

The Indicator Performance Estimate (IPE) Approach to Defining Acceptable Conditions in Wilderness¹

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Abstract: Using data from a study conducted in the Cranberry Wilderness area, this paper describes how the Importance-Performance approach can be used to prioritize wilderness indicators and determine how much change from the pristine is acceptable. The approach uses two key types of information: (1) indicator importance, or visitor opinion as to which wilderness indicators have the greatest influence on their experience, and; (2) management performance. Performance is determined by comparing actual conditions to visitor standards using the Indicator Performance Estimates (IPE) approach. The results can than be presented graphically on a four-quadrant matrix for straightforward interpretation.

The Limits of Acceptable Change (LAC) planning framework utilizes wilderness indicators to represent the condition of the resource and the quality of visitor experiences. The framework explicitly identifies how much change from the pristine is acceptable for each indicator. However, two major limitations have arisen with the LAC process: (1) lack of knowledge about the importance or influence of various resource and social conditions relative to quality wilderness experiences (Roggenbuck, Watson, and Williams 1991), and; (2) difficulties in comparing the performance of indicators. Performance is defined here as the difference between visitor standards (the amount of change from the pristine that is acceptable to visitors) and actual conditions that exist within the area.

The Importance-Performance approach (Mengak, Dottavio, and O'Leary 1986) is an effective procedure for overcoming these limitations. Two key types of information are provided for each indicator: 1) importance, or visitor opinion as to the degree of influence the indicator has on wilderness quality and/or their wilderness experience, and 2) performance, or the degree to which an indicator exceeds or is within visitor norms or standards. The approach employs a matrix divided into four sections. Each quadrant is labeled differently to indicate different management priorities (fig. 1).

Study Process

We used the Importance-Performance approach to analyze indicator data from a study conducted during the summer of 1991 in the Cranberry Wilderness Area, located in Monongahela National Forest of West Virginia. A set of social and resource wilderness indicators was chosen that represented the issues and concerns identified by a task team of concerned publics and managers. The relative importance of the indicators was determined by asking respondents to rate, on a five point scale, the influence of each indicator on the quality of their wilderness

experience. The mean rating was then used to plot the importance of each indicator on the I-P matrix.

Determining the performance of an indicator was more complex. To determine indicator standards, questions were used asking respondents to specify their preferred level of each indicator. The actual conditions of the indicators were determined using two methods. First, respondents provided information on their perceptions of current conditions such as number of encounters and the number of visible places they saw where people have camped. Second, a campsite inventory was conducted in order to determine the amount of vegetation loss and bare ground exposure, tree damage, amount of litter, number of fire rings, etc.

Performance was viewed as the difference between visitor standards and the actual conditions of an indicator. However, indicators are measured using different scales and therefore not directly comparable. To deal with this problem, Indicator Performance Estimates (IPEs) were determined by standardizing the difference between visitor norms and actual conditions using the following formula:

$$IPE_i = \frac{p_i - a_i}{sp_i}$$

where:

- IPE_i = indicator performance estimate of indicator i
- P_i = mean visitor preference level for indicator i
- a_i = mean actual condition of indicator i
- sp_i = the standard deviation of the distribution for p_i

The formula assumes that higher values for the actual condition of an indicator represent poorer wilderness conditions (i.e., number of parties encountered). For indicators in which higher indicator values represent positive conditions (i.e., wild-life sightings), p_i would be subtracted from a_i.

Results and Discussion

The I-P values for each indicator are evident in figure 1. Two indicators appeared in the Keep up the Good Work category; number of large parties seen and the number of fire rings. Visitors found these conditions important to their wilderness experience, and rated the conditions as within visitor standards.

Five indicators appeared in the Concentrate Here category, including the number of parties of people seen each day, the number of parties camping within sight or sound of their campsite, the number of parties walking past their campsite each night, the number of visible places seen each day where people have camped, and the percent of vegetation loss and bare ground seen around where people have camped. These indicators were important to visitors, but actual conditions exceeded their preference standards. These areas warrant the greatest management attention.

