

# NATURE CONSERVATION AND SUSTAINABLE MANAGEMENT OF BIODIVERSITY

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## ABSTRACT

### **A peculiar aspect of inland water management especially in Central Asia**

A brief introduction to the scientific field of biodiversity is given. Its value easily is underestimated. Reasons, general and economic ones, are discussed to save biodiversity. Therefore it should play a more important role in the future also in the field of water resources management.

The outstanding species- and population richness of aquatic ecosystems especially of Central Asia, harbouring a wealth of endemic species, is characterized. Lakes and rivers are not only a source of water for direct human use or a means to transport and clean wastewater. They have to be considered equally as the fundament for outstanding floras, faunas and habitats that affect indirectly human welfare and economy.

Aquatic biodiversity in Central Asia is endangered mainly by pollution, by loss of water by unsuitable irrigation projects and by direct or inadvertent transports of organisms across watersheds. This results in biological invasions, endangering endemic faunas and floras.

There are strategies to reconcile most of the traditional ways of use of water bodies and waterbeds (e. g. for industries, navigation, and irrigation) with the necessity to conserve water-related plant and animal life. This compatibility is examined. Proposals for advanced, integrated concepts of water management are made. They are determined to ensure conservation and continued sustainable use of biodiversity as a natural source for future economy and welfare.

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## 1. BIODIVERSITY: THE SCIENTIFIC FIELD

Life is diverse on all levels of complexity (molecular – cellular – organism – species – community). Of special interest is the diversity of species including their ecological niches. The value of species diversity and richness for the ecosystem and human being is stated by the convention on biodiversity (Convention on Biodiversity, Rio 1992) and by subsequent international agreements. Biodiversity is considered as a natural heritage and wealth. Its protection, connected with sustainable use, is one of the challenges of the 21st century.

The number only of living species (bacteria, fungi, plants, animals) which are scientifically described and registered at time is only for animals 1.85 Million; up to 20 Million animal species worldwide are expected still to be discovered.

Five global “Hot Spots” of outstanding species richness are identified, e. g. South East Asia, Madagascar, Ivory Coast, Central America. This frequently published assessment is based on plants and terrestrial animal life only. It neglects the facts

- That even small freshwater streams in the Northern hemisphere (Nearctic, Palaearctic) may harbour up to 800 species in only 10m of their course.
- That in the water bodies especially of the Northern hemisphere a highly dynamic evolution takes place, sometimes within decades, producing a wealth of infraspecific units, as subspecies, morphs, local populations etc., different from lake to lake and from watercourse to watercourse. So, each single water has its individual biodiversity pattern.
- That there is a tremendous degree of endemism especially among aquatic animals (vulnerable species restricted to very limited areas), due to their isolation in river and lake basins respective parts of them. Only to remember the largest inland basins of Central Asia as Lake Baikal, Lake Hubsugul, Lake Balkhash, and the Caspi-Aralian Basin: They harbour thousands of endemic species. (KOZHOV 1972, KOZHOVA & IZMEST'EVA 1998, KOSAREV, A. N. & E. A. YABLONSKAYA 1994, LÉTOLLE, R. & M. MAINGUET 1996, ILKIN, B. N. et al (1967).
- That biodiversity comprises not only the infraspecific and species levels but includes the diversity of habitats. This allows referring briefly to both, species and habitats together, as “nature”.