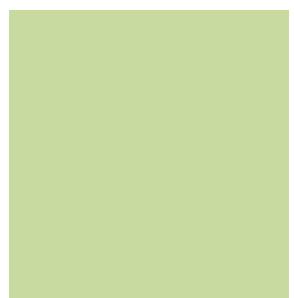




DECEMBER 2004



4. Scientific Workshop on Strategies for Integrated Habitat, Watershed, and Recreation Planning

Edited by Jennifer Wolch

Acknowledgements: The editor is grateful to John Wilson and Joseph Devinny for their guidance and to William Vuong and Maureen Phelan for administrative support. Any errors herein lie with the editor of this Technical Publication.

Prepared for: San Gabriel and Lower Angeles Rivers and Mountains Conservancy
900 South Fremont Avenue Alhambra CA 91802-1460

Cover Photo: Dune restoration (Manhattan Beach), T. Longcore

Preferred Citation: Wolch, J.R. (ed). *Green Visions Plan for 21st Century Southern California: A Guide for Habitat Conservation, Watershed Health, and Recreational Open Space. 4. Scientific Workshop on Strategies for Integrated Habitat, Watershed, and Recreation Planning*. University of Southern California GIS Research Laboratory and Center for Sustainable Cities, Los Angeles, California.



This report was printed on recycled paper.



*USC Center for
Sustainable Cities*
www.usc.edu/dept/geography/ESPE/



University of Southern California
Los Angeles, CA 90089-0255
www.usc.edu/dept/geography/gislab

USC Viterbi
School of Engineering

USC College
OF LETTERS, ARTS & SCIENCES



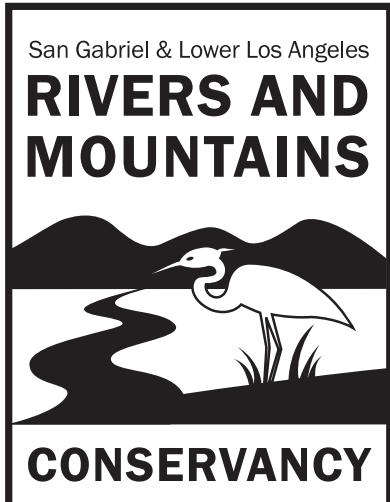
THE GREEN VISIONS PLAN

for 21st century southern california

The mission of the Green Visions Plan for 21st Century Southern California is to offer a guide to habitat conservation, watershed health and recreational open space for the Los Angeles metropolitan region. The Plan will also provide decision support tools to nurture a living green matrix for southern California. Our goals are to protect and restore natural areas, restore natural hydrological function, promote equitable access to open space, and maximize support via multiple-use facilities. The Plan is a joint venture between the University of Southern California and the San Gabriel and lower Los Angeles Rivers and Mountains Conservancy, Santa Monica Mountains Conservancy, Coastal Conservancy, and Baldwin Hills Conservancy.

www.greenvisionsplan.net

FUNDERS AND COLLABORATORS



www.rmc.com



Santa Monica Mountains
Conservancy



BALDWIN HILLS
CONSERVANCY

TABLE OF CONTENTS

WORKSHOP PARTICIPANTS	3
INTRODUCTION	4
SUMMARY AND USC TEAM RESPONSES	6
MORNING SESSION: INTRODUCTORY DISCUSSION	9
MORNING SESSION: HABITAT CONSERVATION	21
AFTERNOON SESSION: WATERSHED HEALTH	46
AFTERNOON SESSION: RECREATIONAL OPEN SPACE	59
AFTERNOON SESSION: GIS TOOLS	70
AFTERNOON SESSION: CLOSING COMMENTS	81
LITERATURE CITED	82
APPENDIX: POWERPOINT PRESENTATION	83



WORKSHOP PARTICIPANTS

Invited Scientists and Experts:

PB: *Paul Beier, Northern Arizona University*
WD: *William Deverell, California Institute of Technology*
MD: *Michael Drennan, Brown and Caldwell*
WF: *Bill Fulton, Solimar/USC*
JHT: *Jeff Haltiner, Phillip Williams and Associates*
MH: *Marc Hoshovsky, California Resources Agency*
JL: *John Landis, University of California, Berkeley*
ALS: *Anastasia Loukaitou-Sideris, University of California, Los Angeles*
KS: *Ken Schwarz, Jones and Stokes Associates*
JS: *Jerre Stallcup, Conservation Biology Institute*
DS: *David Stoms, University of California, Santa Barbara*
MW: *Michael White, Conservation Biology Institute*

Conservancy Partners

BF: *Belinda Faustinos, Rivers and Mountains Conservancy*
EA: *Enrique Arroyo, Rivers and Mountains Conservancy*
AP: *Andrew Petrow, Rivers and Mountains Conservancy*
KS: *Kelly Schmoker, Rivers and Mountains Conservancy*
JH: *Jeff Harlan, Baldwin Hills Conservancy*
MB: *Marc Beyeler, Coastal Conservancy*

USC Green Visions Team:

JRW: *Jennifer Wolch*
JPW: *John Wilson*
TL: *Travis Longcore*
JD: *Joe Devinny*
CL: *Christina Li*
CSL: *Christine Lam*
JS: *Jaime Sayre*
HC: *Hong Chen*

Other Research Assistants and Student Observers:

NC: *Ning Chen, USC*
JS: *Josh Steele, USC*
KP: *Ka`iulani Piper, USC*
PM: *Peter Marolt, USC*

INTRODUCTION

The Green Visions Plan for 21st Century Southern California is a joint venture by the San Gabriel and Lower Los Angeles Rivers and Mountains Conservancy (RMC), Santa Monica Mountains Conservancy (SMMC), Baldwin Hills Conservancy (BHC), and California Coastal Conservancy (CC) to develop a comprehensive habitat conservation, watershed protection, and recreational opportunities plan for southern California. This effort, involving academic experts, political leaders, and stakeholders from the business, government, nonprofit and community sectors, will provide a set of values and principles as well as technical planning tools, capable of guiding the development of a living green matrix for southern California. The Plan's area includes the RMC, SMMC, and BHC territories, as well as CC's dual mandated territories (the coastal zone itself, and watersheds draining into the Pacific Ocean). Figure 1 illustrates the entire Plan area.

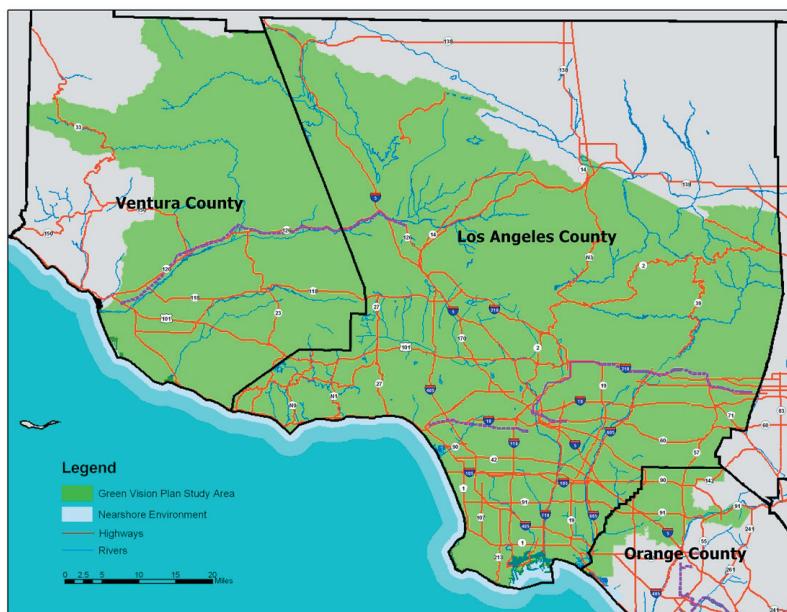


Figure 1. Green Visions Plan Area

The long-term goals of the *Green Visions Plan* are to:

- Protect and restore natural areas to ensure the persistence of native biodiversity and reintroduction of historically present natural communities;
- Restore natural function to the hydrological cycle to maximize groundwater recharge, improve storm water quality, and minimize flood hazards;
- Increase and ensure equitable access for residents to a range of open space types and recreational opportunities, and thereby reduce socioeconomic and geographic disparities in present-day patterns of access to these types of resources; and
- Maximize political and financial support for the Plan by proposing multiple-use facilities wherever possible to meet the goals of habitat restoration and conservation, restoration of hydroecological function, and provision of recreational open space.

Clearly, these are ambitious goals. Although they are widely shared by the many public agencies and private organizations and residents concerned with making southern California more livable, equitable, and ecologically sustainable, the *Green Visions Plan* is not a regulatory plan. It will thus have no power to direct local land use. The primary value of the *Green Visions Plan* will be to set forth a needs-based, long-range plan designed to help the multitude of actors involved in shaping the region's future.

The Plan will highlight the opportunities and constraints that may arise as habitat conservation and restoration projects, open space acquisitions and recreation improvements, and efforts to protect

watersheds are proposed and implemented. The tools and data developed as part of the Plan will also expand the analytic and planning capabilities of local agencies and organizations that seek to attract public funding or allocate their own resources, reduce the fragmented, piecemeal approach to regional resource planning, and promote projects whose collective impacts – because they are part of a larger scientifically grounded vision – are greater than the sum of their parts.

The USC Center for Sustainable Cities and GIS Research Laboratory (hereafter referred to as the Center and GIS Lab respectively) has been tasked to take the lead in development of the *Green Visions Plan* and the accompanying GIS planning tools and datasets. The work, itself, will be completed in two phases. Phase 1 involved the specification of analytic frameworks to guide the work conducted for each of the three focus areas, the hosting of a workshop to solicit additional ideas and feedback about these frameworks, the creation of an inventory of existing plans in the Plan Area, and the development of a data catalogue to identify gaps in geospatial data and other information that must be filled before more detailed plans and the GIS-based planning tools can be developed. This particular report describes the topics that were discussed and the advice that was gathered at a workshop involving the study team and numerous experts. The major tasks identified in the framework – the identification and assessment of opportunities for habitat conservation and restoration, open space acquisition and recreational facilities development, watershed protection efforts, and the development of the GIS planning tools and geospatial datasets will be completed during Phase 2.

The remainder of this report provides edited transcripts from the Workshop of scientific experts convened on April 21, 2004 at USC's Davidson Conference Center. Each participant was provided with the draft Green Visions Analytic Framework document (see Wolch et al. (2004) for the final version of this document). We also summarize the major points of discussion, and discuss how suggestions will be incorporated into the Plan. The PowerPoint presentations prepared for the Workshop can be found in the appendix to this report. As a disclaimer, we note that the editing process was designed to streamline and clarify comments; hence the text does not reflect verbatim speech in all cases. In addition, some cross-talk was eliminated for the sake of clarity.

