

Sustainable Sediment Management: Whose Values Are We Sustaining?

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Introduction: Sediment management is not a sustainable practice. We manage sediment to overcome its natural tendencies to support specific goals or to address past, unsustainable practices. All active management results in (desirable and undesirable) environmental, economic and social impacts on the environment and community. Given the uncertainty inherent in many management activities, sometimes we are addressing how to balance *certain* harm against *uncertain* benefit when considering a range of alternative strategies. The challenge is optimization – how does one achieve the maximum benefit with the minimum undesirable impact?

Whenever a decision is couched in terms of sustainability, this should be defined for the question at hand: What attributes or conditions does the decision aim to sustain; Who is affected by actions (costs and benefits); For what period of time will actions convey benefits; At what cost? and Who answers the first four questions? [1] These are normative questions –not objective and science-based, but rooted in societal values, requiring engagement and a careful consideration of diverse stakeholders' priorities, bearing in mind that risks, benefits and costs are not borne equally, in terms of time, space, stakeholders (defined as any individual or group that can affect or is affected by the decision being made), or demographics. Trade-off evaluation should take into account affected communities' vulnerabilities, needs and values, and how these might be impacted by remedial options. Many stakeholders who do have the time and resources to engage in the decision process have a primary focus on a single or narrow set of remedial impacts. The use of frameworks that guide stakeholders to consider the extent to which they prioritize all (rather than just a narrow subset) of the impacts to of their values can support a more balanced public comment process, less subject to single- or narrow-issue lobbying, but capturing, understanding and addressing the needs of diverse stakeholders can be challenging. Identification of risks and benefits of most interest to stakeholders can support negotiation and optimization of alternatives, support collaborative design of more sustainable options that

addresses community values, supporting informed and balanced decision making that equitably protects services of importance to the community, but unengaged subjects, due to a lack of resources, interest, or awareness, may not have their needs and values addressed unless a special effort is made to identify and consider them.

Methods: Following on from an extensive review of the subject, seeking to pose as many questions as answers, the challenges, risks and benefits to various approaches to stakeholder engagement and trade-off evaluation will be discussed.

Results and Discussion: There can be fundamental disagreement between stakeholders on the desirability of various management impacts. In general, longer-lasting alternatives (long construction times) pose greater concerns for temporal equity—the short- to mid-term impacts associated with construction are borne by a different population, temporally, than those who will reap the benefits of a cleaner river. Qualitative equity assessments provide an opportunity to develop strategies to optimize the equity of selected remedial alternatives, or to consider the equity impacts of various alternatives; more quantitative approaches are under development. Spatial and demographic equity issues can, to some extent, be minimized using best management practices, considering community needs in design, and minimizing footprints. Many tools used to aggregate indicators of impact have embedded value judgements. Monetization using tools such as willingness to pay embed economic assumptions that are not always explicitly addressed; discounting practices privilege the welfare of the current generation over that of others. Habitat equivalency and ecosystem services frameworks also require careful consideration to consider broad-based values. Point estimates of risk and benefit values within calculation tools must be used with care. Environmental scientists seeking to support more equitable decision making must address the embedded assumptions and limitations of tools we commonly use. These issues, and potential strategies to address them, will be discussed.

References: [1] Apitz (in press) Considering the values stakeholders wish to sustain in decision making. *IEAM*.