

## Impact Inference and Assessment

### 11.1 Societal Values and Beliefs

Much effort in the assessment of actual or potential environmental impacts is devoted to matching science with societal values and beliefs. Countries, regions, and cultures have different values or beliefs. While everyone agrees there are concepts of significance, acceptability, and sustainability there may not be agreement on how to define these terms. In Chapter 6.3 on page 45, the various attempts to apply the concept of significance to environmental impact assessments were summarized. In this chapter significance, acceptability, and sustainability are considered in the context of imprecise variables that can be quantified and manipulated objectively and rigorously.

The choice of environmental components to be included in an impact assessment is a combination of statutory requirements, the professional judgments of the technical team preparing the assessment on behalf of the project developer and resource agencies, and a reflection of general societal values. It is in the scoping process that the public and other stakeholders get to express their values. The choices made by a team of technical experts may well differ from the choices made by lawmakers, regulators, or other stakeholders. As early as the scoping stage of an assessment different values can set a confrontational tone that remains for the duration of the assessment. In the explanation of the scoping process (Chapter 3 on page 23) it is noted there are a number of advantages to the project developer, regulators, impact assessors, and decision-makers when public comments are solicited at

an early stage of the assessment process. Those who are supportive or neutral to the project can bring their local familiarity and different viewpoints to creating the list of environmental components and alternatives to be considered. Those who object to the project will have an opportunity to express their opposition and have it incorporated into the analysis. In other words, different societal segments may express their values and beliefs regarding the project.

The objective is to produce a list of environmental components that are ordered in importance and include the beliefs and value systems of everyone. The solution uses the ideas of Saaty [28] for calculating a ratio scale of pairwise comparisons for the set of elements under consideration. As extended by Yager [41], this calculation produces a vector of exponential weights reflecting relative values of the components.

The method involves each interest group with common values and beliefs choosing one from each pair of components—the one that has the higher value *to them*. The group then determines *by how much* the one component is of higher value. These values were carefully chosen to be meaningful, comprehensive, and easy to use (Table 11.1). These

**Table 11.1.** Importance values to be used in pairwise comparisons of environmental components.

Importance value	Definition
1	Equal importance
3	Weak importance of one over the other
5	Strong importance of one over the other
7	Demonstrated importance of one over the other
9	Absolute importance of one over the other
2, 4, 6, 8	Intermediate values between the two adjacent definitions

values are placed in a square, symmetrical matrix, with each cell representing the collective values of the group for a specified comparison. For example, if wildlife habitat (*i*) is more important than water quality (*j*), then the importance weights are entered in the matrix as  $a_{ij} = 1/a_{ji}$ ; the reciprocity is necessary to maintain the square matrix.