SUMMARY AND USC TEAM RESPONSES

Summary

The workshop itself was split into five sessions sandwiched between short introductory and closing sessions. The project overview and habitat conservation sessions took up the morning and the watershed health, recreation open space, and GIS tools sessions followed in the afternoon. A brief introduction organized around a short slide presentation was used to kick off each of the sessions (see Appendix A for copies of the slides that were used). The four subsections that follow summarize the major suggestions for improving the various analytic frameworks offered by the workshop participants. These serve in many ways as a summary of the workshop but readers interested in learning more about a particular topic and/or recommendation will find more information in the appropriate section of the workshop proceedings that follow the summaries.

Habitat Conservation

Workshop feedback on the proposed approach to biological resources addressed six topic areas. First, participants did not favor the term "prioritization" because it implied a single approach that may be too restrictive. The term "evaluation" was preferred to characterize the analysis of parcels. Second, participants expressed a need for an "integrity analysis" that would evaluate the naturalness of particular locations. This would apply to those sites that are still undeveloped. Third, some concern was voiced about the resolution of the analysis. A sliding scale for resolution was suggested that would allow for greater detail in areas, such as wetlands, that have small but important habitat features. While parcels make up the basis for analysis, parcels should not be the only mapping unit. Fourth, some participants expressed a need to evaluate threats to parcels such as urban development, excessive fuel loads, and invasive species. Fifth, questions were raised about focal species. Do they provide important information beyond that provided by a vegetation community analysis? Will habitat suitability models be constructed? What criteria will be used to choose focal species? Participants agreed that population viability analysis could be a useful activity, but that the process was more important than the results. Sixth, the issue of the cost of conservation schemes was raised as an important component for any plan that might actually be implemented. The costs of obtaining, restoring, and maintaining parcels will ultimately dictate what is feasible. Participants agreed, nevertheless, that a vision for the region did not necessarily need to include cost estimates.

Watershed Health

Workshop feedback on the proposed approach to watershed health also addressed six topic areas. First, participants noted that the methodologies and guidelines that we might adopt for this component seemed less clear-cut than was the case for habitat conservation. They suggested that we develop a prototype application using a portion of the study area so that we could learn more about the desirability and feasibility of the different watershed modeling and analysis options. Second, the participants challenged us to think about what could be achieved at the regional scale that is not being dealt with at the local watershed or project-specific scale and to focus our attention on these aspects of watershed health. Third, the participants reiterated the need for baseline information – the historical characterization of the stream channel network, the subwatersheds that contribute flow, sediments, etc., and hydrologic regimes that characterized various parts of this network. This information should then be compared with the present-day inventory to measure impact – to identify what's left, what's missing, what's changed, etc. This analysis needs to describe the stream channel network as well as the sub-watersheds that contribute to various parts of the network. Fourth, the participants advocated the need to describe the basic geomorphic and hydrologic processes operating in the study area, such as the geographic extent of the groundwater basins and where infiltration occurs at present. Fifth, the participants shared some of

their own experiences with modeling studies and offered various types of advice for our own work. Some participants encouraged us to look at the water balances developed by the California Department of Water Resources, the GIS- and land use-based water quality models developed by Los Angeles County to characterize the water quality conditions in the study area, and the HGM or some similar methodology could help with the evaluation of aquatic habitat parameters on a regional scale. And several participants suggested we compile an inventory of sites for which more detailed hydrologic modeling and/or analysis has been completed or is now underway. Sixth, the need to be able to overlay hydrologic assets with parcel data was identified as an important project need because strategic land acquisition is likely to feature prominently in plans to improve watershed health throughout the region.

Recreational Open Space

Workshop participants raised four key issues, around definitions of need for parks and open space; how the supply of open space would be characterized; useful variations on accessibility measures; and how Green Vision Plan tools will interface with decision-making mechanisms on the ground. First, with respect to need, participants contended that recreational open space need cannot simply be estimated on an acres/capita basis, since preferences vary across socio-demographic and cultural groups. However, a consideration that emerged through discussion was that parks and open space exist over long periods of time, during which proximate populations may change radically. Thus we will characterize what is known about the current distribution of need (based on case-specific studies and population surveys), but will not incorporate preferences directly. It should be noted that such preferences are to some extent already incorporated through existing proposals for recreational open space (in city general plans, for example) that will be woven into the Green Visions Plan. Second, the supply of current open space will be inventoried, and characterized based on size but also the range of park/open space types. Some participants suggested that the quality of maintenance was a key factor in the adequacy of park/recreation and open space supply, and so we will include a characterization of park and open space ‘quality’ in our assessment. Supply is also influenced by the availability of private open space (namely, large backyards or gardens, facilities in apartment complexes, and so on) that strongly conditions how residents perceive their recreational opportunities, and so measures of private open space will be incorporated into the analysis. Third, to estimate accessibility, we will move away from simple distance measures, to develop accessibility indices that incorporate both linear distance and network distance and times (via the street network for walking and driving, and by public transit routes), so as to differentiate the accessibility enjoyed by those traveling by car versus transit. Fourth and lastly, workshop participants were concerned that tools developed be directly useful to those making decisions on parks and open space. Hence we will work to characterize alternative park ‘delivery models’ (for example, community land trusts, cities, nonprofits), and will involve stakeholders from those communities in “hands-on” discussions of what features of tools are the most useful for them.

GIS Tools

Workshop feedback on the proposed approach for building GIS tools focused on six aspects. First, there were many suggestions about the desirability and/or need for the GIS data themes to accommodate varying geographic extents, scales (minimum map units, cell sizes, etc.), and time spans. Some information will not be suited to GIS analysis and some tools and data will, ideally, be able to be used to support historical analysis across the entire region. Several potentially useful data sources and/or GIS data sets were also identified throughout the course of the workshop. Second, most participants supported the idea of building scorecards for habitat conservation, watershed health, and recreation open space with a series of sliders that users could utilize to set their own weights. This approach would provide us with the opportunity to consider the social setting as well as the science. Third, participants

advocated expanding the scorecards to include some consideration of threats. This is tricky. Some threats take the form of direct competition (i.e. they are parcel-specific) whereas others have to do with connectivity and various other types of linkages. However, both of these categories of threats may be difficult to identify and capture with a suite of GIS tools. Fourth, participants wondered whether or not we would be able to build toolsets that served the conservancies, local governments, and the general public. They encouraged us to prioritize these audiences and spend some substantial time trying to understand the decision processes of the different groups of users (and perhaps less time on the technical computer design issues). Fifth, participants suggested that the conservancies would be interested in and/or would need two types of analysis – one might be focused on parcels and essentially address what is the significance of doing x or y at this place (as captured in our analytic framework) but the other would aim for some form of regional assessment (e.g. where would you look to invest \$40 million in riparian restoration if funds for this specific purpose suddenly became available). This latter approach might best be handled by building tools that could generate various types of surfaces for different variables on the fly. Finally, several participants questioned the desirability of using the parcel as the basic unit of analysis. Some of these concerns focused on geographic variability – noting that the parcel might serve as the best unit of analysis in built-up areas but not other areas. Other concerns focused on the need for contextual queries – hence, the parcel might serve as a locator to launch a query over a larger area (sub-watersheds, habitat corridors, circular windows, etc.) centered on that particular parcel. All of the participants agreed that the choice of spatial unit was critical and that there was not one option that would best serve different variables and/or parts of the study area.

MORNING SESSION: INTRODUCTORY DISCUSSION

JRW: Thank you for joining us for this workshop, and helping us guide what we hope will be a significant planning effort for the region. So on behalf of all of us at USC and the RMC, let me offer many thanks for coming today.

BF: First of all, I again want to echo Jennifer's statement earlier that we really appreciate all of you taking time from your busy schedules to be here today. You're truly going to be an inspiration to us as we move forward in this endeavor. The *Eden by Design* book that was produced by Greg Hise and Bill Deverell inspired me to take a look at this issue of planning in even more depth and to intensify the RMC's planning efforts in the coming years. The Los Angeles region has witnessed many the efforts over the last several years to restore and revitalize our open space areas, our habitat. This has been a critical focus for all of the conservation agencies, and park agencies that are involved here in southern California.

As the RMC was looking at following through with its subsequent planning efforts, one realization was that at the most fundamental level, we're talking about watersheds and the importance of ecosystem development and preservation. We can't do this in an isolated manner. We have to look at how we fit into the bigger picture. The RMC's territory overlaps with many of the other conservancies down here in southern California, with state parks, and with local park agencies obviously. So we took the larger view and said we have to work collaboratively with all of our other partner agencies in the region, and not look at just our territory as an isolated part of it, if we want this ecosystem to survive, to have some vitality. In future years we have to look at this ecosystem holistically.

So that's our purpose and our intent in being here today, this is why we asked the Center for Sustainable Cities to work with us on this endeavor, and why our significant partners – the Coastal Conservancy, Baldwin Hills Conservancy and Santa Monica Mountains Conservancy (unfortunately not represented here today) – wanted to see how we could leverage each other's efforts to make this happen. And I think that in today's discussion we also hope to get feedback from you to make sure that the planning effort that we're going to undertake really uses the expertise that we have around this room to help guide us and formulate how we move ahead with our planning efforts. I'm not going to reiterate what I know Jennifer's going to talk about in terms of our specific plan goals, but what I really wanted to convey is that this has to be a collaborative effort. We have to utilize those plans, documents, and expertise that have been developed already. We don't want to reinvent the wheel, but we have to put all of this work together cohesively because when we go and look for future funding, or develop future bond measures, I think it behooves all of us to show how we have collaborated, how we can make this picture work and be a real blueprint for what southern California could become.

JRW: Mark Beyeler, did you have anything to add before we start?

MB: The last thing that was said about a trajectory towards new resources, and greater common collaboration both between the state agencies and all the local and regional stakeholders, is important. We need community efforts to establish a new vision for southern California and the greater Los Angeles region, and this is something in which we welcome the chance to participate. I'm from northern California, but I grew up in southern California and I work down here almost every week, and I will say that Los Angeles and southern California faces a challenge, to communicate its natural and human world to the rest of the state. A lot of money comes from Sacramento, a lot of us live and work in the Bay Area and Sacramento, and it's a challenge that I think you can perform, but we'd like to help in strategically locating what we do together, so we welcome this opportunity.

JRW: Jeff Harlan, from Baldwin Hills Conservancy – would you like to say a few words?

