Recreation Opportunity Classification and Challenges in Maintaining Recreation Diversity in Thailand's National Parks

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Introduction

Recreation Opportunity Spectrum (ROS) is a planning framework that has emerged in recreation systems of North America since late 1970s (Clark and Stankey 1979). It first appeared in Thailand's literature in 1998 when Tanakanjana et al. (1998) used the concept to classify ecotourism sites and developed a manual for facility development for those sites. There were some other studies in Thailand which utilized the ROS concept in the past few years. These included Ampolchan (2001), Suriyachay (2003), Ratchano (2004), and Emphandhu et. al. (2004). This paper presents the most recent findings on ROS classification of nature-based recreation sites within Thailand's national parks. This work was part of a large-scale research and development project entitled "Decision Support System for Sustainable Management Planning of Nature-based Recreation Areas" funded by the Thailand Research Fund (Tanakanjana et al. 2006).

There are 103 national parks in Thailand, covering 52,782.20 square kilometers, or 10.29% of the country's area (Department of National Parks, Plant and Wildlife Conservation 2006). This study included 91 individual recreation sites from 47 national parks around the country. While this study used recreation setting indicators similar to other ROS studies in Thailand, there were two major differences from the other studies, including quantitative measurement of setting indices and the statistical equation used to classify the ROS. It also took another step further in verifying the classification result by collecting user data to determine a consistency between normative recreation experiences and actual experiences obtained from each opportunity class.

Methods

Nature-based recreation areas in this study were classified into nine types based on ecosystem differences. The nine types of recreation areas were waterfalls, rivers and lakes, caves, hot springs, geomorphological sites, scenic areas, nature trails, islands, and beaches. A recent database of nature-based recreation areas in Thailand recorded that the total number of individual recreation sites was 1,504 sites, about 80% of them situated within the boundaries of protected areas, national parks in particular (Tanakanjana et. al. 2006). Purposive cluster sampling was used to select the sample sites based on their distribution and diversity in size and usage patterns. A total of 91 sites were chosen, including 24 waterfalls, 7 rivers and lakes, 9 caves, 6 hot springs, 8 geomorphological sites, 7 scenic areas, 11 nature trails, 10 islands, and 9 beaches.

Recreation setting indicators were developed primarily based on literature and previous in-country study (Clark and Stankey 1979; Tanakanjana et al. 1998). A focus group meeting of academics and practitioners was conducted to obtain opinions on those indicators and their measurement. The final set of recreation setting indicators was composed of seven

groups, including access, remoteness, naturalness, opportunity for social encounter, evidence of human impact, site management, and user management. Each indicator had multiple indices. The total number of indices was 16. A list of all indicators, indices, and their measurement is presented in Table 1.

At each site, inventories on basic characteristics of recreation resources were conducted using GPS and associated tools. The size of the recreation area, the area remaining natural, access conditions, and distance between each site were measured. Site boundaries were identified to cover the location of key resources such as water body for waterfalls, trail body for nature trails, coral reef area for islands, etc., as well as to cover development area, and 100 meters of natural buffering from the key resources. A user survey was also conducted at each site. A total of 1,550 visitors completed the study questionnaires. Descriptions of each setting indicator were provided in the survey questionnaire. The survey participants were asked to subjectively evaluate recreation settings. Descriptive statistics, discriminant analysis, principal component analysis, and logistic regression analysis were used in the analysis. Opinions on recreation setting of visitors with post-graduate education were put together with the opinions of the research teams (Tanakanjana et al. 2006) and used to develop initial equations to classify the ROS for the sites.

Results

Site characteristics. The study found that the majority of the recreation sites were moderate-to-small in size. The average size of waterfalls was 6,375.57 square meters; rivers and lakes, 7,694,298.77 square meters; caves, 4,262.40 square meters; hot springs, 2,021.25 square meters; geomorphological sites, 94,401.30 square meters; scenic areas, 8,988.60 square meters; nature trails, 531,052.30 square meters; islands, 3,282,310.80 square meters; and beaches, 95,266.02 square meters. Most sites were preserved in their natural state; the average percentage for all types of recreation areas of areas without vegetative alteration and physical development was 85.59%. However, it was noticeable that changes in natural areas to accommodate recreational uses have been continued in many parks.

