

ASSESSING THE ROLE OF RESERVES IN CONSERVATION OF *BOMBINA BOMBINA* (LINNE, 1761),
EMYS ORBICULARIS (LINNAEUS, 1758) AND *CORONELLA AUSTRIACA* LAURENTI, 1768 IN
EUROPEAN RUSSIA

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Abstract. Analysis of Russian nature reserves' role in conservation and monitoring *Bombina bombina*, *Emys orbicularis* and *Coronella austriaca* was held. There are 25 nature reserves within geographic ranges of fire-bellied toad and pond turtle, and 32 within range of smooth snake. Bibliography of herpetological studies in each reserve is given. Fire-bellied toad lives only in 52 % of nature reserves located within its geographic range, pond turtle – in 28 % and smooth snake is presented in 62.5 %. Ten nature reserves were outlined like most significant for these three species according to their abundance, availability of habitats and scientific monitoring.

Key words: nature reserves, *Bombina bombina*, *Emys orbicularis*, *Coronella austriaca*.

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Introduction

The system of protected areas has key importance for biodiversity conservation, and its role is especially important for the conservation of threatened species and vulnerable habitats. Nature reserves are the most important element of that system, because unlike the national parks don't have anthropogenic impact and tend to have a qualified scientific staff conducting regular fauna monitoring. However nowadays there is no full picture of amphibian's and reptile's conservation on the territories of nature reserves of Russia. Due to lack of unified programs and methods, system of studies of such fauna isn't enough for getting comparable and full results.

Assessment of nature reserves' role in conservation of amphibians and reptiles could be held by analysis of size of protected areas, variety of habitats, species diversity, anthropogenic impact and scientific consideration. Several attempts to analyze distribution of amphibians and reptiles and evaluate the role of protected areas for these organisms in nature reserves of Russia have been done (Borkin & Krever, 1987; Petrosyan et al., 2006; Osobo okhranyaemye... 2009; Bashinskiy & Leontyeva, 2012). However, the main difficulties of such assessments relate with inaccessibility of information. The most of data about fauna of reserves are published in their chronicles, which are usually kept in archives of the reserves, and aren't easy to get for the researchers. Often these data are published in nature reserves' or conference proceedings, which have small circulation and are hard to find in libraries. Similar situation is typical for course papers and diploma works of students, who are often got tasks for fauna investigations. Papers in reviewed journals about herpetofauna of reserves are usually devoted to special tasks and to certain species, so data about distribution, abundance and conservation status could be missed. So it is advisable to assess the role of nature reserves just within the territorial boundaries or focus on limited number of species. Therefore, our task is to assess the role of the nature reserves in conservation of three species – fire-bellied toad (*Bombina bombina* (Linnaeus, 1761)), pond turtle (*Emys orbicularis* (Linnaeus, 1758)) and smooth snake (*Coronella austriaca* Laurenti, 1768).

Material and Methods

Our study consisted of bibliography review and own researches. For analysis of literature we firstly investigated some monographs and publications in the journals, and also we used various proceedings, chronicles, as well as popular scientific publications and oral information. Additionally the regional reports and the Red Books were viewed. Own data were obtained as a result of years of researches on the territories of such nature reserves as Belogorye, Prioksko-Terresny, Centralno-Chernozemny, Utrish, Rdeysky and Privolzhskaya Lesostep. The main sources of information from each nature reserve are shown in the Table 1.

According to character of each species' distribution, nature reserves were combined into 6 groups: I – reserves with no data about herpetofauna; II – reserves, on the territory of which the species is absent; III – reserves, where the species is absent on the territory, but present in nearby areas; IV – reserves, where the species is present on the territory, but there's no data about its abundance; V – reserves, where the species is rare; VI – reserves, where the species is usual or even abundant. We used only two graduations for abundance, as the data from each source was estimated with different criteria and methods, and information often is subjective, so more fractional division would be incorrect.

Table 1. Main bibliographic sources about amphibians and reptiles in the nature reserves.

