 the Lazovsky Reserve was united with the national park "Zov tigra" (83,490 ha).

In the thirties of the XX century the major task for the Reserve was the protection and amplification of populations of rare species including Sika deer, Goral and Sable. Further the primary purpose was formulated as conservation and studying of natural complexes of the liana and pine-broad-leaved forests of the southern Sikhote-Alin. The Amur tiger was added later as a key species. Generalizations and the analysis of the collected data are reflected in scientific monographs and collections devoted to separate elements of natural complexes (plants, invertebrates, terrestrial vertebrates).

Specialists of different scientific organizations of the country regularly carry out researches in the territory of the Reserve. Researchers from the following institutes work here: Institute of Biology and Soil Sciences of Far East Branch (FEB) of the Russian Academy of Sciences (RAS), the Botanical Garden – Institute of the FEB RAS, Zoological Institute of the RAS, Institute of Ecological and Evolutional Problems of A. N. Severtsov of the RAS, Institute of Taxonomy and Ecology of Animals of Siberian Branch of the RAS, the Moscow State University, the Moscow State Pedagogical University. As a result the Scientific department of the Reserve and specialists from other institutions published 1,120 scientific works.

Cooperation with foreign scientific institutes and funds continues in the following fields: monitoring of the Amur tiger with the Wildlife Conservation Society (WCS, USA); studying the biodiversity of the Far East with the Seoul National University (Republic of Korea); protection of the reserved territory with the Far Eastern Office of the Worldwide Fund for Nature (WWF);

wildlife disease monitoring with respect to Amur leopard and tiger conservation with the Zoological Society of London.

There are two visitor-centers in the Reserve: the first one is located at the office of the Reserve in the Lazo town and the other is located in the Preobrazhenie town. The ecological educational activities with students and other visitors are conducted in these centers. Various seminars, training programs and practices for scientific staff, students and post-graduates are conducted in the Reserve both in the visitor-centers and on the basis of scientific stations in the field.

The main part of the Reserve's area (96 %) is covered by forests. Under the scheme of geobotanical zoning of the Far East the territory of the Lazovsky Reserve belongs to the Far Eastern province of the pine-broad-leaved forests of the East-Asian biogeographical area [2]. All types of relief and vegetation of the southeastern Sikhote-Alin are presented here: high mountains, mountain forests, valley forests, plain forests, meadows, lakes and sea coast. 8 basic vegetation formations are identified in the Reserve. Coniferous forest occupies the central part of the Reserve and makes 8 % from the total area of forest. Fir and spruce forest prevailes there. Pine-broad-leaved forest makes 22 % and is distributed on the all territory of the Reserve. Logging was conducted more than 50 years ago on some sites. The main part of the Reserve (66 %) is covered by the oak-broad-leaved forest. By the floristic zoning [3], the Reserve is a part of the Zaussuriysky District of the Primorsko-Manchu Province, Manchu Area. It belongs to the Manchuro-Chinese Sub-kingdom, Holarctic Kingdom.

There are no settlements in the territory of the Reserve. Major factors of anthropogenous influence are poaching and forest fires. The fires periodically occur along the borders of the Reserve.

The Lazovsky Reserve has a high level of biological diversity and a great number of rare species. The highest percent of the rare species included into the IUCN Red List is recorded among mammals. 12 % from the total number of terrestrial mammal species occurring in

the Lazovsky Reserve are included ino this list. Among them there are large mammals such as the Amur tiger and the Amur goral.

The territory of the Reserve is located at 42°49′ – 43°23′ N and 133°42′ – 134°12′ E.

Table. Geographical coordinates of the Lazovsky Reserve

	Center	North	East	South	West
Latitude	43° 7′	43° 3′	43°11′	42°49′	42°56′
Longitude	133°58′	133°59′	134°12′	133°44′	13° 42′

The Lazovsky Reserve is located in the District with the same name in the southeastern part of the Primorsky Krai. It is situated within the southern mountains of the Sikhote-Alin between the valleys of the rivers Kievka and Chernaya. The mountain ridge "Zapovedny" divides the Reserve into a northern continental part and a southern maritime part. A prevalent landscape is mountain slopes covered with forests. The average altitude is about 500 to 700 m a.s.l., some mountain tops reach more than 1000 m a.s.l. The highest peak is Chernaya Mountain – 1379 m a.s.l.

