

CONSERVATION OF RESOURCES OF REPTILES IN ASTRAKHAN' OBLAST' (RUSSIA). ASTRAKHAN' OBLAST' REPTILIAN RESOURCES CONSERVATION (EXPERIENCE OF REGIONAL REALIZATION)

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Reptiles is a group of the vertebrate animals which can be used as a perfect sensitive indicator of environment state. Astrakhan' Oblast' is the unique region of the south-eastern European Russia. The territory's physiographic characteristics determine high variety of reptilian habitats and fauna. The region is situated at the border of several zoogeographic provinces: Kazakhstan deserts of the northern type adjoin the European arid steppes and wormwood-gramineous semideserts, true feather-grasses and gramineous steppes alternate the poplar and gallery forests along the Volga delta branches and spot oak woods of Volga – Akhtuba rivers country. Areas of the salt-domic relief of the Baskunchak Lake and the Bol'shoi Bogdo mountain outskirts play a significant role for habitat preferences of reptiles. It is important that State Bogdo-Baskunchak Nature Reserve is functioning within this area. A distinctive feature of the region is that almost all of its territory lies in the Caspian lowland (on average 30 – 40 m below the sea level) with Bol'shoi Bogdo mount dominating over this lowland at 135 m.

Astrakhan' Oblast' is strongly transformed by human activity. Agricultural holdings (melon plantation and pastures) occupy more than 70% of the territory. In addition, the transport network is dense in the region because the branchy inland water routes are easily available even to the remote places. Finally oil, gas and chemical industry as Aksarai gaseous condensate complex and Tengiz – Novorossiisk oil-pipe line (the largest in Europe) are functioning there.

The variety of landscapes and the southern location of Astrakhan' Oblast' determine the herpetofauna diversity and its representatives' abundance. There are 17 species of reptiles in the region. Tortoises are represented by single species (*Emys orbicularis*). One species of geckos (*Alsophylax pipiens*) lives here, in its type locality. Other lizards are represented by the following species *Eremias velox*,

Eremias arguta, *Lacerta agilis*, *Phrynocephalus mystaceus*, *Phr. guttata*, *Phr. helioscopus*. Snake fauna of the region is also quite diverse: *Eryx miliaris*, *Natrix natrix*, *N. tessellata*, *Elaphe sauromates*, *Elaphe dione*, *Coluber caspius*, *Malpolon monspessulanus*, *Vipera renardi*.

Unique characters of Astrakhan' Oblast' having high reptile species diversity, ecotope variety and originality as well as very strong economic developing make the problem of conservation of Astrakhan' Oblast' herpetocomplexes especially actual and urgent. Obviously, the conserving and maintaining the sustainable existing of reptiles need elaboration of coordinated actions which realization is possible within the framework of a regional program.

The particularized regional program on reptilian resources conservation has been realized by us in 1991 – 1996 and included three stages.

The first stage means the fauna inventory all over the region for survey of the species diversity. During this work records of all species are registered and cadastral maps are charted. This stage of the regional program resulted in the model of reptile atlas (Bozhansky and Nikerov, 1993) and in cadastral evaluation of reptilian resources (*Astrakhan' Oblast' Fauna Cadastre*, VNIIPriroda, 1992 [in Russian]). Data acquired in this stage allow to estimate reptile numbers for annotated list of rare and endangered species (Bozhansky and Poluinova, 1998).

The second stage of the program represents the elaboration of zoning of the territory on the basis of the data on reptilian fauna and density. We have zoned only sand-desert sections of the region, steppe and flood-land ecotopes have not been covered (see Table 1). It resulted in allocation of richest ecotopes both in the number of individuals and species diversity. We have noted the Berly sands section, where sand deserts border upon arid steppes, and both desert and steppe species are present. The desert species are the following: *Eremias velox*, *Phrynocephalus guttata*, *Phrynocephalus mystaceus*; intrazonal species: *Eremias arguta*; steppe species: *Vipera renardi*, *Elaphe*

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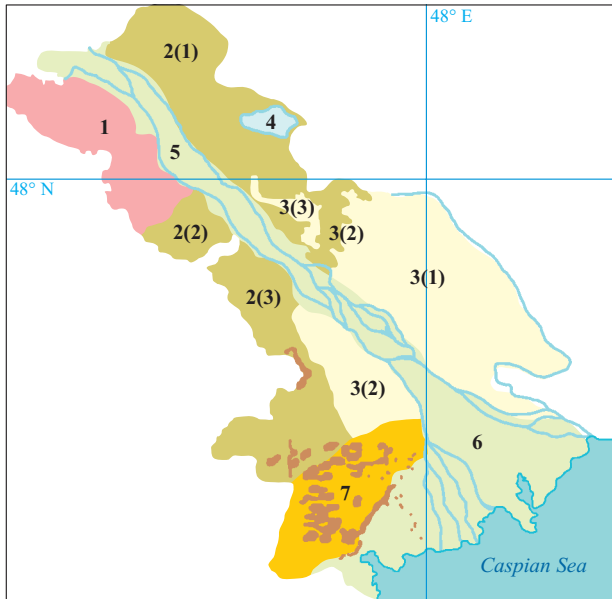


Fig. 1. Landscape and herpetology areas of Astrakhan' Oblast': 1, clay semidesert; 2(1), Sand-clay desert on the left bank of the Akhtuba river; 2(2), sand and sand-clay desert areas; 2(3), sand-clay desert on the right bank of the Volga river; 3(1), Volga-Ural sand desert; 3(2), Volga sand desert; 4, Bogdo-Baskunchak area; 5, flood-lands country between river Volga and Akhtuba; 6, delta; 7, Podstepnye Il'meni.

dione, *Lacerta agilis*. Those places show very high numbers of reptiles.

