

Nathakitt Puangchit 2007: The Modeling of Forest Road Standards for Khao Yai National Park, Thailand. Doctor of Philosophy (Forestry), Major Field: Forestry, Interdisciplinary Graduate Program. Thesis Advisor : Mr. Chanchai Yarwudhi, Ph.D. 242 pages.

The study of existing park roads in Khao Yai National Park was conducted to investigate the park road planning and design, road construction, road performance, and park road density. Moreover, the geometric design and park roads characteristics were included in this study, to set down the basic standards for the satisfactory roads design by mean of developing the multi-objective mathematical programming models as decision support tools for park roads management. The existing park roads data, were used to derive the relationships of park road designing and cost data. These relationships were used to formulate multi-objective mathematical programming models to obtain optimal values for park road design in national parks. The multi-objective criterion models for park roads planning and design using multi goals programming were applied to minimize conflicting goals. These developed mathematical models can be applied to control park roads design and construction in national parks of Thailand.

The results found that there were 72.092 kilometers of paved road built by Highway Department as provincial rural highway served as main road of the park and 356 kilometers of unpaved roads served as park boundary line and forest fire protection purposes. The road density indexes results of 6 management zones, intensive use zone, outdoor recreation zone, special use zone, recovery zone, strict nature reserve zone, and primitive zone were 0.802, 0.802, 1.017, 1.709, 0.0, 0.0 km/km<sup>2</sup> respectively. No road was found in the strict nature reserve zone and primitive zone. The average forest road density of Khao Yai National Park was 0.185 km/km<sup>2</sup> that was very low and had no effect to wildlife and environment, but the amount of roads were not enough to promote tourist industry in Khao Yai National Park that had average daily tourist of 2,055 persons per day and average daily traffic of 641 vehicles per day. The results of multi-goal programming indicated that the model of the less environmental impact criteria resulted in the highest cost of construction. While, the model of the maximum traveling safety and the minimum environment impact criteria resulted not much difference in construction cost. Thus, these two criteria were taken into account in preparing the proposed Park Road Standards for controlling park road design and construction in national parks.

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