JH: I really don't have much more to add, except that I've actually been saying that same thing time and time again.

JRW: I'd like to provide a bit of background before we start our initial discussion about this project. Belinda gave you some background but basically we all know that we face a legacy of piecemeal planning, a lot of environmental problems, habitat loss, watershed contamination, coastal ocean pollution, ecosystem dysfunction, and a lack of (and maldistribution of) open space for people in the region. Also an important driver of this project is the way that resources are flowing into the region for habitat conservation, watershed development and open space. These resources are structured in ways that make it difficult for smaller cities and poorer cities without as much staffing to compete successfully for resources to aid their communities. I think we're also all aware that a lot of dollars will be invested in the region from various sources, certainly not the least the state, to acquire open space, to improve open space resources, conserve habitat and so on. As Belinda said, it's important to have a unified vision that makes it easier for those funds to add up to something more than a series of individual projects.

We have four goals guiding the plan. They're very general. The first is simply to protect and restore natural areas, to preserve native ecosystems, native vegetation and animals, and to reintroduce historically present natural communities. That emphasizes the fact that we're also interested, as part of this effort, in thinking about what was here in southern California and how we might recreate some of those historically present environments, maybe not all in the same spot but hopefully somewhere in the region.

A second goal is to restore natural function to the hydrological cycle in the region, to map groundwater recharge, improve runoff water quality, and minimize flood hazards. Not only are we all interested in this but there are many regulations driving some of these goals.

Our third goal is really about people and their relationship to nature in the region. Here the major emphasis is on providing better access to open space, particularly for under served communities, of which there are many. Many people in the region have virtually no access to, not only the region's large open spaces like the ocean, beach and the mountains, and some of the rivers – but they don't have access even to local parks and open spaces.

Our final goal is in some ways an instrumental goal. One of the things that we want to achieve is multipurpose suggestions or recommendations for projects – projects that accomplish a variety of functions (such as habitat conservation and restoration, recreation and open space, services provision and improving watershed health). I think that it's clear that these types of multipurpose approaches are important to generating financial support and also political support. So that's another goal.

From the map of the Green Visions Plan area, you can see that it's very large. As Belinda said there is some overlap in conservancy boundaries, but the main point is that this is a very large area, and a very large part of southern California. The first phase of the project (the first 6 months) has been devoted to a preplanning exercise. We've created a Plan Library – because we don't want to start from scratch and reinvent the wheel, it's been very important for us to look at all the planning efforts that have been going on in this very large territory, to find out what communities want, what agencies want, what national non-profits are working toward, so that we can

incorporate, to the extent possible, the aspirations that have already been articulated in the plans that have been developed thus far. We want to provide an easy way to access that information, so we have developed a clickable web-based map for people to eventually use, so they can go to the Plan Library and look at summaries of a particular plan. We worked on a system for cataloguing data, cataloguing metadata, and we're in the midst of a data scan to find out exactly where the data gaps are in terms of our work as we move forward. Eventually we're going to be working on forming technical committees to help guide this effort, and as you all already received, we have prepared a framework document that will be helpful for the focus of today's discussion.

Just to give you a little background on the Plan Library, these are the kinds of plans that we have been collecting over the last few months – the Research Assistants have done a spectacular job in ferreting these often elusive plans out. And anybody who's worked with General Plans, for example, knows that many of them are in some state of inaccessibility or disarray, or they're out of date. But we've looked at a large variety of plan types, including forest plans, and this slide gives you an idea of the number of the plans that have been collected by the different types. We're looking at a universe of about 170 plans, and most of them have been entered, meaning they've been logged and summarized, in terms of their major recommendations.

We also will be able to look at these data on the basis of function. If you don't know what kind of agency has done a plan, you can just type in "landscape design" and a plan will come up, if there's a plan out there that exists. Looking at plans from this perspective, we actually have more plans because general plans of course have elements. Once you divide them up by function, you have a lot more sub-plans to deal with. So we have a large number of plans, and you can see the distribution: lots of recreation and parks plans, habitat and biological resource plans, and bicycle trail plans. This is a highly variable landscape in terms of plan size and scope. The plan information is entered via an Access database that the team created, and it can be updated. Finally, this gives you some idea of the map that's been created to display the plan information. Eventually, you'll be able to search on this map, you'll be able to click on an area and pull up what plans have been done, search by plan type, and also zoom in and look at what's going on in a smaller area.

We're expecting that eventually this will be a resource available to others, and it can be continually updated, to enable people who are with agencies, community groups, or cities that are thinking about a project for an area, to see what's going on around them.

The main point about the plans is that there are a lot of plans in progress, some of the watershed efforts are just now starting to come out and they're not done yet. But there isn't any region-wide plan other than what SCAG will produce as part of its COMPASS planning project, which is transportation driven.

MB: How will the data itself get rolled up, from the regional plans down to the small-scale plans? The objectives don't get rolled up as easily because you're looking at things from a different scale.

JRW: What we're hoping is that part of the rating system used to score potential parcels for acquisition or redevelopment or projects would indicate whether or not the kind of project that is being thought about for a particular parcel is consistent with a local plan, for example. One of the things that we expected to find was a lot more data associated with plans, but that hasn't happened; a lot of it is too general. There are some big exceptions but at the local, smallest scale this is true. And there are high levels of variability in the quality of plans we obtained.

So this actually speaks to this issue you've raised. One of the things that we will be able to do with

this kind of database is to show which areas have a lot of planning activity going on, and which areas don't have anything really happening, except maybe a General Plan coverage of some kind. Most of the General Plans are outdated, they're often vague, sometimes they are virtually impossible to get. There are some exceptions; some specify particular open spaces that they're very interested in protecting, for example Burbank, which has generated some strict hillside ordinances to protect specific hillsides in that jurisdiction. There are also some sub-plans that are quite specific – such as Bike Plans, and some of the park and recreation plans, that actually specify parcels, locations and routes. But it's extremely uneven. There is an LA County bike plan, luckily, so there is a little bit on the regional level when it comes to bikeways.

The watershed plan review that Kelly Schmoker undertook showed that a lot of the watershed planning that's going on really does focus on the main channels and not the tributaries and not the upland areas or efforts to protect uplands. And species restoration plans do provide some geographic detail, but aquatic species for example, haven't been given very much attention yet.

We've also done a data scan assessment, basically looking at all the geospatial data sources that are available, assessing their coverage, quality, currency, and availability. We obviously want to use all the data that's already been collected, from secondary and other sources. But we also want to make sure that we know what data gaps exist as we move forward on the plan, and I'm sure that's going to be a central point of discussion today.

These are the kinds of data that we're looking at and because this effort involves so much of the urban area as well as the region's wild lands and urban wildlife interface zones, there's a lot of social economic data, land use data, and infrastructure data that were acquired as well as the habitat and watershed information.

The scan information is being entered using cataloguing systems developed by the GIS Research Lab that are consistent with Legacy and ESRI products, and so hopefully they will be usable by other folks, once the data is provided online, which is something we envisage in the future. Metadata catalogue systems allow us to track where the data sets are coming from, and assess their parameters.

In the next phase of the project, one of the goals is to have a framework and a methodology for this kind of complicated effort. From this basis, we can develop a much more detailed set of work plans for the second phase of the project. The framework document you've been provided with lays the groundwork for this. We also will create the GIS planning tools for the conservancies as well as local agencies and nonprofits. And also one of the things that will be important is to figure out how to keep the plan alive. A lot of great efforts die on the vine, people spend lots of time collecting data and then it sits there and it doesn't get updated, and so part of the challenge is to figure out a way that the tools can be utilized for as long as possible and the cost of updating them and maintaining them can be minimized.

These are some of the products that we're expecting to produce as part of the second phase of this plan:

- Schematic landscape plans for recreational open space
- Early notice maps
- Multi-use plans for watershed health

And also one of the things that we are hoping will be a novel contribution here is the design of

model ordinances that cities can incorporate into their planning apparatus that will help promote a more sustainable region and provide them guidance on questions about restoration, urban forests, lighting to minimize night sky pollution and so on.

We're also talking about other kinds of efforts that could be part of Phase 2, pending resolution of the state's budget. If we're able to, we hope to look at the extent to which this plan is in conformance with some of the infrastructure plans that are out there, particularly with flood control and integrated water planning and so on. We'd also like to look more closely at general plans and what might have to change in order to make them consistent with the Green Visions Plan. We'd like to look at some of the political and legal obstacles or barriers to implementing this kind of plan. What kinds of political changes or legal changes might need to occur in order for this to become more of a guiding document for the region?

We think it's also going to be important to test out the models and see if they actually work in particular places, and so we envisage having a small set of demonstration sites in which the tools will be used and folks on the ground, from the community, will be involved in using the tools and deciding what should, if there are parcels available, go into a particular area. This will let us know how useful the tools actually are, and what changes need to be made in this suite of tools and the plan itself, in order for it to be as useful as possible.

Lastly, any effort like this needs a major communications and public education strategy and effort, and this one certainly is no different. From my perspective this is actually one of the most critical pieces of the whole project.

JS: Will you be looking at an implementation structure as part of this planning effort?

JRW: I think that's something the conservancies will probably do.

BF: For the RMC, that's definitely what we see as being the useful outcome of this planning process. Obviously for us the challenge is how do we take this plan and then use it to mold our priorities based on the outcomes here, because that is one of the challenges for us. Our priorities so far in terms of funding have been dictated by opportunities that are brought to us, not necessarily based on a good analysis done to identify the most critical acquisition or restoration project. This is why we got started down this Green Visions road to begin with. And again, there has been a lot of planning historically, a lot of local community efforts to preserve open space, to develop restoration opportunities. I'm not saying that any of those projects shouldn't have been done, but were they in fact the highest priority? There isn't a good document out there to give us that kind of a template, a growth map, if you will. So that's what we're really looking for. We want a tool that can be based on different sets of criteria and can be used flexibly. We don't want a tool that says, OK, RMC, you need to buy these top five properties, and you can't cross that line and go beneath that. Obviously there are many things to consider, like real estate sellers that appear and create opportunities, political situations and so on. But we want to have a blueprint that tells us from an ecological standpoint, these should be some of our highest priorities.

JS: One example perhaps of the usefulness of implementation structures pertains to database maintenance. Once this planning phase is over and you've accumulated all the data, catalogued it, you acknowledge that there's going to be a challenge of maintaining that database. Is there going to be some sort of database maintenance entity, or is that going to be up to the individual conservancies or individual participants? Will there be some sort of regional entity or regional database maintenance that oversees management?

