Chapter 12

# ECOLOGICAL ASSESSMENT OF DEGRADATION PROCESSES IN THE MONGOLIAN PART OF BAIKAL BASIN

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## 1. INTRODUCTION

Despite the declaration of Lake Baikal as a UNESCO World Heritage Site in 1996, the environmental quality of the lake and its surrounding ecosystems continues to decline. The southern boundary of the Baikal territory is the state border between Russia and Mongolia. However, this is a political boundary between the two nations and environmental quality of the Lake Baikal area can only be achieved under international cooperation (RFL 2002).

About 52 percent of the Baikal watershed area and over two thirds of the main artery of the Selenga river is in the central and northern part of Mongolia. This region of Mongolia is one its most densely populated and industrialized, and this creates conflicts between economic development of the region and enhanced conservation of resources. Mitigation of the conflicts requires better understanding of ecological conditions in the Mongolian part of the Lake Baikal basin.

In our case study, we describe the results of an inventory of the ecosystems of the southern (Mongolian) part of the Lake Baikal basin at the level of mesoecosystems; we have classified the ecosystems according to their economic use and level of modification by humans. We also describe the spatial distribution of ecosystem degradation processes and the levels of their impacts on the biota of both the Lake Baikal territory within Mongolia as well as in contiguous areas in Russia. The data can be used in the

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monitoring of anthropogenic pressures on the ecosystems of the Lake Baikal basin. For control purposes, we set aside plots for establishing a transborder reserve in the central part of the Selenga River.

Our study had three objectives: (1)to conduct an inventory of the ecosystems of the southern part of the Lake Baikal basin and classify them according to economic utilization and modification by humans; (2)to analyze processes affecting the Lake Baikal basin's ecosystems and components such as vegetation, soil, topographical relief, etc.; and (3)to assess integrated zoning of the southern part of the basin to help mitigate environmental degradation.

## 2. ECONOMIC CONDITIONS AND SPATIAL STRUCTURE OF THE ECOSYSTEMS OF THE SOUTHERN LAKE BAIKAL BASIN

### 2.1 Physiographical Characteristics and Natural Conditions

The basin's total area is 545 thousand $km^2$ of which 303.9 thousand $km^2$ resides within Mongolia (National Atlas of Mongolia 1990). In terms of physiographical zoning, the Mongolian part of the Lake Baikal basin is within the Siberian provinces of Khentei, Muren and Eastern Khubsugul, and within the Central Asian provinces of Orkhon, Selenga and Khangai (Murzayev 1952, Preobrazhenskii et al. 1984). Most of our study area is situated in the center of the Asian mainland between $46^0$ and $52^0$N, and $97^0$ and $109^0$E. In the north and northwest the study's boundary coincides with the state border of Russia, and in the remaining portion it passes along the main watershed of Asia dividing the watershed basins of the Arctic and Pacific Oceans, and also the region of the intramainland runoff of the Central Asia. In the south, the study area is bounded by the Khangai mountain range; and in the east, by the Khentei mountain range. The basin's climate is on the whole sharply continental, with a long cold winter, arid and windy spring, hot and relatively wet summer and cool and dry autumn. A characteristic feature of the area's climate is sharp fluctuations of precipitation from year to year (in some places from 50 mm/g in dry years to 500 mm/g in wet years). The basin contains some of Eurasia's highest levels of continental and summer aridity (Vostokova et al. 1995).