The slopes are steep; approximately 20° to 35°, the crests are narrow and often rocky. Large-stony streams extend on large areas. Mountain ridges lower down towards the sea, forming a rocky coast with steep slopes up to 100–200 meters high. The highly rugged mountainous landscape is the reason for difficult access to the most part of the Reserve.

The territory of the Reserve includes two small islands : Petrov and Beltsov, located near the southern border of the Reserve. The islands are covered with a forest.

For orography of the Lazovsky District a middle-moun tainous, strongly dismembered terrain is typical. Formation of the modern relief is in junction to formation of folded structures of the Mesozoic Age, which are complicated by faults of volcanic and intrusive activity. Geological spread of the main structures of the relief coincides with a direction of a coastal line of the continent. The brown forest soils are most widely distributed in the

Reserve. A specific alluvial humus-brown soil existed in former times at high altitudes under dark coniferous forests. Nowadays it is replaced by the typical brown soils of mixed coniferous-broad-leaved forests. Podsolic soils can occur outside the valley ground. Recent water courses are accompanied by sediments of sand and gravel with less developed raw soils. Some coastal plains and mountain basins show black, chernozem-like soils.

The Lazovsky Reserve is located in the coastal climatic area of the temperate zone of the Far East. The general features of the climate of the Reserve are determined first of all by proximity of the sea. The monsoon climate is revealed in strongly pronounced change of directions of air streams from Pacific Ocean to continent in summer and on the contrary in winter. Winter lasts about three and a half months with prevalence of winds of the western and northwest directions. The mountain ridge "Zapovedny" divides the Reserve into two climatic microzones: continental and coastal. The coldest month is January. On some days the temperature of air in northern part of the Reserve falls up to a -30°C. Milder climate is noted at a sea coast. In summer there is cooler, than in a continental part and warmer in winter. Thaws are frequently occur in winter at the coast. The snow cover on the southern slopes is changeable. Average annual temperature of air at the coast is 5.2°C, in the continental part is 4.4°C. The warmest month is August with average temperature +19.8°C. The coldest month is January with average temperature –10.5°C. Mean annual precipitation is 706–770 mm.

The flora of the reserve counts 1284 species of vascular plants, 285 – bryophytes, 775 – algae, 407 – lichens and 1188 – fungi [4; 5].

6658 species of invertebrates are recorded on this territory and adjoining areas. 6381 species of them are insects [6; 7]. There are 8 species of amphibians and 8 species of reptiles in the Reserve [8]. The Reserve takes front rank for a quantity of bird species including rare, in all middle latitudes of Europe and Asia. 392 species of birds are recorded in the Reserve and in the buffer zone. The terrestrial mammal fauna numbers 63 species, 56 of them constantly live there and 7 species are recorded periodically. The most typical and widespread predatory mammals are