JRW: That's one of the challenges, that John Wilson keeps reminding everybody about, who's going to maintain this? I think that in order for it to have long-term utility, somebody's going to have to be updating the plans and also data on land use. If you're looking at potential opportunities, parcels out there that could be acquired, for example, you have to have up to the minute assessor's data. And public land inventory data. So there has to be a mechanism whereby not all the data has to get updated, but some of it has to get updated pretty regularly.

ALS: You mentioned that you would like to be sensitive to the different constituencies and municipalities and their plans, and at the same time you want to create a regional vision, another type of plan. Have you checked, or are you planning to check to see how consistent all of these plans are, in terms of goals and objectives?

JRW: That was one of the reasons that we wanted to do the Plan Library and look at all of these general plans. I think that there are conflicts definitely out there. A lot of the planning is so general, however. They will probably have to be other processes in terms of implementation that involve localities in working through the extent to which some things that are suggested by this plan are not consistent what they want.

MB: Or work with them to ensure that what is proposed in the plan is implemented with individual jurisdictions, or at least not precluded from being implemented.

JRW: That will require looking at these sorts of legal barriers.

JHT: One observation on your process that you've outlined so far is just a caveat that one should not to become a slave to the tool that you're using. One of the things that I've found over the years is that GIS lends itself very well to certain approaches, such as land use, or land cover, parcels available for acquisition, etc. It doesn't lend itself very well to process-based issues. I think what you'll find is that certain aspects, like flood control projects, are much harder to get your arms around and to start thinking about on a regional basis than things like land availability. So as you're planning your Phase 2 work I think you're going to struggle a lot more with how to deal with a myriad of small individual studies and projects going on. Just within the LA basin, the flood control district, you could spend several lifetimes getting to know different projects that are going on, and they have a very local basis, and so trying to figure out what makes sense to look at from a regional basis will be a challenge. That's worth thinking about, what you can do from the top-down versus the bottom-up.

KS: Following up on what Belinda said, it seems like there are two parts here. There's the GIS toolbox that will allow you to look at various resources and identify opportunities, constraints, etc. But then the Plan itself is the guiding principles or the frame that tells you how you use those tools. Before we get into that though, and it kind of follows up on what Jeff was saying, is the identification of needs. Is that something that happens in this pre-planning process, what are the needs out there, or do the needs follow from the missions of the conservancies?

BF: The needs are very consistent with the goals that we've set up, and I think that those goals are consistent with all the Conservancies' goals in terms of watershed health, habitat restoration and recreational opportunities being the high priorities that we all have. We've already established the need – it's more now an issue of how we get there. Where do we start in terms of analyzing some of this from a regional perspective, because we want to have that regional justification for moving ahead but then again it all gets down to local implementation. How do you bridge those gaps

and how detailed you can get in some of the tools that are developed? That's one of the things that we have discussed: do we really need to start from a parcel basis up, or look at the regional landscape and decide what landscape model is the best one to use? Maybe there are different ways to look at it, for different purposes, but that's where I hope we get your input.

TL: RE the needs question: the goals are very general, stating what the needs are. As we go along today, especially if we take recreation, for example, those needs will be operationalized and quantified in the process of trying to plan how to address them. For example, you will need to identify neighborhoods that do or do not have access to certain types of open space recreation opportunities. Doing so will thus require an operational definition of what need is, so that it can actually be mapped, and the inverse of that map is what open space we now have. The identification of needs gives us a picture of where we need to go.

JL: I was involved from the beginning of the Legacy Project in Sacramento, and so some of this is a little bit of *deja vu*. Legacy is sort of an orphan now, given what's going on in the Resources Agency, but I think it was really started in a similar way to this. It was in some ways a top down approach: let's organize all of the information, let's put all of the information out there, let's agree on a core set of goals and then we'll go off and convince everybody that we've done it right. After about a year and a half it emerged that California, at least, was far too big to do that. The effort consumed a lot of money, a lot of time and unfortunately, we didn't complete it before the new governor arrived. But our final series of regional workshops suggested where we might have instead started the project: they were about building core constituencies and identifying which of the five or six or seven goals and criteria that Legacy had started with were appropriate, and how we could build long term political support at the ground level.

The reason these workshops got underway was that we started off thinking that we had \$4 billion dollars in bond money to buy an immense amount of land, but we realized how quickly you can burn through \$4 billion dollars and buy nothing in the state of California. What became apparent was that the action was going to be at the county and local levels, with general plans and restrictions and working with private conservancies. So we needed a bottom-up constituency building effort. Unless local people were on board, agreed on what the goals were and what their role in the ultimate location was to be, those resources were never going to be there. So, how much the top-down information, analysis, and understanding of the big picture meshes with the bottom-up view and availability of resources: this is critical, because at the end of the day, the resources are mostly going to come from the bottom up.

WF: The Legacy project has become so orphaned that even though I worked on it, when you mentioned it, it didn't register with me that that's what you were talking about. The first thing that struck me was always the problem on a regional basis, of inconsistent knowledge about different pieces of land. So one question is this: is your goal to try to accumulate all this information as a way of filling in as many of those gaps as you can, or is it simply isolating the gaps by accumulating all the knowledge good enough? From a top down perspective, and this was one of the original reasons for Legacy, how do you distinguish between something that's truly a regional or statewide need, or something that's just got a lot of local juice? John is quite right, that the other question is, if you are trying to achieve regional goals, then what do you do about the fact that the constituencies are local and the constituencies don't always line up with anybody's particular scientific or open space regional or statewide requirement? I think that was one of the traps that Legacy fell into, and once we figured from the Legacy project that you couldn't just pursue science, you had to pursue all of the state policy objectives having to do with open space, it became pretty clear that they all conflicted with each other and so it was very difficult to

prioritize. Accumulating everything from the ground up is really valuable, and I can see the value to local governments. But the understanding, both the knowledge and the perspective at the different levels, is what is really important.

WD: The breathtaking ambition of this academic exercise to collate, catalogue, and make accessible all this data, is easy to understand conceptually, and it could do a lot of good. But I wonder about the transition from that master collation of so much data – is the expectation that the plan exists somewhere in that data somehow, that it'll be revealed? I worry that in the transition to creating the plan, another equally breathtaking and ambitious, and geographically stunning major objective, I would think that so many more inputs would have to take place in terms of data at that point. Once you've created a foundation of what's out there, like land prices, like zoning regulations, and inputs from developers, multi-jurisdictional issues will arise. These include keeping alive the original foundational data with new and compelling data about legal issues, structural issues, development pattern. Then you've really got something, because then you've got a masterful collation of data the likes of which has never been achieved. In other words, the development community, zoning and land use attorneys, state employees in those fields, would have to be involved – not yet perhaps – but ultimately they are going to have to make their contributions. The transition from A to B seems as hard as the A's or B's, to me.

JRW: I do see the challenge as actually quite terrifying! I think that, in our conversations, it's clear that however much is thrown at the data side and collated information and the scientific analysis, as much or more is going to be required to make the transition that you're talking about, to do the outreach, the various kinds of workshops, committees, negotiations, interactions, that are required to make this really have legs and power. Historically we haven't been very good at doing those things. We have some regional examples here, visioning efforts, starting from the right impulse, but they're just too small, and involved too few people, to have the kind of impact that is required. How to actually accomplish it, in terms of mechanics? I think we know how to do it but it's going to have to attract a similar level of attention and support from all the partners to make that transition.

WD: And the partners working together to create in effect, a super-jurisdictional authority, which is very tricky.

KS: Coming back to the needs or the goals from the different Conservancies, is there some type of framing statement that assesses the objectives regarding preservation or enhancement of existing open space in somewhat decent condition versus rehabilitation or restoration in compacted or heavily urbanized zones? Obviously, the Conservancies cover the whole area and so they're interested in all these different things. But is that something that would be set at the outset in the objectives and the goals or will it depend on how things come up, opportunistically?

BF: I think that is part of what we're trying to define here in these Framework documents. We have to get into some very detailed discussions of that in terms of how we're going to define, in the area of habitat conservation, for example, which benchmarks do we want to set?

KS: Right – not to be blatant about it, but if you have \$5 million dollars, will that go toward something that you can preserve on a floodplain or a river, or is it towards wetland enhancement on the LA River? What would you do with the funds?

TL: I can elaborate on this question. Certainly its been our understanding given the political genesis, especially of the RMC, and the demographics and degree of urbanization within the watersheds

that it deals with, that part of the legislative history indicates that this is going to be an urban conservancy, and it is going to deal with restoration, and the charge is to bring nature back into the city in some form or another. Is that actually written in your official mandate, or is that left up to your implementation?

BF: Our general statutory authorization, if you will, includes habitat restoration. It doesn't say specifically that our territory includes both densely built out urban areas as well as some of the open space that we still have on the upper Santa Clara river area, on the San Gabriel Mountains, Puente-Chino Hills, etc. That whole issue was identified earlier, concerning what the Conservancies do that is of statewide significance versus what might be a local project, and how this plan includes all those different levels of potential projects. This is going to be a challenge. That's one of the things that Legacy somewhat stayed away from.

JL: This is just wisdom that we learned the hard way in Legacy, and I'm not sure how transferable it is, but I'm starting to think it might be. I know you didn't invite me down here to rain on your parade, or more appropriately, rain on your watershed. But we learned pretty early on that there was no constituency for a plan. Particularly the more, the bigger scale it was, the less the constituency for the plan. We learned early on that there was broad constituency for developing an inclusive vision. To some extent, your goals start to become an inclusive vision to the extent that you make them more spatially explicit, they become even nicer. Within that there is a broad constituency, there are lots of local constituencies for projects that were consistent with those visions. But that there may be little constituency for a plan in the sense that a planner would say, this is what we want to accomplish, this is how we're going to organize ourselves, these are the power relationships, these are the resources. It also became apparent to us that to do the planning effort would be so much more costly with uncertain results at the end. Again, I think what Legacy came up with was this idea of, what's the vision that people would buy into? That vision differed a little bit in different places, indicating the types of projects that could be undertaken and the types of organizations that should collaborate on them.

JHT: What makes this program different from the individual conservancy is the attempt to do it on a regional basis. We're working with RMC right now, on a watershed plan for the Rio Hondo, and you immediately jump to individual projects, and that's a group that's best organized to work on that individual watershed, and you do identify the individual projects. But what struck me about this was that the real challenge is to say, what needs to be done on a regional scale that can't be done at a watershed scale, or at a local scale? That's what's really going to be different about this. At some level you have to produce that and say only by taking this broad of a vision can you identify whether it's better to put effort here or there. In terms of then generating the individual local support, you eventually have to end up at the local scale. Nonetheless, I agree with your comments and Bill's about the breathtaking scope of this, because I was going to add the 5th goal of world peace! It sort of scares me when I see something this big, because I've worked so much at the local scale, and I know how complex the local scale is. You have to say to yourself, what can we only do at this regional scale that will really work?

