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Proposing an Early-Warning System for Optimal Management of Protected Areas

(Case Study: Darmiyan Protected Area, Eastern Iran)

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Abstract

An early-warning system is a general idea that can act as a functional and inexpensive tool to ease the access to the global strategic goals of protection and sustainable development. Before the crisis happens, this system can provide effective information by using known resources, which creates an awareness of probable dangers and necessary actions. This study proposes an optimal method to cover the shortages in protected-area management. The proposed early-warning system is based on the pressure-state-response (P-S-R) approach and ecological security index. Twelve environmental indicators in three different criteria (P=4, S=5, R=3) were chosen and the ecological security index of the protected area was generated. Based on the ecological security index status in the study area, statistical analysis, and expert opinions, three indicators (precipitation, vegetation covering status, and soil brightness) were chosen as the main and final indicators, to be used in the early-warning system. Eventually, with the calculation of the thirty-year average of the mentioned indicators in the area under study, the confidence interval for each of these indicators with a confidence factor of 95% was achieved. According to the results of this research, some parts of the south-west and east of the area under study were in warning status, which requires special management decisions. Based on the field visit and expert review in these parts, there was an obvious breakdown in the selected indicators. In fact, we've prevented the ecological disturbance in the ecosystem which plays an important role in preserving species of international importance by using technologies. We've made a shortcut to achieve the managerial goals in less developed countries in further studies in this field; the importance of each early-warning system indicator can be determined, so warning regions can be divided into more categories. This research can be applied in other climates, and the result can be compared to this paper, but the choice of general and effective indicators remains the most important part of the approach reported here.

Keywords: Early-warning system; Darmiyan protected area; ecological security; PSR model

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