The access to most recreation sites is by dirt road, making the sites moderately easy to get to, particularly during the dry season (between November and April). The majority of the sites had a low level of remoteness and had a moderate-to-high level of opportunity for social encounters. The evidence of human impact found in most recreation sites was moderate, and litter was the most prominent impact. Though the natural basic characteristics of recreation resources within each type of recreation area were diverse, site management of most recreation areas was uniform and consistent. Basic facilities such as parking areas, walkways, interpretive signs, trash cans, toilets, etc., were provided to visitors at almost all sites. Most sites had visitor surveillance and control, and indirect control by interpretive programs, to moderate degree. However, there was no use limit at almost all sites surveyed. The similarity of site and user management caused challenges in maintaining recreation diversity to some degree.

Use characteristics. Results from the visitor survey found that the proportion of male and female users was almost equal. Their average age was 30 years and most of them completed a university degree program. Over 50% of them had prior experience in visiting the

Setting indicators	Indices and measurement
1. Access	Land-based site: 1) Road and trail access conditions, measured by air-photo interpretation and ground checked by GPS, focusing on the last 1,500 meters before getting to a key resource; then converting to 5-point rating scale: e.g., 5 = very rough hiking trail with >1,500 meters in length; 1 = very convenient road access all year round with <500 meters' walk to key resource Water-based site: 2) Distance from mainland to the site, e.g. 5 = >70 kilometers; 1 = <10 kilometers 3) Number of months per year that the site is accessible, e.g., 5 = <3 months; 1 = 12 months
2. Remoteness	4) Distance of the site from motorized area, measured by GPS, e.g., 5 = >10 kilometers; 1 < 1 kilometer 5) Visitors' perception of the remoteness of the site, using average rating score obtained from questionnaire; e.g., 5 = very remote and peaceful (score between 4.21–5.00); 1 = very noisy (score between 1.00–1.80)
3. Naturalness	6) Percentage of areas left in their natural state, measured by air-photo interpretation and ground checked with GPS, e.g., 5 = >95%; 1 = <80%
4. Opportunity for social encounters	7) Number of other visiting parties encountered within the site, obtained from questionnaire, e.g., 5 = <5 parties; 1 > 20 parties
5. Evidence of human impacts	8) Amount of litter found in activity area (piece per 10 square meters), e.g., 5 = < 2.0; 1 = >5.0 9) Amount of broken tree branches along the trail (point per 100 meters of trail length), e.g., 5 = <1; 1 = >6 10) Percentage of area covered with broken stalagmites and stalactites (as compared with the total area covered with stalagmites and stalactites), e.g., 5 = <5; 1 = >20 11) Amount of scars on trees (point per 100 meters of trail length), e.g., 5 = <1; 1 = >6 12) Visibility of soil erosion on trails (percentage per trail length in meters), e.g., 5 = <5; 1 = >20 13) Length of trail with exposed tree roots (percentage per trail length in meters), e.g., 5 = <5; 1 = >20 All indices were measured by direct observation.
6. Site management	14) Quantity and size of facilities within the site, measuring by direct observation at each site, e.g., 5 = only trial access provided; 1 = highly developed area with full facilities that can accommodate more than 100 people at a time
7. User management	15) Direct surveillance and control by staff, 3 = no control; 2 = sometimes or in some activity areas; 1 = all the time at all activity areas 16) Indirect control by interpretive programs, 3 = no interpretive program; 2 = interpretive program installed

Table 1. Recreation setting indicators, indices, and their measurement.

site in which they were surveyed. Most user groups were individual–mass tour groups with an average group size of ten people (mean = 10.49; SD = 12.83). Generally, the diversity in socio-demographic characteristics of visitors to national parks in Thailand was moderate-to-low. It was found that most park visitors engaged in more than one type of recreation activity. The average number of activities engaged in by each individual was 3.89. The top five activities in which visitors engaged were sight-seeing, relaxing, taking photos, picnicking, and playing in waterfalls. Most activities were general recreational activities that did not require the individual characteristics or the particular resources available at the particular site of recreation.