JL: I agree, but would argue that as long as we used the word regional 'vision' we were on safe ground. But when we started saying regional 'plan' the ground started getting a lot less stable.

JHT: The jump from the data to the plan is a huge jump.

WF: What do you think people meant by 'vision' that they were comfortable with, that they didn't mean by 'plan' that they were uncomfortable with?

JL: That's a great idea, the great question. I don't have an answer for it, but I would have to say the regional vision was a shared set of priorities for action and a shared set of the types of outcomes people wanted to see, the types of outcomes and priorities for action without spatially locating it in your jurisdiction or my jurisdiction, so that somebody from outside our jurisdiction wouldn't tell us what to do. If you say we're going to have our shared regional vision, which is the types of outcomes we want and the types of priorities that we want as a region, then you don't stop there and say "and now it's up to you at the local level to bring forth projects and ideas and local plans that are consistent with those, and show us, using the data that we've given you and, or we've worked with you on, how those local projects are consistent with the regional vision." As a planner, this horrifies me, because I just erased my reason for being!

The striking thing that we learned from Legacy is that even when you're putting wildlife biologists in the same room, the fact that they're from different parts of the state and have different specialties – we could all agree on a vision, but as soon as we said OK, here's the plan and your responsibility is going to be this and your responsibility's going to be that, and these are the budgetary implications, etc., that's when everything started to get hard and we realized that you could blow a lot of resources on just trying to implement a plan. So, I go back to this idea of regional vision, local implementation. Somebody else who worked on Legacy might have a very different opinion, however.

JH: I just wanted to offer up the Baldwin Hills Conservancy as a sacrificial case study, since we're talking about plans and visions. Unlike the other Conservancies we are much smaller geographically, but we do have a master plan. Granted the objective is to create a park, so there is that developed constituency that we have. Unfortunately a question keeps popping up in my mind is, who is the ultimate audience for whatever tool we're going to provide, and from a micro level or from a Conservancy perspective, we're already engaged in trying to use our resources to implement something. And it becomes increasingly difficult when the politics shift, or your acquisition strategy finds a hurdle that you didn't anticipate. But from the Baldwin Hills Conservancy's perspective, we also see a greater value in being part of a much larger vision, and so that there's, it's not just an academic value, but there's certainly a potential for funding, and making those connections between open spaces and recreational opportunities helps develop that constituency. Maybe we have a visionary perspective, but we are trying to find those specific plans that we can implement, and more importantly, what are the tools that will help people implement those plans.

JPW: Maybe I can respond and shift the discussion just subtly in three ways. First off, my role today is to listen, all the hard questions are directed to Jennifer, I respond to easy ones! Despite the impression you might have got from the way the slides were constructed and presented this morning, it is this vision plan that's our first and foremost goal here, and the information cast in a GIS framework or some other framework that's really just going to support them. One way to ensure that and maybe avoid some of the kind of Legacy stories that John Landis was talking about, is to say: show me blueprints of a vision and we'll identify what information you need and then we'll organize ourselves to get there. This is different from focusing on database building that could consume enormous time or energy or money. We don't plan to invest our resources that way, and so that's one subtle difference from Legacy.

The other difference is that some people have been talking about these GIS tools, but I don't have any particular notion about them being used in a particular way. In general, such tools might be

used by people on the ground dealing with their own constituencies, and if that's all they did, then it doesn't matter whether they're specialists in habitat conservation, or watershed enhancement or whatever. All it would do is to provide context – a group or locality have their eyes on a particular parcel of land or some particular sub-watershed, and the tool might provide them some understanding about the context of that piece of land that they're looking at. I don't think anybody wants to give an answer that says go out for this parcel because it is priority number 1 on some predetermined list. But you might be able to differentiate things that are apt to be highly successful versus things that have some value, versus things that have low value. I think we should focus on the vision and then just deal with the information part of it as needed to accomplish that vision.

MB: This is interesting, this Legacy discussion. It gets us into a discussion of the kind of planning effort this will be, for example, top down versus bottom up. There are other observations I'd make about the relevance of Legacy to this effort – both successes and failures. What was interesting about the regional workshop discussions or for that matter, the urban open space issue area discussions, was that they were both add-ons to what was originally a very top-down, habitat-oriented, Sacramento/Bay Area skewed statewide strategic plan for lack of a better label. And the politics of conservation in California is that first it's more than biology, it's a lot of politics, it's a lot of human use, and it's 30 to 40 years old. There's an enormous and rich culture already, of efforts that you've already documented by looking at how many plans are underway. Plus now there's a revolution in community planning, and in fact, there's a southern California open space council forming as we speak, much the way that the Bay Area Open Space Council formed 25, 30 years ago.

We need to take the vision, and populate that vision in all levels of government, across all the actors (bureaucratic, non-bureaucratic). We have never thought about whether this effort will be successful or not in fact, because it is such an ambitious attempt. We think any visioning or planning will be worthwhile, however.

The southern California region is not the Los Angeles region. Legacy had two workshops in southern California, one in the San Diego region, and one in the Los Angeles region. And, although this is really ambitious, it's really the greater Los Angeles portion of southern California. So even this is a sub-region of the larger southern California region. And it's still incredibly ambitious.

In the Coastal Conservancy's point of view, I think the breakdown between vision and plan is that nobody wants to be told what to do. We would violate our first principle, is that we don't want you to tell us how to spend our money. Or your money, for that matter. And every agency is the same way. It doesn't matter what level, it doesn't matter, region or statewide. But, everybody's willing to cooperate to get a larger vision implemented. The Santa Monica Mountains. Baldwin Hills. RMC, Coastal Conservancy. We collaborate in the most elaborate methods everyday, we collaborate with all the local stakeholders.

We've always thought the metaphor was the quilt of local pieces that could be stitched up into a statewide plan. We've long argued that statewide significance is embedded in local priorities. We are a state of many landscapes. And when San Diego activists and bureaucrats tell us that the regional linkages for habitat are x and y, we at the Coastal Conservancy accept those, because their science is our science, their policy is our policy, and their personalities and structures are really us. And although I won't say how far we'll go in the plan or the vision process, it's a bit of a sourdough starter for the region to start to re-imagine for itself what it could be, and to build that case, and we see that as a very productive outcome. I'll be silent on what the real outcomes will be of this effort. We just don't know. It remains to be seen. We don't know if the money's there, the

money that's been given is really small, compared to what Legacy used – the burn rate of Legacy was rapid. We have to think about creatively spending our money. We think this is a little bit of risk money for the Coastal Conservancy, to see what might come out of this. But we also have given money to the Southern California Open Space Council efforts, and we'll kind of grow that out too, and we think that all these things grown may in fact reach very interesting and creative solutions for how to work cooperatively and collaboratively together. Because we think there are great efforts already underway, and really new initiatives that we can imagine.

I just want to give one example of what we might do. We distribute money with the Santa Monica Bay Restoration Commission for the preservation of Santa Monica Bay. We preserve habitat in Santa Monica Mountains for both fish and habitat, and open space and human use. We give money in the Santa Clara River and Los Angeles River for those regional habitat connections that take the Malibu Lagoon and link it to Ahmanson Ranch all the way to the San Gabriels. We play on so many different levels that we think although it's a very complex and kind of daunting place to view. We have to acknowledge that's how complex it is, and we will go forward and stitch those pieces together, and I think that all the issues and problems everyone's raised are really very legitimate issues, very deep problems to solve. I just would caution everybody to make creative suggestions or provide constructive criticism on how to get to the next level.

We need to get to the next level, and this is one of the forms we believe that'll take us there. It's unfortunate that we have spent \$1 billion already (or maybe \$2 billion), of about \$4 billion that we have for conservation efforts, with the impression that there's no planning behind it. We should take credit for a lot of science and planning that has gone into these individual, discrete actions. We shouldn't bemoan the fact that some of it's opportunistic and some of it's kind of political and some of it is community based and sometimes local projects aren't the highest priority from the conservation science point of view. But in the mix of it all, the achievements are daunting and stunning, and we're on the right track towards this landscape level analysis, which is what I think this might end up to be, a landscape level analysis, that will benefit the smallest local little wetland and the largest open space concentrations that we have together.

MORNING SESSION: HABITAT CONSERVATION

TL: I'm Travis Longcore with the USC's Center for Sustainable Cities, and my job now is to talk about the habitat conservation planning module in this plan. What I'd like to do – drawing heavily from people like Paul Beier and others who have done this in southern Arizona, and the Tucson experience that Bill Shaw headed up down there – and present a series of methodologies that we think would be useful for this effort. Please be thinking of the questions: what's missing, what is never going to work, what is going to work, where are the pitfalls, what's already been done, that we haven't done, where do we really need to go back to school.

The butterfly image on the screen is perhaps emblematic. We're not going to be solely dealing with the 'big stuff' or big critters in this plan. We will deal with the big stuff but we also need to deal with the little stuff, the insects, so we're looking at a broad range of species and habitat patch sizes.

One goal that we have set out is reintroduction of historically natural communities. This is a little different than what we normally want to do in a conservation planning effort, which is to figure out what used to be here, even species that might be completely gone, and get it back – restore it in some way. And the reason we want to take this direction is because this is not your standard conservation plan area.

Here is a photograph taken from the space shuttle by one of the astronauts of the Los Angeles region. Here's the Port of LA, there's the Palos Verdes peninsula, LAX, the Santa Monica Mountains, and so on. This is a highly urbanized area. So we have to have a little bit different approach than your standard conservation planning effort. This also provides us some very useful ways to start drawing lines around resources that we haven't lost yet.

We have four basic approaches. The first is a focal species approach, or a multiple species conservation plan. We will be taking 30 to 40 local species that have a broad taxonomic breadth and a broad natural history breadth, including rare and endangered species of course, but also some that aren't rare and endangered. Because we want to be able to get back into some of these urbanized areas, such as the Baldwin Hills. What's going to be good about this indicator species analysis is that it will pick up whether we can maintain the health of (for example) the Baldwin Hills. The California quail, perhaps, can be used for such a purpose, as well as species that are certainly going to indicate particular habitat types around this region. We will pick 30 to 40 of them, develop life histories on them, develop the best incidence models that we can, using the best data, to create a profile that we can then use to determine – if we want to protect these species – what habitat and area would we have to protect?

