Numerical Values and Agency Decision Making

By Larry Freeman, PhD.

Does NEPA (the National Environmental Policy Act) mandate numerical values for its impact forecasts? Do the CEQ (Council on Environmental Quality) Regulations state that numerical or quantified values are necessary?

The preceding questions are good ones. Many NEPA practitioners, I suspect, have asked themselves the same questions. And a reader of last month's Shipley web newsletter did ask a similar question in an e-mail response to my newsletter article on the selection of impact indicators.

I initially answered that reader by saying that I recommended numerical data, if available, but that, as far as I knew, neither NEPA nor the CEQ Regulations "mandated" numerical values for impact forecasts. In my answer, I was taking "mandate" in a strict sense because some language in both NEPA and the CEQ Regulations does imply that quantified values would be desirable.

For example, NEPA in Section 102(A) speaks of the "integrated use of natural and social sciences and the environmental design arts." Such language implies a reliance on numerical or quantified information about the natural and social environments. This reliance assumes, of course, that numerical values even exist for a resource. For some resources (and associated impacts) no numerical values are possible based on unavailable information or inadequate methods. In these instances, an agency still has to estimate impacts even if the explanations for the impacts are only subjective judgments.

Then I went on to explain that numerical values in NEPA documents are desirable for two other reasons:

- NEPA case law decisions imply that judges expect impact projections to reflect the best and latest quantified scientific information.

- From a lay point of view, "proof" in the scientific sense surely implies measurable estimates. Thus, the credibility of an agency's forecasts has evolved to rely on quantified values as support for impact conclusions.

NEPA Case Law and the Quantification of Impact Projections

The courts seem to expect that adequate NEPA documents will be based on the best and clearly understandably scientific reasoning. Daniel Mandelker in his comprehensive *NEPA Law and Litigation* (Release #1, 2003 from West, a Thomson business) observes that an adequate EIS must "not contain vague, general, and conclusory reasoning " (Section 10-16, page 10-38).

The preceding quote does not mandate numerical values, but such values are surely implied. The best way to avoid conclusory or vague circular reasoning would, it seems to be, to lay out a chain of evidence. And evidence, by its very nature, relies on acreage, soil types, current sediment ratings for a stream, and other numerical measurements. Each environmental resource would, of course, have its own set of potential measurements or indicators of change. (For a discussion of NEPA indicators, see my newsletter article in last month's Shipley web newsletter.)

Quantification of Impacts as a Measure of the "Best Science"

NEPA impact projections begin with the existing environment, called the Affected Environment in NEPA documents. Most resource specialists begin their description of the existing environment by recording known data, using numerical values insofar as possible.

A NEPA EA (Environmental Assessment) on wild horses recorded, for example, the number of current horses, the ratio of mares to stallions, and data on the ages of horses within a herd. These numerical values were then the basis for a model that projected the carrying capacity of the range available to the horses.

This model provided estimates (impact projections) of how well a given herd of horses would do in the future. Such estimates are usually a range of potential values, but they are the best available evidence for resource managers, who have to make decisions today about how to manage the growing herds of wild horses.

As in this wild horse example, the existing environment begins with known or estimated numerical values. These then become the basis for a model that allows an agency to project horse populations 5, 10, or more years into the future. Such projections are necessarily provisional, depending upon weather variations and many other unknown future environmental and management conditions.

From a lay perspective, the best impact projections use some numerical values as a basis for a chain of evidence (thus avoiding circular or "conclusory" language). Numerical data provide both understandability and credibility to this chain of evidence.

Conclusion

Numerical values are central to any understandable and credible NEPA disclosure document. A lay reader of an EIS or EA will likely understand projected impacts if they are framed in terms of changing acres, differing widths of stream-side buffers, or a changing ratio between mares and stallions in a wild horse herd.

In today's technically inclined culture, numerical values are an assumed starting point for serious policy decisions. Consider that the recently passed federal No Child Left Behind Act is based on a faith in test data as revealing important information about individual children and about their schools. Skeptics might challenge the validity of some test data, but the reality is that both educational decision makers and parents must make decisions using whatever data is available.

Similarly, agency decision makers need credible and understandable resource data before making environmental decisions. And sound decisions require resource specialists to interpret available numerical data as fairly and honestly as possible. Specialists must remember that no one is better qualified than they are to interpret limited and perhaps contradictory numerical data about complex environmental conditions.

Such interpretations are the heart of NEPA's legal mandate: to disclose honestly and fairly to all interested parties understandable forecasts of future environmental impacts.