

## LANDSCAPE-ECOLOGICAL MONITORING OF THE RUSSIAN BLACK SEA COAST

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Landscape-ecological monitoring has been carried out during last years on the Black Sea coastal zone of Russia. This region, characterized by unique subtropical landscapes with relict flora and fauna, undergo various anthropogenic impacts. The ecological situation is aggravated here due to the increasing of uncontrolled recreation within the narrow coastal zone and construction of new pine-line and oil terminal near city of Novorossiysk as well as periodic influence of active nature processes such as high-floods, debris flows, hurricanes, landslides, earthquakes.

Large-scale landscape and landscape-ecological scheme (1:50000) of Abrau Peninsula (between Anapa and Novorossiysk) with more detailed maps (1:25000) on some background areas within the coastal zone and with anthropogenic transformation have been compiled on the basis of fieldwork (mapping and profiling) and distant analysis. Natural and different anthropogenic modified landscapes have been shown on these maps.

The agricultural lands, widely spread in the region, are of a particular interest for monitoring. The study area is known for its vines. It was ascertained that forest landscapes decreased by more than 50% in the region of Abrau settlement in the 40-th years of the XX century and near 20% of them was occupied by vineyards, fields and orchards. Some vineyards were cut out in the 1986 and replaced by the pine-tree plantings of different ages, cottages and so on. By 2002, vineyards decreased in some places more than five times. Study of the agricultural modified landscapes showed the reduction of the biological diversity, including ecosystems with relict and endemic species, expansion of shrubs, and the decrease of biomass, increase of soil disturbances and erosion landforms. Geochemical monitoring showed the high concentration of Cu, Pb, Sr and Zn in soils of vineyards and decrease of Mn and Ti. Recent research confirmed high concentration of Cu in the soils of former vineyards, which had been found some years ago. High concentration of Cu was marked out in the water of Abrau Lake and seawater of Novorossiysk bay. Intense applying fertilizers and pesticides characterize the agricultural lands near some cities. The high concentration of pesticides is typical for river suspension and sea sediments, especially in bays and near coast with intense viticulture.

Urban areas are notable for appearance of high concentration of Pb, Zn, Cd, Sn and etc. The lion's share of pollution is connected here with automobiles (70-85%). The increase of Pb, Zn, Cd in soils and river waters near motorways and parking zones along the coast even in the background landscapes are also marked out as a result of rapid increase of unorganized tourism and settlement. The monitoring showed the deterioration of ecological state of the coastal Mediterranean landscapes.

Special research was undertaken to estimate the modern state of river valley landscapes as a result of high-floods and debris flows of 2002 year. The increase of erosion forms, deepen of river beds on 2-4 meters as well as their expansion, the

appearance of new debris fans, damage of houses, vineyards, forests and so on are only some consequences of this nature hazard. The high pollution of seawater and the seashore by different kinds of dust is another result of the high-floods and debris flows.

The study region can be suggested as one of the main conservation site and as a standard background for landscape-ecological monitoring of Mediterranean landscapes.