Recreation motivation or desired recreation experience was measured with a five-point rating scale on how important each motivational item is in visiting each site. It was found that the three motivating factors with the highest mean score were motivation for being with nature (mean = 4.31; SD = 0.71), motivation for escaping from crowds and noise (mean = 4.21; SD = 0.87), and motivation for experiencing the scenic beauty of the landscape (mean = 4.15; SD = 0.75). Discriminant analysis found that the mean scores of the 15 motivational items were significantly different among each type of recreation area. For only three items, including motivation in cultural learning, motivation in being independent, and motivation for safety was there no significant difference found. However, the overall correlation among each motivational item and type of recreation area was moderate (canonical correlation = .345; p-value <.001). There was not much difference in the motivation of people who visited each type of nature-base recreation area. Recreation motivation in this study accounted for 40.9% of variance in the users of each type of recreation area.

Principal component analysis was performed to group recreation motivation items into domains. It was found that the 15 items of motivation could be grouped into five domains. The first domain was motivation for physical development and self-reliance. The second domain was motivation for relaxing, escaping from crowds and noise, and finding solitude. The third domain was motivation for safety, comfort, and social bonding. The fourth domain was motivation for experiencing nature and learning. The last domain was motivation for escaping from one's daily routine, and cultural learning. The cumulative percent of variance for the five factors was 60.65%.

ROS classification. Logistic regression analysis was employed and result was taken to develop the ROS classification equation. The ROS equation was:

$$Y = 3.762 + 0.462X1 + 0.677X2 + 1.073X3 + 0.483X4 - 0.162X5 + 0.308X6 + 0.189X7 \ (R^2 = 0.631)$$

Where Y = sum of recreation experiences to be gained from visiting recreation area in each ROS, and X1 = access, X2 = remoteness, X3 = naturalness, X4 = opportunity for social encounters, X5 = evidence of human impact, X6 = facilities and site management, and X7 = visitor management.

From the equation, factors that highly influenced the differences in opportunity class were naturalness, remoteness, and opportunity for social encounter, respectively. The ROS for recreation sites within Thailand's national parks in this study was classified into five classes primarily based on the results from recreation diversity analysis. The five ROS class-

Obtained recreation experience	MN	SPM	SPNM
Socializing, convenience, and comfort	71.95 (n=59)	54.66 (n=129)	31.96 (n=31)
Isolation, solitude, risk-taking, and self-reliance	28.05 (n=23)	45.34 (n=107)	68.04 (66)
Total	100.00 (n=82)	100.00 (n=236)	100.00 (n=97)

Chi-square = 30.053; df = 2; p-value <.001; n = 415
SPNM = semi-primitive non-motorized area; SPM = semi-primitive motorized area; MN = modified natural or rural area

Table 2. Relationship between recreation experiences and ROS of recreation areas.

es included primitive area (P); semi-primitive non-motorized area (SPNM); semi-primitive motorized area (SPM); modified natural or rural area (MN); and urban area (U). It was found that 35.17% of the recreation sites were SPM, 34.07% were SPNM, 18.68% were MN, 6.59% were U, and 5.49% were P. Finally, another user survey was conducted in order to test the consistency between normative recreation experience from visiting each opportunity class and the actual experience gained. Socializing, convenience, and comfort were specified as normative recreation experiences for more urbanized areas, while isolation, solitude, risk-taking, and self-reliance were specified as normative experiences for more primitive areas. A total of 415 recreation area users participated in the survey. The analysis found that 71.95% of people visiting MN sites obtained their normative experiences and 68.04% of those who visited SPNM did so, as presented in Table 2.

Conclusion

Findings from this study led to the conclusion that the ROS model moderately applies to Thailand's national parks. However, the study revealed that recreation diversity, the underlying concept of the ROS, has not been well maintained in the national park system. Most park managers did not pay enough attention to the diversity concept as previously discussed, causing the site management of most areas to be overly consistent and uniform. Another observation is that the majority of recreation sites were motorized, with control over uses and impacts generally less strict than in non-motorized areas. Maintaining resource quality thus becomes another challenge. Lastly, continuous change in natural areas to accommodate users and no use limits are the other challenges for recreation management in Thailand's national parks.

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