Except Berly sands of great importance for reptilian diversity conservation are the sands around Malyi Aral settlement and small steppe ponds in Balkhuni settlement outskirts in Akhtubinskii Raion where mass accumulations of *Bufo viridis* and *Pelobates fuscus* occur as they

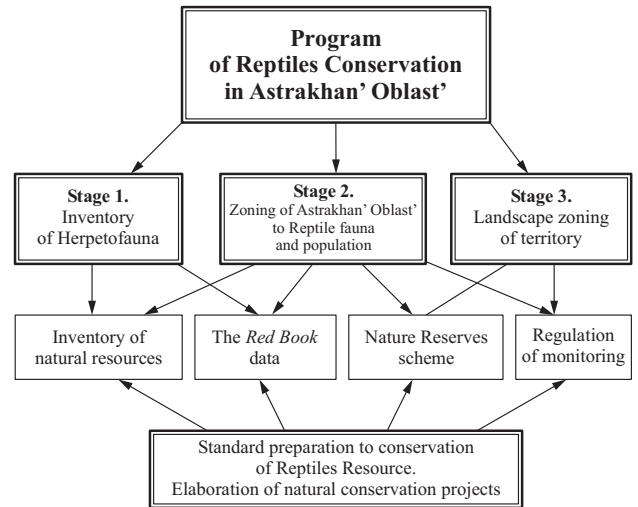


Fig. 2. Structure of action plan for regional reptiles conservation in Astrakhan' Oblast'.

mate and spawn there. In second stage of the program the high variety and originality of Bogdo-Baskunchak reserve ecotopes was refined (Bozhansky and Polynova, 1997).

It would be expedient to complete the second stage with elaboration of documents for particularized regional reserves' projection. So, according to our investigations the Berly Sands reserve was founded in 1998, situated in Kharabali Raion (500 hectares). The Malyi Aral herpetological reserve is under development now. Preproject surveys for complex zoological reserve near Balkhuni settlement were also carried out.

The third stage of the program is concerned with the development of special measures for the territorial protec-

TABLE 1. Reptile Populations of Desert and Semidesert Landscapes in Astrakhan' Oblast' (in specimens/ha)

| Species | Landscapes (see Fig. 1) | | | | | | | | |
|-----------------------------------|-------------------------|------|------|------|------|------|------|------|------|
| | 1 | 2 | 2(1) | 2(2) | 2(3) | 3 | 3(1) | 3(2) | 4 |
| <i>Eremias arguta</i> | 0.77 | 28.5 | 16.2 | 53.1 | 18.9 | 56.3 | 45.5 | 16.9 | 68.3 |
| <i>Eremias velox</i> | — | 0.33 | — | 7.5 | 16.2 | 0.7 | 4.9 | 3.2 | 1.6 |
| <i>Lacerta agilis</i> | 43.5 | + | 5.5 | — | 5.7 | — | 6.7 | — | + |
| <i>Phrynocephalus guttata</i> | — | — | — | 0.5 | — | 3.7 | 3.7 | 0.95 | 0.5 |
| <i>Phrynocephalus helioscopus</i> | — | — | 1.1 | 2.6 | — | + | — | — | — |
| <i>Phrynocephalus mystaceus</i> | — | — | — | 1.25 | — | 11.1 | — | + | — |
| <i>Eryx miliaris</i> | — | — | — | + | — | 0.33 | + | 0.03 | — |
| <i>Elaphe dione</i> | + | + | 0.56 | + | 0.3 | 0.63 | + | + | + |
| <i>Elaphe sauromates</i> | + | — | + | — | — | + | — | — | 0.33 |
| <i>Coluber caspius</i> | — | — | — | — | + | + | + | 0.97 | 0.81 |
| <i>Natrix natrix</i> | — | — | — | — | — | — | — | — | 1.44 |
| <i>Vipera renardi</i> | 0.66 | + | 1.93 | — | + | 1.0 | 2.4 | + | + |
| <i>Alsophylax pipiens</i> | — | — | — | — | — | — | — | — | 4.0 |

Note. —, give a definition; +, give a definition.

tion of individual species and reptile communities, and also with the improvement of legislative acts and by-laws supporting these measures. They are: regional *Red Data Book* regulations, annotated lists of rare species, “For Regional Herpetological Reserves” standard regulations, standard passport of a regional herpetological reserve. At present these standards have been already worked out and are being considered by regional administration.

Thus, the regional program of reptilian diversity conservation foresees:

— intraspecific level of conservation — keeping a certain diversity inside a species;

— biocenosis level — conservation actions for preventing population declining and preserving the territories richest in reptile diversity;

— landscape — preserving the places richest in reptile ecotopes diversity.

See Table 1 and Fig. 2 for formalized layout of the regional reptile conservation program.

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