

the newsletter of
LOS ANGELES & SAN GABRIEL RIVERS
WATERSHED COUNCIL

WATERSHED WISE

Valuing Multi-Benefit Projects *Fall 2006*



1 Establishing Economic Value For Watershed Projects

4 Analyzing the Costs and Benefits

6 Prioritizing Multiple Benefit Watershed Projects: Dollars or Sense?

8 Measures of Health

Volume 10, Number 2

PRIORITIZING MULTIPLE-BENEFIT WATERSHED PROJECTS: DOLLARS OR SENSE?

BY TRAVIS LONGCORE, PH.D | USC CENTER FOR SUSTAINABLE CITIES

Watershed management projects must more than ever achieve multiple goals and benefit multiple constituencies. The public has ratified this approach through approval of public bond issues to support multiple benefit projects and its continued desire for additional open space, habitat, and recreational opportunities along with clean water, flood protection, and reliable water supplies. A multiple benefit approach is no longer optional from both political and practical perspectives.

Within this context, agencies and advocates in the public and private sector must choose between competing projects in allocating limited public funds or in pursuing grant opportunities. How to compare projects with diverse sets of benefits and potential beneficiaries is not immediately obvious.

One option is cost-benefit analysis, where the multiple benefits of a project are expressed in a common metric — dollars and cents. But a quick look across the greater Los Angeles region reveals a landscape where cost benefit analysis in the past has led to a single purpose water management system made of concrete. Can cost-benefit analysis, better executed, now be applied to reverse the decisions of the past and choose the projects that will restore our waterways, habitats, and recreational open spaces?

Alternatives to cost-benefit analysis are available and may avoid some of the downfalls of the past. In this column, I review the shortcomings of cost-benefit analysis as a tool to prioritize environmentally beneficial project, explore how a different type of ranking system might work, and describe tools that my research group at USC is developing that would help agencies and advocates prioritize multiple benefit projects in the region.

Cost-benefit analysis that applies dollar values to desired outcomes of environmental projects has a series of well-known difficulties. Assigning values to “nonmarket goods” such as biodiversity is one of the most problematic elements. The various methods tend to undervalue the “services” given by nature because the public, and indeed scientists as well, do not fully understand ecosystems or the function of each part. Consequently, we cannot assign appropriate values to ecosystem elements.

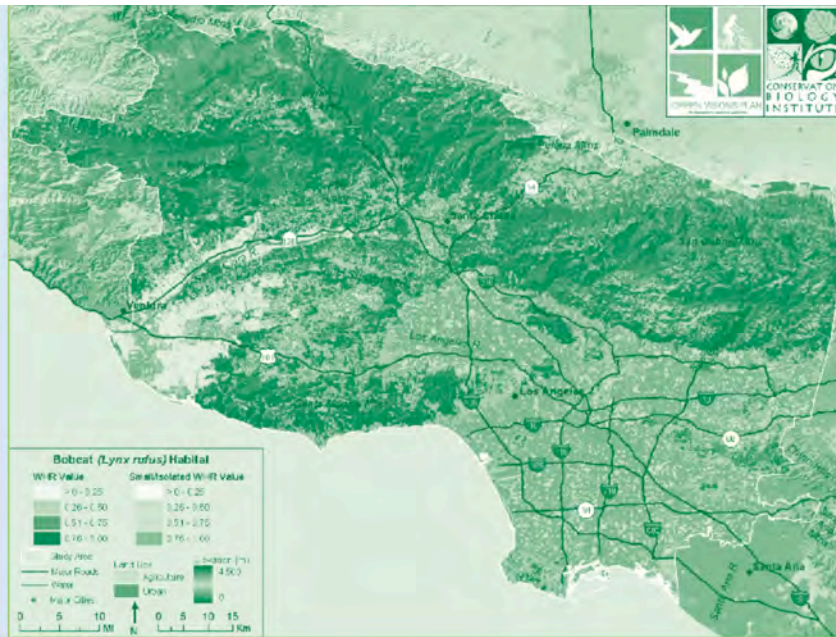
Sometimes economic values are derived by surveying individuals and measuring their willingness to pay for open space or biodiversity, but this method suffers from the lack of public understanding of ecosystem process and can yield the undesired result of resources seeming more valuable to wealthier individuals. If used as a method to prioritize proj-

ects, this would reinforce the unequal distribution of parks and open space across economic classes.