(16 constantly living species): Raccoon Dog (*Nyctereutes procyonoides* Gray, 1894), Red Fox (*Vulpes vulpes* Linnaeus, 1758), Brown Bear (*Ursus arctos* Linnaeus, 1758), Asiatic Black Bear (*Ursus thibetanus* Guvier, 1823), Badger (*Meles leucurus* Linnaeus, 1758), Sable (*Martes zibellina* Linnaeus, 1758), Yellow-throated Marten (*Martes flavigula* Boddaert, 1785), Siberian Weasel (*Mustela sibirica* Pallas, 1773), Otter (*Lutra lutra* Linnaeus, 1758), Amur Tiger (*Panthera tigris* Linnaeus, 1758), Asian Lynx (*Lynx lynx* Linnaeus, 1758), Leopard Cat (*Prionailurus bengalensis* Kerr, 1792). A wide forage base is a reason for a great number of predatory species. For example, there are 6 species of ungulates: Wild Boar (*Sus scrofa* Linnaeus, 1758), Musk Deer (*Moschus moschiferus* Linnaeus, 1758), Sika Deer (*Cervus nippon* Temminck, 1838), Red Deer (*Cervus elaphus* Linnaeus, 1758), Siberian Roe Deer (*Capreolus pygargus* Pallas, 1771) and Amur Goral (*Nemorhaedus caudatus* Milne-Edwards, 1867). Due to the prey diversity and its number, such as Sika Deer, the density of the Amur Tigers in the Lazovsky Reserve is the highest in the range of its habitat. Besides 4 species of pinnipeds and 12 species of cetaceans are recorded on the adjoining aquatory. The common species are larga seal (*Phoca largha* Pallas, 1811), minke whale (*Balaenoptera acutorostrata* Lacepede, 1804) and killer whale (*Orcinus orca* Linnaeus, 1758) [9].

All types of ecosystems of the Lazovsky Reserve are of particular significance for the conservation of biological diversity in the South Sikhote-Alin. It is a good model for monitoring of the changes caused by the pollution of atmosphere and water. Conservation of ecosystems of mountain oak forests, making up to 66 % of the territory of the Reserve and being also widely distributed outside of the Reserve, is the most significant. The majority of species of flora and fauna needing protection are concentrated here. Conservation of ecosystems of pine-broad-leaved forest are of great relevance. The role of this forest in the formation of fodder resources for many species of birds and mammals is essential, especial during winter time. Protection of

valley deciduous forest, which plays a significant water-regulating part, is necessary. These forest has complex structure and high species diversity. There are unique plant associations with rare and endemic species of the Far East on the sea coast: Dimeria invisible (*Dimeria neglecta* Tzvelev, 1957) and Ephedra monospermous (*Ephedra monosperma* J. G. Gmel. ex C. A. Mey, 1846).

One of the main functions of the Reserve is conservation of genetic diversity of flora and fauna, especially of the rare and endangered species. The protection of many species in the Lazovsky Reserve is an important contribution to the conservation of these species in the wildlife.

The territory around the Lazovsky Reserve is traditionally used by locals for hunting (for meat and fur), fishing and gathering of wild plants. The Reserve plays the significant role in conservation of a biological diversity because a lot of species of plants and animals are intensively used by the locals for food or in traditional medicine. Thus these species significantly decrease in number and distribution outside the Reserve. At present there are hunting grounds of several hunting farms in adjacent territories. The reserve's area acts as a reproduction zone for many species and maintain their number outside of the protected territory.

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Лазовский государственный природный заповедник

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Аннотация

Приводится краткая информация о Лазовском государственном природном заповеднике. Описывается история создания, рельеф, климат и природа заповедника.

Ключевые слова: природный заповедник, биоразнообразие, флора, фауна, редкие виды

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Приложение.

The Petrov Island. Photo by A.I. Myslenkov.

Forest with dominance of the Japanese yew *Taxus cuspidata* Siebold et Zucc. Ex Endl.(1846) on the Petrov Island. Photo by A.I. Myslenkov.

Spruce-fir forest. Photo by A.I. Myslenkov.

Pine-broadleaved forest. Photo by A.I. Myslenkov.

View of the central part of the Lazovsky Reserve from the Chernaya Mountain. Photo by A.I. Myslenkov.

Thickets of *Microbiota decussate* on the Chernaya Mountain. Photo by A.I. Myslenkov.

The Zapovednyi Range in the Lazovsky Reserve. Photo by A.I. Myslenkov.

The Coast of the Lazovsky Reserve. Photo by A.I. Myslenkov.

Adult male of the Amur goral *Nemorhaedus caudatus*. Photo by A.I. Myslenkov.

Tigress with cubs. Photo by A.I. Myslenkov and I.V. Voloshina.