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BLACK SEA SALMON *SALMO TRUTTA LABRAX*. STATUS, CONSERVATION, REHABILITATION AND MANAGEMENT STRATEGY

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ЧЕРНОМОРСКАЯ КУМЖА *SALMO TRUTTA LABRAX*. СОСТОЯНИЕ, ОХРАНА, ВОССТАНОВЛЕНИЕ И СТРАТЕГИЯ УПРАВЛЕНИЯ

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A salmon, a unique and precious phenomenon of the Black Sea and regional biodiversity has been under a constant anthropogenic pressure during the last two centuries. Though, in the living environment changed during the last 20 years, a danger of extinction was faced by the species as the result of unreasonable exploitation, which is primarily related to the processes occurring in the Black Sea such as eutrophication and degradation of ecosystems resulted from the pollution of water reservoirs, as well as surplus consumption of the biological resources and invasion of exotic species.

Protection, conservation, rehabilitation and management of salmon greatly depend on the economic, social and eco-educational successes which will be obtained by the Black Sea countries within the nearest future. To save the above-mentioned species it is necessary to unite the efforts of the Black Sea countries as well as the countries concerned with the above-mentioned problem, which was partially achieved (Helcrow, 2000 a, b; Горадзе, Гадаева, 2002; Горадзе и др., 2003; Goradze et al., 2003, 2004).

With the joint efforts taken by the Nature Protection Foundation GEF (Mee, 1996), European Union TACIS Black Sea Ecological Programme GEF/BSEP (Mee, Topping, 1998), Sal monologists from Georgian Marine Ecology and Fisheries Institute and International Nature Conservation Office of England (Halcrow, 2000a) as well as with our personal involvement and leadership (Горадзе и др. 2001) a project was carried out in 1999–2000 to elaborate "Black Sea Salmon Status and Biological Research, Conservation and Management Strategy".

The state of the Black salmon was examined by comparing with Northern Kumja and its subspecies (Caspian salmon, Aral salmon), with relative species (trout of Sevani, Tabackhuri, Eizenami, Ohrid, Mediterranean regions). A retrospective critical analysis has been used based in XIX and XX centuries being related to salmon's present area's genesis, relationships, systematic state, taxonomical nomenclature, its biology and ecology.

Since 1990 there has been implemented the ichthyologic monitoring on illegal catching of salmon and trout (Goradze et al; 2004, 2005).

The Work provides a fundamental research of salmon status in the Black, Caspian and Aral Sea basins, its ecology, systematic character as well as origin. In particular, ecology of salmon and trout species, contemporary extension ranges in the Southern Sea basins.

As the result of limited spawning, surplus fish-catching indicator and unreasonable exploitation, regulation of river flows and hydro-construction activities, the supply of trout was radically reduced in the whole region, whereas a majority of migrant salmon stocks became totally extinct, their extension range being rather intervallic and limited (Кудерский, 1974; Осинов, 1984, 1985; Цепкин, 1987; Lelek, 1987, 1988).

The work fundamentally explores systematic state of the Black, Caspian and Aral Sea salmon, trout and their cognate species on the basis of researching embryological, karyological, hematological, osteological and, immunological, immunological-serologic, ecological and bio-chemical genetics. The ways of originating salmon and trout species in Black, Caspian and Aral Sea Zoo-Geographical region were finally specified.

On the basis of comparison and critical analysis of our researches with large-scale informational materials it was proved that Black, Caspian and Aral Sea salmon and trout species have one common ancestor – Northern Kumja, which penetrated into the Southern Sea basins during the Valdai Ice Period from the water reservoirs near the glaciers located in the above-mentioned water reservoirs and water dividing lines of Baltic and White Seas. Despite a number of possible variants of salmon's moving into Southern Seas from the Northern Seas the ways and schemes presented by Kuderskii and Osinov seem to be more reliable. However, as it was noted by the authors as there existed a number of ways for Salmon's penetrating into one and the same basin and the number of populations tested in various basins is not high, it is not justified to absolute the above-mentioned schemes and reject other alternative variants. A solid basis for systematic identification and regulation of taxonomic nomenclature for the Black Sea trout, as well as its cognate species and sub-species and relevant ecotypes was created.

