自然资源学报 2011, 26(11) 1879-1889 DOI: ISSN: 1000-3037 CN: 11-1912/N

论文

丹江口库区土地利用变化与生态环境脆弱性评价

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摘要:

基于RS和GIS技术,研究了丹江口库区1990—2007年的土地利用变化状况,采用空间主成分分析法构建了生态环境脆弱性评价模型,评价了库区生态环境脆弱性,探讨了土地利用变化与生态环境脆弱性的关系。结果表明:①库区土地利用格局承受着社会经济发展和生态环境保护与建设两方面相互矛盾的巨大压力,1990—2007年间,除水田和旱地减少外,其他用地比例均有不同程度增长。②18 a间,库区生态环境整体状况有所好转,脆弱性综合指数从5.96降至5.56。林地基本处于微度脆弱性状态,灌丛、园地、草地属于轻度和中度脆弱状态,水田、旱地和未利用地多属于中度和重度脆弱状态。③不同利用类型的脆弱性综合指数顺序基本保持为:城镇>农村居民地>未利用地>旱地>园地>草地>水田>灌丛>林地,林灌措施是库区生态恢复和重建的首选,同时应加强城镇与农村居民地以及农田的生态环境建设。

关键词: 土地利用变化 生态环境脆弱性 空间主成分分析 丹江口库区

Land Use Change and Eco-Environmental Vulnerability Evaluation in the Danjiangkou Reservoir Area

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Abstract:

The Danjiangkou Reservoir is the source of water for the Middle Route Project under the South-to-North Water Transfer Scheme (SNWT) in China. The eco-environment of Danjiangkou Reservoir Area (DRA) plays an important role in water conservation and purification and would have significant implications for the economic prosperity in Hanjiang Basin as well as for the SNWT. In order to analyze the relationships between different land use patterns and eco-environment in the DRA, RS and GIS technologies were adopted, and an environmental numerical model was developed using spatial principal component analysis (SPCA) method. The land use and eco-environmental vulnerability dynamic change in the last 18 years were analyzed and discussed. The general tendency of land use change in the study area was that the proportion of forest, shrub, grassland, urban and rural land increased constantly from 48.76%, 10.13%, 5.32%, 0.35%, 0.47% to 50.41%, 12.43%, 6.91%, 0.8%, 1.49% between 1990 and 2007, and that of cropland and paddy field decreased gradually from 28.26%, 0.64% to 20.90%, 0.55% between 1990 and 2007. During this period, the land use pattern in the DRA was under the tremendous pressure from the conflict between the rapid urbanization, economic development and the eco-environmental protection and recovering. From 1990 to 2007, the average eco-environmental vulnerability synthetic index (EVSI) in the study area decreased from 5.96 to 5.56, which showed that the eco-environment of the DRA had been improved. However, the eco-environment in some areas even went worse despite of large-scale eco-environmental protection and recovering. In the DRA, most of forest, shrub and grassland were at potential or slight vulnerable levels, and the rest of the land use types basically at slight, moderate or heavy vulnerable levels. Land use types were closely correlated with eco-environment. The order of EVSI was: urban land>rural residential land>waste land>cropland>orchard>grassland>paddy field>shrub and forest land, which indicated that measures taken based on forest and shrub are the priority and important means for ecological restoration. Furthermore, the urban and rural residential land and cropland were the essential problems of the eco-environmental protection and recovering.

Keywords: Land use change eco-environmental vulnerability spatial principal component analysis

(SPCA)　Danjiangkou Reservoir Area

收稿日期 2011-01-06 **修回日期** 2011-05-08 **网络版发布日期**

DOI:

基金项目:

中国科学院"百人计划";水利部公益性行业专项(200901008)。

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