Reserve	Abbr.	Source
Astrakhansky	AST	Astrakhansky zapovednik, 1991; Fedorovich, 2013
Bashkirsky	BAS	Khabibullin, 2004; 2009
Belogorye	BEL	Lada et al., 2011; our data
Bolshaya Kokshaga	BKO	Zabiyakin, 1997; Pavlov et al., 2013
Bryanskiy Les	BRL	Lyapkov, 2004; Kotserzhinskaya, 2008
Centralno-Chernozemny	CCH	Vlasov & Vlasova, 1998; Vlasova et al., 2013; our data
Centralno-Lesnoy	CLS	Zheltukhin, 1995; Krasnaya kniga Tverskoy... 2002
Dagestansky	DAG	Djamirzoev et al., 2011
Erzy	ERZ	no data
Galichya Gora	GAL	Ushakov, 2005a; 2005b
Ilmensky	ILM	Chibilev, 2003; 2006
Kabardino-Balkarsky	KAB	Chapaev, 2009
Kaluzhskiye Zaseki	KZA	Zavgorodniy et al., 2001
Kavkazsky	KAV	Tuniyev, 2008
Kerzhensky	KER	Mannopova & Pestov, 2002
Khopyorsky	KHO	Lada et al., 2012
Mordovsky	MOR	Kasatkin, 2006; Ruchin & Ryzhov, 2006; Ruchin et al., 2007
Oksky	OKS	Antonyuk & Panchenko, 2014
Orenburgsky	ORE	Chibilev, 1995; Khabibullin, 2004
Polistovskiy	POL	Krasnaya kniga Pskovskoy... 2014
Prioksko-Terrasny	PTZ	Pereshkolnik & Leontyeva, 1989; our data
Prisursky	PRI	no data
Privolzhskaya Lesostep	PLS	Pavlov, 1999; Bashinskiy, 2014
Rdeysky	RDE	Bashinskiy & Zavyalova, 2007
Rostovsky	ROS	Belik & Gaidukova, 2004; Lipkovich, 2010
Severo-Osetinsky	SVO	Oral information
Shulgan-Tash	SHU	Khabibullin, 2004; 2009
Teberdinsky	TEB	Oral information
Utrish	UTR	Ostrovskikh, 2011; Leontyeva et al., 2013
Volzhsko-Kamsky	VLK	Garanin et al., 1989; Khairutdinov, 2003
Voronezhsky	VZH	Masalykin, 1999; Pozvonochnye zivotnye... 2008
Voroninsky	VOR	Kolobaev, 1999; Sokolov & Lada, 2006
Yuzhno-Uralsky	YUR	Baiteryakov, 2003; Khabibullin, 2004; 2009
Zhigulevsky	ZHI	Bakiev, 2001; Bakiev et al., 2003

For the assessment of nature reserves' role we paid attention for three main factors – abundance of the species on the territory, presence of suitable habitats and conditions for monitoring and conservation of population (scientific staff and publications).

Results and Discussion

There are 25 nature reserves within geographic ranges of fire-bellied toad and pond turtle, and 32 within range of smooth snake. Results of analysis of distribution of these three species on territories of the reserves are shown on Figure 1.

Fire-bellied toad lives only in 52 % of nature reserves located within its geographic range. Despite the fact that the species is usually common or abundant in the central parts of its area, most of the nature reserves don't have enough information about the distribution of fire-bellied toads on their territories (Fig. 2).

Unlike amphibians which have terrestrial or observable lifestyle, fire-bellied toads are sometimes hard to find for non-specialists. Therefore, data of *B. bombina* are mostly from the nature reserves which have the herpetological staff or the inventory of amphibian fauna was carried out. In most cases, monitoring of the species composition of amphibians was performed for other purposes, so data about fire-bellied toads are missing or need to be clarified. For example, as a result of our investigations on the territory of Prioksko-Terrasny nature reserve it was noted that *B. bombina* was absent. But at the same time there was oral evidence of findings of this species that was received from ornithologists. Prioksko-Terrasny nature reserve is one of the northernmost within the fire-

bellied toad range, so its role could be very important for the conservation the species on periphery of its area. However, lack of data makes it difficult to plan studies on its population.

