Avoiding and Opening Bottlenects (Newsletter)*

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Every environmental process is likely to have bottlenecks where progress toward the desired goal stalls. Bottlenecks cause long delays in EIS approvals, release of reclamation bonds, regulatory actions on environmental concerns, competing expert interpretations and understanding by finders of fact in litigation, and many other situations.

Avoiding and resolving such bottlenecks is different from preparing environmental permit applications, designing structures or operational plans, and collecting baseline and monitoring data.

The ultimate cause of environmental bottlenecks is that natural ecosystems are very complex and highly variable, and are not well understood by non-technical decision-makers and the public.

When you look at the causes of environmental bottlenecks the overwhelming majority focus on the data presented or how those data were analyzed and interpreted. Environmental policy and regulatory decisions are based on existing data, not long term research. These data are spatially and temporally spotty and could have used different methods for data collection and analysis. This lack of rigor leads to uncertainties by regulators, environmental NGOs, finders of fact, and the general public. And, of course, groups or news media with narrow agendas will select data or interpretations which promotes their cause.

Data, their analysis, and their interpretation are the foundation for environmental laws, statutes, regulations, and the bottlenecks everyone's experienced.

Adding to the confusion are the use of deterministic models (those that fix in equations how dynamic and changing ecosystems function), one-size-fits-all regulations (that fit no one situation correctly), and the use of "reference" sites (which are different in their ecologically-significant appearances and behaviors).

Natural ecosystems are dynamic and change on different time scales from hourly (weather conditions) to seasonal (life cycles of plants and animals) and longer (secondary succession in terrestrial ecosystems from bare ground to forests and river courses changing through meanders). Each ecosystem is different and understanding it requires use of statistical models that are designed

for these types of data rather than fixed models that work in the built environment. As a chemistry professor once asked me, "Shepard, how can anyone be an ecologist when everything is a variable?" My response was, "That's why we invented probability." In environmental science we deal with uncertainties by assigning likelihoods or probabilities to future conditions. There is no certainty when making environmental policy or regulatory decisions. There is also no certainty in environmental litigation, but a technically sound and legally defensible basis for the likelihood of what was observed or should be expected.

Bottlenecks involving environmental concerns have been, and can, be avoided and resolved when they do occur. Doing so begins with accepting that the tools and approaches used in the past are not appropriate and that different paradigms are required. When your business, money, or reputation are involved in the bottleneck delay and acting to get past it as quickly as possible I encourage you to use proven approaches even though you've not before gained their benefits.

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