The Article analyzes main direction of Black Sea Salmon Conservation, their rehabilitation ad management strategies, as well as chief principles and methods of implementation.

According to our latest studies and IUCN classification the salmon habiting under dangerous ecological and anthropogenic conditions of the Black Sea and related water reservoirs is granted with the status – category EN – AT DANGER, C criterion, indicating that salmon population consists of less than 2500 grown-up individuals suffering from 20 % reduction within 5 year, i.e. 2 generation period. On the basis of data from our long-term researches as well as our personal appeal, in pursuant with conclusion drawn by the Commission Determining Species at the Edge of Extinction within Georgian Science Academy, Black Sea Salmon was granted with the category EN – at the edge of extinction, with criterion

Ald. A worrying state of the above-mentioned taxon is included is the Red List of Georgia (2006), as well as in the List of Red Books of all Black Sea and Black Seaside countries.

The Work explores the phases of salmon preservation, rehabilitation and conservation strategy, analyzing the reasons of reducing their supplies as well as results of conducted research.

Presented Article presents a program-conceptual structure for conservation, rehabilitation and future management of the Black Sea Salmon (adopted by the scientists from the countries concerned with the fate of the Black Sea Salmon), as well as aims, objectives, implementation methods and ways, possible financial sources, etc to implement the above-mentioned strategy. The Work also provides chief principles for elaborating implementation plan for management of the river appropriate for breeding salmon species, as well as basic principles, aims and objectives for implantation. The work also provides a management plan.

Fundamental study of contemporary status of the Black Sea Salmon and biology enables us to declare that with the purpose of increasing a supply and rehabilitation of the above-mentioned species maximal promotion and stimulation of natural reproduction of salmon, as well as protection of spawning population, living habitats and spawning rivers, improvement of their ecological conditions and functioning of other protective mechanisms will be more effective and efficient than a complex of reproductive measures taken down to the present down with the above-mentioned purpose.

Principal condition for conservation and rehabilitation of the Black Sea Salmon is recognition of natural reproduction as an overall priority in the water reservoirs of the Black Sea basin as a whole, application of all effective means, taking particular steps and creating special measures (ecological, ameliorative, economic, legal) for non-interruptive reproduction of Black Sea Salmon and exponential increase of its supply. Artificial reproduction is acceptable only in separate concrete cases, for reintroduction of sub-populations being at the edge of extinction dependent on conservation, as well as radically weakened and already extinct stocks of in the rivers appropriate for breeding salmon species. Natural reproduction is genetically most important and ecologically proved approach for the genetic fund of salmon and preservation of genetic balance (Дубинин, 1988; Goradze et al., 2005).

Implementation of management and monitoring of the rivers appropriate for breeding salmon species serves as a fundamental approach towards salmon strategy, principal aim of which considers preparation and further realization of implementation plan for management of separate rivers appropriate for breeding salmon species according to water reservoirs, as well as monitoring management efficiency. Natural reproduction and rehabilitation of salmon species will become possible by introducing nature protective systematic ecological measures and introduction of spawning-melioration and technical means.

To rehabilitate Black Sea salmon species and expand its aerial it is necessary to remove the impact of migration as well as physical barriers on the river and construction of fish passing ways. In relation to the above-mentioned the presented work provides reviews and photos reflecting biological, reconstructive, constructive and monitoring basis for latest and practically introduced fish passing ways. From various samples of stair type fish passing ways (Denial, Fatou, Chevron, Super-Active Baffles, Alaska) – we consider Super-Active fish passing way with bottom – resistance to be successful for the river of Eastern Black Seaside, which is highly effective for diadromous migrations for the representatives of salmon family.