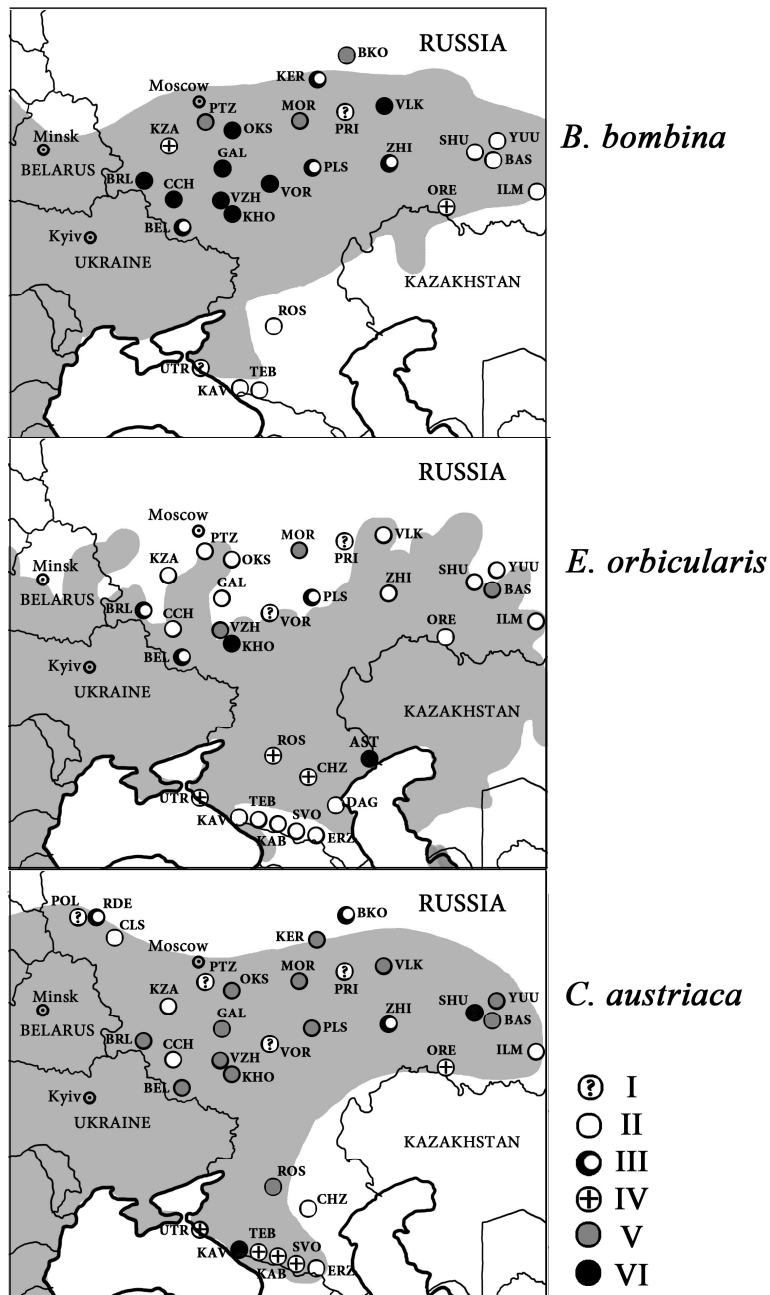


Figure 1. Presence of *B. bombina*, *E. orbicularis* and *C. austriaca* in nature reserves of European Russia (geographic ranges are shown with grey according IUCN; I-VI – see in Material and Methods; abbreviations of nature reserves is explained in Table 1).

In addition, water habitats of the nature reserves have great attention from scientists primarily if they occupy a significant part of the territory or are important for the ecosystems of reserves. In most cases that is river systems (for example, such streams are the backbones in Kerzhensky, Khopyorsky, Voroninsky reserves). Standing and slow flowing waters, which are suitable for fire-bellied toads, usually are presented by floodplain lakes on the territories of the nature reserves. Despite the importance of these waterbodies for ecosystems, small amount of studies dedicated to them (Bayanov, 2014). The nature reserves which held a lot of environmental studies of oxbow lakes (Oksky, Kerzhensky, Bolshaya Kokshaga, Khopyorsky, Belogorye) have quantitative data about

the status of *B. bombina* populations also. Thus, the role of nature reserves for the species can be determined not only by the presence of herpetologists, but also by scientific interest to whole ecosystems.

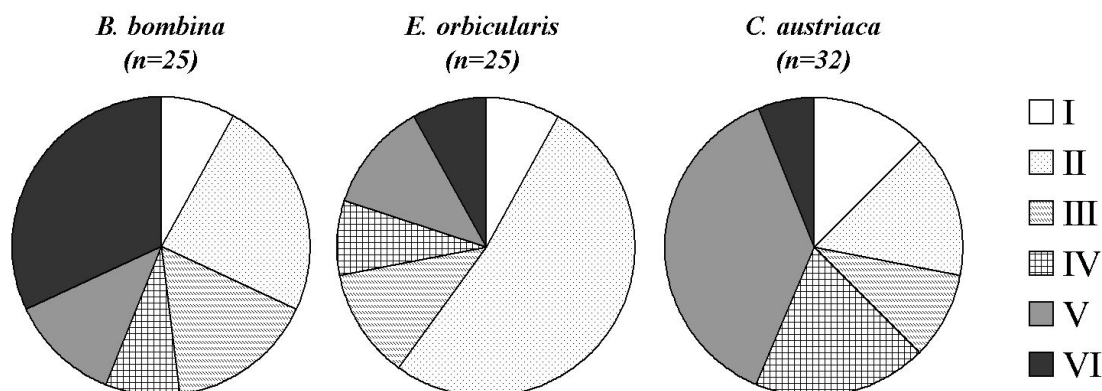


Figure 2. Character of distribution of the species in reserves (I-VI – see in Material and Methods)