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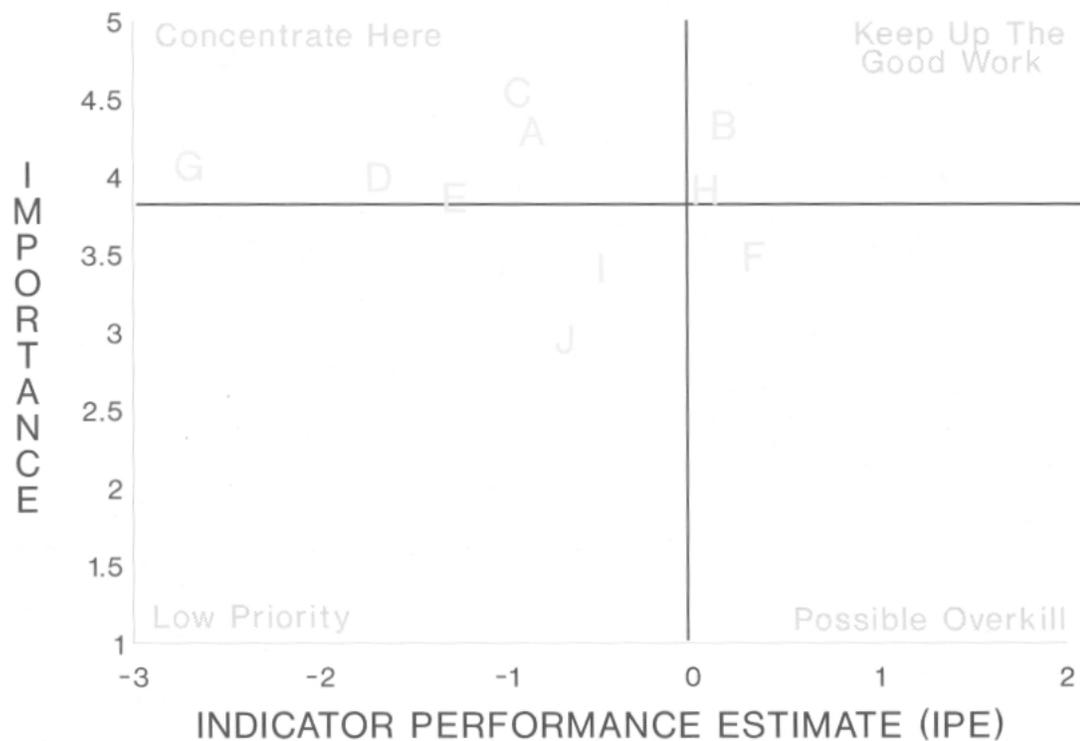


Figure 1—Importance-performance ratings of wilderness indicators, Cranberry Wilderness study, December 1991.

Code	Indicators
A	Number of parties of people seen each day
B	Number of large parties (more than 6 people) seen each day
C	Number of parties camped within sight or sound of my campsite
D	Number of parties that walk past my campsite each night
E	Number of visible places where people have camped
F	Number of horse parties encountered each day
G	Percent of vegetation loss and bare ground where people have camped
H	Number of fire rings (from campsite inventory)
I	Signs seen each day
J	Culverts seen each day

It is interesting to note that four of these indicators related to feelings of crowding while only one related to recreation impacts on the resource. The indicator that had the most influence on the quality of visitors' wilderness experience was the number of parties camped within sight or sound of their campsite. With respect to performance, the indicator that exceeded visitor standards by the greatest margin was the amount of vegetation loss and bare ground exposure where people have camped.

In order to determine the most appropriate management action for a given situation, objective information is needed regarding the influence and condition of various indicators of

wilderness quality. The I-P approach provides managers with a simple means of including this information in the LAC decision-making process.

References

- Mengak, K.; Dottavio, F.; O'Leary, J. 1986. Use of importance-performance analysis to evaluate a visitor center. *Journal of Interpretation* 11(2):1-13.
- Roggenbuck, J.; Watson, A.; Williams, D. 1992. Defining acceptable conditions in wilderness. *Environmental Management* (in press).