



Changes in the landscape structure of the Nagara River Basin, central Japan

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Abstract

A watershed is a structural and functional unit of a landscape consisting of various environments and sustaining a certain biodiversity. Conservation of watershed environments is important at both the regional and the national level. As a basis for conservation management, sufficient information about landscape structure should be provided for the whole terrestrial area of a watershed. In the present study, we reconstructed the former landscape structure and elucidated the changes in land use patterns during a period of about 80 years after 1900 (late Meiji era) in the Nagara River Basin, central Japan. We used three sets of maps for the analyses: old and modern topographical maps made in 1909, 1971 and 1992 by the Geographic Agency. Each map (ca. 18 km × 22 km) was divided into 400 (20 × 20) grid cells, according to latitude and longitude. The dimension of each grid cell was about 1 km² (0.9 km × 1.1 km). In each grid cell, all land-cover types were inventoried and the most dominant one was determined to be the dominant land-cover. The relative dominance (RD), frequency (FQ) and similarity index (SI) were calculated for analyses. The relative dominance of broad-leaved forest decreased, whereas those of conifer forest and residential areas increased throughout the whole study area during the 80-year period. However, regional differences in landscape change were found. In the upriver area, the relative dominance of broad-leaved forest decreased while that of conifer forest increased. In the mid-river area, the relative dominance of conifer forest decreased, while that of broad-leaved forest increased. In the present study, we revealed the basic regional differences in landscape structure and the changes in the Nagara River Basin. Land use history with reference to socio-economics should be considered as an important factor affecting the present landscape structure.

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Keywords: Landscape ecology; Old topographical map; Broad-leaved forest; Coniferous forest; Human impact; Land-cover type