All this is largely true for the pond turtle, which is found in 28 % of nature reserves. Because the turtle is the southernmost of the considered species, almost all nature reserves are located along the periphery of its area. Therefore, conservation and monitoring of the species population is limited not only by lack of suitable waterbodies on the territories of the protected areas, but also by low abundance of it in Russia. The aforementioned floodplain waters in the vicinity of Privolzhskaya Lesostep are populated by turtle according to oral information, but only one discovery was made in the last ten years. Species presence in adjacent areas to the nature reserves has been noted for several protected areas (Centralno-Chernozemny, Bryanskiy Les). However, unlike fire-bellied toads, which could benefit from beavers, turtles don't inhabit beaver ponds because of their instability. So appearance of additional suitable waterbodies for turtles is impossible in nature reserves. Thus, nowadays nature reserves don't play a determining role for the conservation and monitoring of populations of the species and more than half of the reserves within the turtle area don't have information about this species on their territories (Fig. 2). So at first it's necessary to conduct additional studies, which could be held not only by herpetologists. Especially because the turtles are more observable and could be easily identified from a distance in contrast with other two considerable species.

Among all three species smooth snake is presented in the highest number of nature reserves, about 62.5 % within its area. But almost all protected areas, where the species was found, registered only single finds. Such situation is connected mostly with hidden life of the snake but also with insufficient surveys. However, in contrast to previous species, habitats of *C. austriaca* are mostly well represented in the nature reserves. Therefore, abundance and availability of habitats aren't important for assessment roles of reserves for that snake, but lack of studies is typical for the most territories.

Analysis of distribution of species in nature reserves, as well as analysis of bibliographical sources, allows determining those protected areas, the role of which is the most important for conservation of these species (Table 2).

Table 2. The most important reserves for conservation of these three species.

Nature reserve	Species	Commentary
Astrakhansky	<i>E. orbicularis</i>	Lot of habitats, high abundance
Bryanskiy Les	<i>B. bombina</i>	Lot of habitats, high abundance, monitoring
Centralno-Chernozemny	<i>B. bombina</i>	Lot of habitats, monitoring
Galichya Gora	<i>B. bombina, C. austriaca</i>	Monitoring
Kavkazsky	<i>C. austriaca</i>	Lot of habitats, monitoring
Khopyorsky	<i>B. bombina, E. orbicularis</i>	Lot of habitats, high abundance, monitoring
Oksky	<i>B. bombina, C. austriaca</i>	Lot of habitats, high abundance, monitoring
Shulgan-Tash	<i>C. austriaca</i>	High abundance
Volzhsko-Kamsky	<i>B. bombina</i>	Lot of habitats, high abundance, monitoring
Voronezhsky	<i>B. bombina, E. orbicularis</i>	Lot of habitats, high abundance, monitoring

The greatest degree of protection in the nature reserves has fire-bellied toad – seven reserves have high abundance of its population and a lot of suitable habitats, and have opportunities for annual scientific monitoring. They are Oksky, Volzhsko-Kamsky and Khopersky reserves, where regularly herpetological researches are held. The turtle is abundant in two nature reserves, but only one of them carried out studies of reptiles. Smooth snake is rare almost in all reserves, but Kavkazsky reserve should be mentioned, because many suitable habitats are presented and long-term monitoring is held (Tuniyev, 2008). The Galichya Gora nature reserve doesn't have large population of smooth snake and few habitats are presented, but for many years qualified investigations of herpetofauna are carried out (Ushakov, 2005a).

Besides, we should also mention the nature reserves which situated near or beyond range borders of the species, even if they are very rare there. The Bolshaya Kokshaga nature reserve could be interesting for conservation studies of fire-bellied toad. The protected area located on the northernmost of the species range, but has a small population of it (Pavlov et al., 2013). For pond turtle we could note The Mordovsky reserve, where findings of the species were in the past, and nowadays there are no data about it, but scientific staff is monitoring herpetofauna (Ruchin et al., 2007). Rostovsky nature reserve could be interesting for some study of smooth snake, because single findings of the species were registered. But suitable habitats are absent on the territory of the reserve, which mostly has dry steppe landscapes. So reserve's population of *C. austriaca* could be the relict (Lipkovich, 2010) or on the contrary be the result of invasive processes due to anthropogenic influences.

Conclusions

Thus these three species don't have enough protection under Russian system of protected areas. Pond turtle is under studying and monitoring in 28 % of nature reserves within its area, fire-bellied toad – in 52 % and smooth snake – in 62.5 %. So, less than half of nature reserves could be suitable for monitoring and conservation of these three species (Fig. 2). A lot of nature reserves have knowledge gaps about distribution of amphibians and reptiles on their territories. Few reserves are inhabited by the species with high abundance. Only 10 nature reserves could be potential the key territories for conservation of the species, e.g. Khopyorsky for *E. orbicularis*, Oksky and Kavkazsky for *C. austriaca*, Volzhsko-Kamsky for *B. bombina*. But generally conservation of these species in nature reserves faces two main problems – lack of suitable habitats and insufficient researching.

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