Cost-benefit analysis using monetary comparisons implies that the public good is no more than the sum of individual preferences. This is not likely to be true. Imagine the unfortunate instances where implicit cost-benefit analyses determine grade school curricula. Classes that are perceived to have little economic value to students (e.g., music, arts, social studies) are not taught. Of course this decision misses the known longer-term benefits of music and the arts to human lives and the benefits of well-educated citizens, but it is the outcome of a cost-benefit analysis, just as cost-benefit analysis for environmental projects is likely to place lower value on those elements not perceived to have personal benefits and without well-developed economic markets (e.g., biodiversity, wildlife habitat).

A final difficulty with the use of cost-benefit analysis is that the benefits often accrue to different agencies or departments than those who pay for the project. Air quality regulators, for example, do not pay local street tree departments for planting trees, even though these projects remove air pollution. In such instances, economic valuations for public goods and markets to trade them could be established. But this will only work in

Figure 1:
Habitat Analysis for the Bobcat (*Lynx rufus*). Analysis performed by Esther S. Rubin, Heather L. Rustigian, and Michael D. White of the Green Visions Team in June 2006.



limited instances where the human health imperative has made development of such markets a priority, undervaluing benefits for which markets do not exist (e.g., the commitment to protect endangered species made in the federal and state Endangered Species Acts).

An alternative approach to prioritize multiple benefit projects while avoiding the pitfalls of monetizing benefits is *cost effectiveness analysis*. This is a similar approach, but differs in that the benefits of the projects are measured in non-economic units. These metrics must be established ahead of time across the region of interest. Costs of projects are still quantified as dollars and cents, but the effectiveness of the project is measured in terms of how well it meets goals for any number of beneficial outcomes (e.g. habitat, watershed health, and recreational open space).



The framework to make comparisons across a region takes significant research to establish. But it allows the expressed priorities of society (often in the form of legal requirements) to be weighed across diverse benefits.

The USC Center for Sustainable Cities and the USC GIS Research Labo-

ratory is developing tools to set such goals and undertake cost-effectiveness analysis to prioritize projects. The *Green Visions Plan for 21st Century Southern California* has been funded by the state conservancies in the region to aid in prioritizing projects. Our research team has assembled a large quantity of data on hydrological assets, habitats, and recreational open space, and conducted a series of analysis that could be used to rank the effectiveness of multiple-benefit projects in addressing needs across the region.

For example, we have identified 40+ target wildlife species and modeled their distribution across the region based on vegetation maps. The number of target species protected by a project could be a measure of its “effectiveness” which could be quickly derived from the map output.

To make sense of the volume of data available for the region, we have integrated it all in a Geographic Information System, and provided a web-based access with tools to investigate the benefits of potential projects. These tools currently emphasize creation of recreational open space, but additional wildlife and hydrological tools will be added.

A cost-effectiveness approach has great promise in prioritizing multiple benefit watershed projects than traditional economic cost-benefit analysis. It will give decisionmakers important information about the benefits of projects and allow them to make informed decisions, while avoiding the distortions of assigning dollar values to nonmarket environmental goods. Our knowledge of ecosystems will never be perfect, so we should devise tools that encourage the protection and restoration of parts of the system that we do not understand. In the words of Aldo Leopold, “To keep every cog and wheel is the first precaution of intelligent tinkering.” A cost-effectiveness approach, based on the regional assessment and analysis of the *Green Visions Plan*, should allow us to better prioritize multiple benefit projects, give value to “every cog and wheel,” and make decisions with a long-term and humble view of the ecosystem that supports us.

www.greenvisionsplan.net

Dr. Travis Longcore is a Research Assistant Professor of Geography and Director of Urban Ecological Research at the University of Southern California Center for Sustainable Cities. Please send comments and questions to longcore@usc.edu. ☼