

Recreational Impacts on Nature-Based Recreational Areas

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In order to depict the impacts of the recreational activities on the natural based recreational areas of Taiwan. This study analyzed the landscape ecological indicators (LEI), the environment impact (EI), and the bird's indices (BI), followed with the on-site visitor's perceptions (VP) of the environmental impacts due to the recreational activities (RA). The relationship between landscape ecological structures and natural environmental impact in the natural based recreational areas were examined and analyzed.

For the on-site works, the first step is the on-site investigation of the natural environmental impacts, which includes the bird species, and recreational noise. The second section was the visitors' interview, the questionnaire items includes the cognitions of environmental impacts, their recreational purpose, satisfaction and acceptable management programs. The third section tests the relationships among landscape ecological structures, recreational impacts, and ecological function indicators of bird species.

The period of this study was performed in the past two years. The work for the first year includes the establishment of the evaluation model of the natural environmental impacts in the ecotourism areas. The model was tested at the MeiFong area, which is located in the mountain area of the middle part of Taiwan. The work for the second year was to refine the evaluation model by monitoring the conditions of the MeiFong areas and tests the evaluation model with the proposed indicators at 2 new ecotourism areas. Finally, this study tries to com-

pare the selected three testing areas to propose the management strategies and the programs for the ecotourism development.

The findings of the first year from the on-site investigations of soil compactness, vegetation cover, and roots exposures were compared with the results of the other 2 sites. The survey of the bird investigation shows the Steer's Liocichla (*Liocichla steerii*) has the highest frequency observation rate in the MeiFong area. From the visitors' reported perceptions, visitors' cognition of crowding, too much traffic, over-development, few wildlife observed, and the bad landscapes of power lines and pipelines. All the findings show the recreational impacts were serious due to development in past few years. The woods were the largest area in the landscape's ecological structure of the MeiFong area, while the water bodies were the fewest.

The relationships between landscape ecological structures were tested. Under the hierarchy of 100 meters investigation radius, farmland, wasteland, and the built area were found to have significant relationship with the bird ecological indicators. Under the 50 meter investigation radius, only grassland and wasteland have a significant relationship with the bird ecological indicators. However, under the 500 meter investigation radius, there was no relationship between landscape ecological structures and the bird ecological indicators. The Mean Patch Fragmental Dimension (MPFD) shows more than 2 significant relationships with the bird ecological indicators,

and plays a role as a good indicator in regard to the farm and grassland. For wasteland and the built areas, the Mean Shape Index (MSI) is a better predictor for the birds.

References

- Antrop M. (2001). The language of landscape ecologist and planners 3. A comparative content analysis of concepts used in landscape ecology. In: *Landscape and Urban Planning* (55), p 163-173.
- Arrowsmith, C. & Inbakaran, R. (2002). Estimating environmental resiliency for the Grampians national park, Victoria, Australia: A quantitative approach. In: *Tourism Management* (23), p 295-309.
- Farina, A. (1998). *Principles and Methods in Landscape Ecology*. New York.
- Forman, R. T. T. & Deblinger, R. D. (2000). The ecological road-effect zone of a Massachusetts (U.S.A) suburban highway. In: *Conservation Biology* (14), p 36-46.
- Forman, R.T.T., Reineking, B. & Hersperger, A. M. (2002). Road Traffic and Nearby Grassland Bird Patterns in Suburbanizing Landscape. In: *Environmental Management* (29/6), p 782-800.
- Forman, R. T. T. (1995). *Land mosaics*. Cambridge.
- Grenier, D., Kaae, B. C., Miller, M. L. & Mobley, R. W. (1993). Ecotourism, landscape architecture and urban planning. In: *Landscape and Urban Planning* (25), p 1-16.
- Hammit, W. & Cole, D. (1998). *Wildland recreation — Ecology and management*. John Wiley & Sons, Inc.
- Hansson, L. (2000). Edge structures and edge effects on plants and birds in ancient oak-hazel woodlands. In: *Landscape and Urban Planning* (46), p 203-207.
- Knight, R. L. & Cole, D. N. (1991). Effects of recreational activity on wildlife in wildlands. *North American Wildl. Nat. Res. Conf.* (56), p 238-247.
- Roggenbuck, J. W., Williams, D. R. & Watson, A. E. (1993). Defining accept-able conditions in wilderness. In: *Environmental Management* (17/2), p 187-197.
- Wall, G. & Wright, C. (1977). *The environmental impact of outdoor recreation*. Dept. of Geography Publication Series, No. 11. Waterloo.