We want this to be a robust selection, with a large enough number of species, so that if you were to take 2 or 3 species out and put 2 or 3 other ones in, you wouldn't change your overall outcome in terms of reserve design. We aim to have enough species so that our design does not depend so much on a single species. This obviates discussion about what would happen to reserve design if this or that species was taken out. Our goal is to be able to test this and be able to say: it doesn't really matter at this point whether we add one more or one less species, or this species or that species. We would then be able to use these focal species as part of our planning tool, enabling the planner back in the office to say, all right, this parcel is likely to have x, y, and z focal species, it has 3 of them, it has 6 of them, it has 8 of them. And therefore the planner can develop a parcel ranking system.

Now will we rank every parcel? No. We don't intend to do that. But we want to provide this capability as a part of the GIS scorecard that is able to go into this database and extract the

pertinent information about different sites.

Our second approach is a representational approach, looking at vegetation communities. This is the ‘Noah’s Ark’ of vegetation types, if one can still refer to cultural history in public settings and not be accused of being exclusionary! We want to make sure that we have all the vegetation types that used to be in this region represented. Some of them are probably all gone. I did a historical analysis of something called the Los Angeles Coastal Prairie. It’s a field or grassland habitat, associated with the consolidated dunes system reaching inland from the coast 3 to 6 km, going along the coast from the Ballona Creek down to the Palos Verde peninsula. It’s basically gone. It had vernal pools, it had wildflowers – it had all manner of interesting things. And you can only find it now because you can look at the hydrology, you can go back into your historical specimen collections and you can find the species that were once there. That’s something that’s completely missing from our conservation radar screen right now.

A representational approach will help us develop a good map of the historic vegetation of this region. One might think there’d be a good map of the historic vegetation of this region. But there really isn’t. Not one that gets at what was in West LA, what was in the San Fernando Valley, what were the vegetation types along the Los Angeles and San Gabriel Rivers? We have analogies but no one’s really put it together.

So we want to develop this historical vegetation map. The tool that we’re proposing to use to do that is a tool called topo-climatic classification. Here, we take the digital elevation model of the region, and classify the cells within that on the basis of their position in the landscape. How wet they are, the amount of solar radiation, slope, aspect, etc. This has been used and applied by John Wilson and others in less urban situations and we certainly believe that it can be applied here. Then of course there will be some checking, you classify the cells according to what’s actually on the landscape and associate various topo-climatic classifications with vegetation types and recreate a map that one can go back and check with historical sources, photographs, etc. One can then rank vegetation types on the basis of their rarity in the landscape, something that’s alluvial scrub, for example, that’s become incredibly rare in this area, or something that is totally gone, but that then can go into our vision, so that we can eventually have all the historic vegetation types represented somewhere in the region. With respect to the GIS tool, this will allow a planner to assign parcels a value on the basis of their ability to support rare or lost habitats.

A third approach is an umbrella species approach, for example, selecting the large carnivores. Here’s where the plan becomes a bit of a ‘meta-plan.’ A major part of this exercise has already been done. The Southern California Missing Linkages project, with which Paul’s been intimately involved, has done this. Missing Linkages looked at these landscape level linkages so that the large carnivores can interact, and identified (in a series of regional workshops) the lower level taxonomic indicator species that might also be able to utilize landscape linkages. So here we are dealing with connectivity, the minimum areas needed for the large intact parts of the ecosystem to remain functional.

Here, though, we have to add a little bit of an urban twist that is parallel to what Missing Linkages does. We will look at urban areas and connectivity for lower trophic levels. Trying to get a handle on connectivity, not for cougars but for coyotes. Now, coyotes of course do range through urban areas quite easily, but how far? How can we develop some criteria so that smaller areas in the urban landscape such as hillsides are connected, at least for the smaller carnivores? In short, we’ve got to look at the big picture, which has basically already been done, but then also look at the smaller scale urban examples.

We then get to the difficult portion of this: urban development. We have this urban matrix. How can we make that urban matrix more friendly for wildlife? If we don't do that then we're just going to perpetuate inequalities in access in terms of recreation. We're also going to perpetuate the idea that nature is 'out there', people are 'in here' – and the two don't meet. As a fundamental premise, that's wrong.

So we want to develop model municipal ordinances that will help the various jurisdictions be able to tread more lightly, be a little more friendly to wildlife and promote wildlife. These will include model ordinances on, for example, fuel modification, night lighting, human-wildlife conflicts. What you do when somebody finds an unwanted raccoon in her back yard? In Los Angeles, if you take a wild animal to a shelter, people kill it. Usually conservation scientists are worried about the rare stuff, the endangered species, but such shelter policies can make a difference because every so often, somebody brings in something rare.

And then there are local nature parks. And you've seen some of these new developments by the Conservancies, the sort of visionary leadership they've demonstrated in putting nature parks in the middle of very urbanized areas. Like Augustus Hawkins Natural Park in south Los Angeles. It's eight acres of nature park in the middle of a residential/industrial area. We want to have such places be part of our plan as well, as part of multiple use projects. The location of such parks might be allocated in order to maximize the 'percolation' of certain types of wildlife through the urban area. Maybe this network is for coyotes, or birds – whatever they are, we can pick some target organisms and figure out how many nature parks, and what configuration they would need to take, for the landscape to percolate for wildlife, for it to be useful for animals to move across, and also to serve as a sort of stopover for migratory birds and other mobile organisms, butterflies, etc.

So this is different than the standard species conservation effort. One, the emphasis on reintroduction and restoration over preservation, although preservation is an essential part of this. With restoration, looking at multiple scales, we're acknowledging that not everything's going to be connected. Cougars and bobcats won't be able to be present in all parcels, but that doesn't mean that a piece of urban land has fallen from grace and has no value. We have real grudges and ideas about these things! It's either perfect or it's gone. We need to get away from that type of either/or thinking. Recognizing that some of the basic ecological and geomorphic processes have been disrupted in this area, irretrievably – all the restoration in the world will not get the Los Angeles River back to what it was in 1850. Acknowledging that in this context, and working within the constraints of our ability to re-engineer natural processes, we can better represent what was here historically while recognizing that there are limits.

Finally, unlike many other conservation planning efforts, we recognize here that the little things do count. Right along the beach in Redondo, for example, there is habitat between a parking lot and a bike path, habitat that was restored last year, and the pollinators are back! If you bring little things back to little fragments in the city, that's a contribution to a regional vision for nature conservation, recreation, etc.

What do we need to do all this planning analysis? In terms of data, obviously we need vegetation information (we may need to develop some of this), as well as historical data, and data on soils, topography, wildlife (especially on our 30 or 40 focal species), land use, hydrology, climate, and disturbances (such as fire history). We can get into the data later as we go on.

We're open for comment, criticism, and questions. I've put up some questions here, just starting with: are these good approaches? And I'm sure Paul wants to start.

PB: I think it's great – I love this. You just mentioned my name so of course...! For your focal species, I presume you're going to be building models for most of them, because we're not going to have distribution data for 30 to 40 focal species.

TL: We're going to have to build models – we're going to get the data that are available, assuming that using some of this has been worked out because the California Natural Diversity Database is now available from the state. However, once you get beyond the rare and endangered species into some things that might help us with Baldwin Hills for example, yes, we have to build models.

MW: Recognize, Travis, that there's obviously a lot of uncertainty or probably will be a lot of uncertainty in those models. So going back to the ranking of parcels based on that sort of information, I wonder sometimes if that's a worthwhile endeavor or not. I think you have to take the data for what it is, sometimes, and not try to push it too far.

PB: One of the things that will rescue you – I love your idea of having enough focal species that if 2 or 3 of these maps or models are abysmal, it doesn't matter. But to say, this parcel is higher than this parcel because I've got 10 species instead of 9 species.

MW: I'd be cautious about that. The one other thing I would think about as well is looking at some measure of condition of the landscape. What's the degree of change, land cover change, erosion.

TL: As a matter of threats? Or...

MW: Or the inverse of threats. Places that have not been compromised yet. You may end up with a category of a landscape that doesn't have any particularly rare species on it, has common vegetation communities, but it's intact. It's an intact little watershed or sub-basin where you've got natural hydrologic processes. It may be worth protecting for that reason alone. Because there's something downstream that it's providing functionality to today. But fire and other things affecting the condition of the landscape, might be worth including as an additional factor.

TL: We could even add some of the fire regime or hydrological regime values that are going to be developed in the hydrological section into the biological rankings.

MW: How fragmented is the landscape, how many roads are in the landscape and what kinds of roads. Those sorts of things could be included also, perhaps as a fifth element in the analysis.

MH: Building on this, have you seen any of the work that Frank Davis at UC Santa Barbara has done for the Legacy project? He's put a lot of thinking into how to look at underrepresented habitat and/or species, species concentration areas, buffers, other things. It would build on the things that you're talking about here and put it in a more structured context to compare different places.

TL: Hopefully David Stoms from Santa Barbara might share some of those ideas, especially the thinking that has gone on in that project about how to deal with urban areas. From the discussions we've had with the Conservancies, they really are interested in pretty fine-scale information, to be able to guide and put together a conservation plan or find projects over time that weave together into a cohesive whole. The goal is to make sure that the plan is detailed enough. With all due respect to visions and not having spatial certainty, I think we have to provide tools that offer a lot

of spatial certainty and specificity, to allow the Conservancies to put together plans and funding that come together into something that's greater than the sum of their parts.

JHT: One of the things to remember as you're gathering data, is that it would be very useful, in addition to the actual data itself on the species or on the topic areas of interest, to know more about comparable scale planning efforts that have been done. The two I was going to mention are the San Francisco Goals Project, which ended up being more of a species based goals project, and I think was very successful because of that. Because, even though I'm a hydrologist, people relate a lot more to species than they do to hydrologic function. And so, you were describing the need for having species models but as well as, where a lot more was known about what an individual species might need as opposed to where it was, they did do a whole species profile, and then used that as part of the basis for the goals project. Another example is the Harvard study at Camp Pendleton, which is a regional species based study as well.

In terms of your mapping approach, the one thing I would say is, you will probably need an unequal spatial scale to do your mapping, because certain upland areas will map as very large areas and then when you get to the fringe or edge systems, like the riparian or the wetland fringes. If you have kind of a continuous, spatial scale of 10 meters or whatever you're working at, you won't get adequate characterization of those edge ecosystems or narrow corridor ecosystems that you will if your scale is smaller.

TL: In general for all efforts or specifically looking at vegetation mapping?

JHT: They are more concerned with characterizing habitat, as opposed to just vegetation mapping. But when you're looking at characterizing historical changes or opportunities, if you're looking at a riparian corridor, it is a long, narrow feature, so it doesn't lend itself as easily to a continuous map of a whole vegetation coverage, you couldn't even see that line on such a map. And yet there are all kinds of variability over a very short spatial scale. When you get more to a hilly uplands system, you don't have as much variability. So just in terms of your mapping, you may want to have kind of different scales, or overlays of maps that handle different ecosystems differently.

CL: With regard to vegetation data, there is GAP analysis of vegetation, and there is land use data from NOAA that could have vegetation type in there as well.

TL: That's actually a question that I wanted to pose: what resolution, what classification of vegetation data do you think is appropriate or useful? Because one can go to the series level but we're not going to get vegetation series data for all of these areas. What's the sort of optimal classifications being used for something of this ambition?

MW: We're maybe a little bit spoiled in San Diego, especially if you start talking about representation. Finer scale is better, clearly, or you start potentially missing things that may be of interest. You sort of have to work with what you have available, though. But Jeff's point about some of these communities of interest are not even going to show up in GAP data is correct.

MH: There is some better data out there, other than the GAP data. The Department of Forestry has put together a multi-mosaic data set for the state that includes the GAP data but also includes the work that the Forest Service and others have done. Plus there's lots of other different datasets that may provide. I don't know about the particular quality in LA and Ventura Counties, but it may actually be better than what has been done before. David, you would know more. Have you worked with the multi-mosaic source data?

- DS: It is high-resolution maps that have been cookie-cuttered in, and in lots of places you're not going to get riparian data at a state scale or a regional scale. But it raises a point about the plans for creating better habitat representation: will you aim at a coarse filter approach, in which you're trying to get habitats that represent all the species that you're not modeling specifically? If there are rare and critical habitats, you may not want to use that kind of coarse filter approach. These are the sorts of things that you want to protect more explicitly. So, you can map those or use those as higher resolution sources rather than trying to find some blanket resolution for data.
- TL: Right. The historic exercise is partly to get at this, partly also to inform where the river restorations might go, because that's one thing where we will need data development. We have old Spanish accounts, which are mostly general; but we won't be able to determine what kind of trees were along the river banks, where were they, and so on, and that's why I've suggested this modeling approach, to identify the difference across landscape pieces. One habitat that you might identify this way is vernal pools, which are largely ignored in Los Angeles County. We have some identification of them away from the coast, and around LAX. If there are any left, can we find them, where were they? Those are in and of themselves worthy in a scheme like this because of our goal is not simply to put together 100% of intact, connected reserve systems, but also to have, for lack of a better word, a museum of what was here on the landscape, for its educational and conservation value. Some of these are really small things, like vernal pools, that can support the endangered birds or toads. We can get at some of those things by 3 dimensional modeling.
- MH: You might be able to use some of the coarser vegetation maps, as David suggested, to map out the major habitat types. Then identify the sensitive habitats within the area you're thinking about. Then, use other sources, for example, the Natural Wetlands Inventory, the NDDB database, etc., to select some riparian wetlands, alluvial prairie, coastal sage scrub, or other habitats. So, think about what those are and there may be some other sources you can go to, which would be derived from separate vegetation coverages. One which is like a vegetation land cover layer that you're using to try to get representation of that habitat, and the other one is more of a sensitive habitat layer that you would want to include well. Sort of the Nature Conservancy's coarse filter, fine filter, type of approach, but really for habitat.
- JPW: Technically, there's no problem. From the tall building here, that seems pretty straightforward to do. We may have to pay some attention to the attributes. But, Mike, could you describe for me why you think the San Diego case is so rich, could you just describe that data requirement?
- MW: There was a lot of effort spent to map the county using aerial photography, and so we actually have multiple chaparral community types, some species dominance information that makes a representation analysis a little bit more meaningful than just knowing you've got some chaparral. Those data, including wetlands, were mapped down to 1/2 an acre. So we got some pretty small little polygons that could be picked up in a conservation planning effort. There was a ton of effort spent on this, and the problem we're running into now is that it's totally out of date, the county literally burned up so it's really out of date.
- JPW: There are lots of possibilities for data with fine granularity. That is not the issue. I was just interested in both the description of the attributes as well as the spatial resolution of the data.
- MB: Just to speak to the context and the ambition of it all, this is a decade or more old project of \$6 to \$10 million dollars, involving multiple agencies, from the state down to local levels, so it represents a very long march of science and analysis.

- MW: Even those data are not super-accurate when you go out and walk across a particular piece of ground in certain instances.
- BF: Did you end up being able to incorporate parcel data in that?
- JS: In parts of the county, yes, we used parcel level data. But that was a real problem: most of the data were mapped at a much larger scale than the parcel level data, and so then trying to georectify those data that were mapped at a larger scale to the parcel level was an issue. We're going back now, and having to do some of that. And one comment that I wanted to make that you'll always face in conservation planning exercises the problem that you're looking at a piece of land at a point in time and yes, you see specific animals there, but how much longer are they going to be able to be there? How sustainable is this patch of habitat? Perhaps there's going to be a road coming through here 2 years from now, it's going to cut this habitat piece off. The road's not there yet, but this habitat is ultimately going to be isolated. So, are you really trying to conserve this habitat for biological purposes, or is it more for open space aesthetic purposes?
- This means that even though you see some resources there, if you don't have the same processes operating there 10 or 20 years from now, you may not have conserved what you thought you were conserving when you were doing the planning.
- TL: That brings up a point about doing population viability analysis for a species to determine whether or not features are sinks or not for them. And for those of you who have done this in other places, other times, how useful are such studies? If you have included population viability analysis for one, for a number of species, how useful was it in putting together your overall project, and basically, did it work?
- JS: My experience with that is your analyses are only as good as the data you have to put into them. The viability analyses, and at least for the work that we did in San Diego, were not that helpful. We spent a lot of time and money on doing the analysis. It's definitely a tool in the toolbox, but it's something that has to be weighed against all your other tools.
- PB: I've worked on two endangered species and recovery plans and by and large I felt it was an engaging exercise that was useful for the participants because it made us think about processes. The outcomes weren't worth recording.
- JS: Sometimes those outcomes can be taken and used against you, used by people who aren't invested in the process, and taken out of context.
- PB: Does a low probability mean a hopeless case, let's give up? Does it mean it's time to get to work? What does it actually mean for action? We all know that bigger and better and more connected is better than fragmented, so what's the point of attaching a probability of extinction of 45%, or 83%?
- MW: But the times where I've seen it done, it makes you think about what are all those suites of information that you need to understand the possibilities: What are all the life history attributes and habitat needs associated with those life histories? Do you have all those attributes and do they function, and what would be the spatial arrangement to allow them to function?
- JL: This is a related point. One of the things I really appreciate about this project, but also makes it

ambitious, was in the slide that Jennifer put up that emphasized restoration, not just conservation. I'm thinking ahead, so supposing some local conservancy brings a project or proposal in and it's consistent with the vision or plan. It seems that you have something about robustness of the restoration. The example I think of here is Chrissy Field, in San Francisco, where they've rebuilt this marsh. It's turned into a great tourist area. But in terms of biodiversity, it's not clear that it's worked. And one of the arguments is that they didn't get the hydrology right and the coastal tides right, and now they're going to go back and enlarge it or try to enlarge it and hope they get that right. But it seems, particularly when you're talking about both conservation and restoration, that you've got to have some confidence that your intervention or your restoration is going to take.

TL: You're absolutely correct, that's one of the areas that we have to both add specific sorts of recommendations that are very closely intertwined with the processes, hydrological processes, of fire, other natural disturbances, and also general approach guidelines. Because it is true that the quality of restoration projects that goes on, whether it's compensatory litigation, or whether it's voluntary and aiming to create habitat because someone wants to create it, the quality is widely variable. Model guidance documents could tell those involved in a restoration effort: Here's what you need to have in it. Here's how you base it, here's how you decide what plant community you're going to go to. You would offer a general framework, to let people know not to encourage wild type conversions where you're mitigating woodland. Or warn people off deciding that a slope would look really great with some oaks up there on the ridge line, and then you end up with an orchard of oaks on a ridge line that's only established because somebody irrigates it and they water it, and there are oaks up on the ridge line which would never have been there. And which agencies in this county have actually signed off on as mitigation for removal of woodland.

But included in those sorts of guidelines, also needs to be some specific information about restoration and also some guidelines about what constitutes a reasonable restoration. Take the example of coastal sage scrub restoration: there are restorations that just establish 6 to 8 shrub species, which is just a little part of the community. There are some off the shelf guidelines that are being done already, raising standards. And the Society for Ecological Restoration is producing some documents that set out some of these principles but some focused ones for this region are in order and overdue.

KS: Following up on John's point here, to move away from the technical discussion we're having here more toward the process and the procedure of this effort. Because the way it's laid out here, the methodological approach, the needs are pretty clear. There are four issues here, including endangered species, representation across the area, design connectivity, those types of things. So we collect the data, in Phase 1 here. Phase 2 comes around, and here are the scale issues again. You've got your next 2 years of work, or however long it's going to take, and here you have to decide: are you starting from the bottom up, or the top down, in terms of scale? The types of things you're mentioning, about ordinances, are already at the level of the project implementation, or mitigation. I don't think we'll have the answers certainly today on this, but have you started thinking about how this translates into Phase 2? How do you start that process, because I don't know if that helps you go through the data collection.

DS: Without speaking about what your process should be, one of the things that I find is valuable about a regional approach like this, and I don't think you get from a bottom-up method, stitching together the local general plans and seeing if something emerges, is that the regional perspective provides answers about how much of these different biological resources you have, how well managed they are now, how likely are you to lose them in the future. These are questions that any local jurisdiction, no matter how good their local place-based science may be, will not necessarily

be able to address. So when inter-jurisdictional conflicts emerge, this vision may prompt everybody to do a share to achieve the regional vision, or conversely, everybody may propose projects that serve to protect the same things.

KS: If you line up this with maybe more regulatory type issues, then people are getting into projects while they're making sure they're following other permitting processes through Fish and Game, Fish and Wildlife Service, Army Corps, etc. It's big, because these projects operate in the real world. Are you locked into making sure that you're always consistent with that, or do you have situations where one of the things you come out with trumps one of those decisions? Or developers argue that their proposed project is consistent with the Green Vision Plan goals, while the Army Corps says they're not satisfying 10-404 permit rules? And so on?

TL: We have no interest in making this a regulatory plan. Or one that substitutes for doing proper regulation. Now, could some of the analysis and data brought together as part of this project contribute to the analysis by the Army Corps in consultation with the CA Fish and Wildlife Service? Absolutely, it could contribute to that. Getting to the transition between collecting the data, developing these sorts of ideas and what the products are produced at the end, there are two outputs here. And there may even be more than that at different resolutions or scales. One is the vision: what would we need to achieve this, what would it look like, what is our dream vision of this region, if we could put it all together, what would it look like? That big bold vision, how things fit together, how the watersheds could work, where streams are daylighted, representations of alluvial scrub, we have steelhead back, the endangered fish are happy, etc. We can put that vision out there, and maybe this gets to the issue of a vision versus a plan.

That vision wouldn't be a plan. It wouldn't say how we get from A to B. And that's where the 2nd product comes in, which is this tool that is able to assess on a parcel-by-parcel basis and determine: how does this parcel contribute to that vision? Let's say for instance that this parcel is part of a watershed that is only 2% developed. Now, the plan tells us that we only have 3 sub-watersheds in the Santa Monica Mountains that have this minimal level of overall development. And that means that the parcel gets a specific score that reflects this context and we can use that tool in a very detailed way for the Conservancies. Now, the other question is, who else gets access to it? Can I go in as a land speculator and say, "Give me the cheapest parcel with the most endangered species on it? Because I've got my bank all lined up, I have a letter of credit and I know you're going to be boxed into buying me out here later on!" I don't think we want that to be the unintended outcome of the process, which may mean that there will be some general data, just like the NDDB has public data and limited access, more specific data. There may be some level of spatial blurring that goes on in releasing this information. We're trying to figure out how to turn a vision into projects, and again, the goal isn't to box the Conservancies into saying, you have to do this versus that. They may say look, we have money that's just for increasing Latino access to open space. You can come in with a tool and query a few things in the open space section and say, we want the secondary goal to be storm water management. Fine. You can use the tool to get that, and you may end up with a very different outcome, depending on what money comes in, or what political objectives are going to be met, so you may end up within the context driving things in different ways. The goal is that once you do those things, it all comes together at the end. Twenty years down the road and \$4 billion more, it all comes together to a system that works, in my instance, ecologically, one that works hydrologically, improves the situation, and one that works for equity and people's access to recreational open space.

MW: What you just described sounds very different than a prioritization though, and I think it is more appropriate. We want a system where you can ask, what is this parcel buying me? What are the

attributes that it has?

TL: Right. I think we're suggesting ways to prioritize, and I did say up there "prioritize based on". But that would apply if your goal was just ecological, for example.

MW: But I think part of the discussion of the vision versus the plan is saying, OK, the first thing everybody's going to do, priority 1, is x. And I don't know that you want to go down that road. But to be able to say, look, Conservancies, within your turf, here's this suite of attributes and you can go in and look around for the shopping list. And you know it just turns out that this piece gets you five things on your shopping list, rather than one.

TL: Right. But we do need to do some prioritization just to come up with a vision.

MH: You don't necessarily need the prioritization, what you need to do is the valuation. You need to be able to say "this property has these kinds of values," and depending on what your mission is, some values are more important to you than others. So one Conservancy may come in and say, I'm interested in these 3 values, so this is a higher priority to me. Someone else may come in to the same property and say, "No, I'm not interested in those 3 values. I'm interested in these. So it's a lower priority for me." So it's really a valuation of the parcels is what you want to get at.

JPW: Later this afternoon I'll share with you an idea of just how we might do that.

MH: I do want to ask one thing. Talking of valuing parcels, parcels may not necessarily be the best kind of cell to be working with. If you think about places where there's high parcel density, portions of acres, trying to assign some of these large natural resources to portions of an acre isn't going to work very well. And also in other more rural areas where you have really large parcels it may not be the entire parcel you're interested in, it may be just part of the parcel. So you might want to think about different kinds of units to assign. The other idea I had is that not only just simply valuing what's on the parcel, but if there's a way to capture, essentially the strategic value of the parcel. You may have two parcels that both have wetlands, but if one has the only wetland within 10 miles versus the other one is in the middle of a wetland complex, it may have very different contributions to it. You may want to think about the strategic context of future growth. The future growth, for example, is not slated for the parcel itself, but it's in the watershed area around the parcel. So, think two ways: the value on the parcel or the unit you're working on, and the strategic context.

ASL: I think that this would increase its value as a tool for a municipality or jurisdiction, the ability to be able to know what they may get from that particular parcel, but what they may already have in the surrounding area, so that they can be able to prioritize in a better way. So everything in relation to the rest of the surroundings.

WD: Can I make a quick historical point? In terms of your data for benchmarking restoration and having some foundation upon which to build representative data, Missionary records, Spanish language records are going to be rich. With respect to the Missions, we've got a couple of Missions down here that kept an eye on what was happening in the landscape pretty closely. Once you get a change in land regime after the Mexican war, Land Claims Commission cases, while labor intensive to look at it, pay very close attention to vegetation, what's there, and that might be a rich data source. And then by the 1850s and 60s, railroad, federal railroad and topographic surveys are probably rich sources of data for this region. And then certainly by the

next generation, there are going to be pretty well trained, classically trained botanists or amateur botanists wandering around here keeping an eye on the landscape for exactly the reasons you're looking at it. And I think those records will probably be useful.

TL: One of the tools that we used before are herbarium records. And a lot of herbarium records are coming online. You can now search and query with varying degrees of spatial specificity, although some of the old mountaineering collections are simply labeled "Los Angeles". Well, that doesn't really help much. But some are specific, like "vernal pool at the corner of Sepulveda and Western." It'll depend on how successful we think we're being with some of the other tools, how much we need to go into historical data and sort of check our analysis.

DS: That's the key: using it, in some cases. The other source was the government land office survey notes, to the extent that it was survey, I don't know how much of this was pueblo lands or something that didn't get surveyed, but if you have other evidence or some indication that there might have been a vernal pool complex that you could go to specific records, not try to do a whole study area, those notes would be useful to use as more of a sampling and verification of places that were of particular interest.

JPW: Can we go to the tool discussion for a minute, because I think everybody's on the same page as we are and vice versa. Later this afternoon we'll detail that scorecard, right? So Travis was right in the sense that you imagine a tool and a user has gone in with a particular parcel that's captured her attention. Maybe she wants to buy it or she wants to transform it into something else. But basically the analysis and the results that return to produce those scores would be based on some surrounding area, not just the parcel itself. This area of 'context' might be a circular buffer which is maybe the kind of idea that you were advocating, but in the case of measures that may be related to hydrologic function, it might be a sub-watershed, because that would be a more logical unit for considering context, right?

That helps provide some additional structure, and the other point that's not obvious here, but one could imagine that you could have your own criteria, because you've got your own political agenda. And so one could quite easily build on the right hand side here a set of sliding scale bars, and you could, from a programming point of view, organize them so that the white bars add up to 100, right, and you could set 9 of them 0, and 3 of them at 33 or set one at 50 and 5 at 10, you could provide the user the capability to do any of those things they want to. Then it's very helpful at not boxing people in to the kind of priority ranking that various people alluded to before. If you can set your own objectives then you can come up with your own plan. That doesn't make the scale issue go away. So my point here is not to change the discussion, but to focus on the piece that really counts. If you go from that dense urban area to the national forest for example, does the size of the buffer change? Should it change? If you had to pick, should you let the user specify the buffer size? I could make a tool that could do that too. These are, to my mind, the things that might cause me sleepless nights. It's not whether we actually do what you advocated.

MW: There's some work that Santa Barbara folks are working on, incorporating some of those concepts.

DS: We didn't allow for separating the science evaluation from the social setting. For example, how important is hydrologic function or a rare species versus something else that is a more socially based value? We also tried to measure not just content and context, but what you actually get when you spend conservation dollars. It's not just whether a parcel has a bunch of endangered species. But looking at a specific land use scenario or multiple scenarios, are you going to lose

that species or habitat by not doing conservation, or do you get some of it essentially for free? So it's a similar kind of scorecard in a sense, but with other factors that influence those values, not just number of endangered species. How much you would lose if you don't spend money there?

JPW: It's very tricky though. Bill Fulton and I have used John Landis' CURBA model in Ventura County, and we can pretty convincingly demonstrate that if you just change the land use policies, then if you could change them again, you could very quickly change the parts of the landscape that developers want to focus on, to build parks or new homes for example. SOAR boundaries allow some kinds of development and if you suddenly took those away, you might see a different set of developments.

DS: Change your conservation priorities.

JPW: Yes. It's a very dynamic situation.

JRW: I actually want to pick up on this development question and get insight from David and John and others. We've shied away at this point from incorporating CURBA-style or other kinds of growth models into this effort as a means of estimating threat, and maybe that's a bad idea. It seemed like a very, very difficult undertaking, not only for the fringe, like Ventura, but to think about redevelopment. Here the models are not yet as effective at predicting any kind of redevelopment. I just wondered what you all thought about that.

JL: The good news is, with what few dollars he has left, Mark has actually funded us to do the next generation of CURBA, to look not just at urbanization and suburbanization but to look at all urbanization along a continuum, from the least urbanized, some sort of suburban-ranchettes, which are just intensifying agricultural lands, all the way up to the most dense infill, and hopefully we'll have a new set of projections for the whole state shortly. It comes in a simulation tool. So you can do dials and stuff like that if you want to do scenarios. And so we'll have a new baseline projection that shows, for the state, those areas that are most likely to have intense infill. I'm not sure about this area – how far into Santa Barbara and Riverside does the project go? Because as Legacy clearly showed, the biggest impact on the natural environment is not in the sort of urban wildland interface, it's up in the Sierras and it's up near Redding as well.

JRW: What scale is the model going to be at?

JL: The projections will be at the one-hectare level. Now, there's confidence intervals that go with it, but the idea is pretty simple from a state perspective. The more you do on dense infill, presumably the less there is pressure on the fringe. That's a general theory, but it isn't always true locally, since the types of people who want to live on the fringe are different than the types of people who want to live in the central cities. But the logic generally holds.

The question is, are you in the restoration game or the preservation/conservation game? If you're in the conservation and preservation game, you really need to know where the threats are, and the imminence of those threats, because if it's a certain threat, you don't waste any time, you go out and buy that parcel. Alternatively, if the threat is 10 years from now and the developer would be just as happy to go somewhere else if they were directed there, you want to have a different type of approach.

On the other hand, if you're in the restoration business, as we were just talking about, it's not just that parcel the developer wants to transform, it's the 200 parcels that are around that, and that

have their own unique geometry. But regarding the usefulness of having a projection of future urban development: First it does need to be over the full spectrum of densities and locations, but secondly, how you integrate that depends on how you're choosing projects, and how you're choosing plans, and again whether you're in the protection business or whether you're in the restoration business.

MH: I think to not use any of the risk indicators is not appropriate. I think you should use risk or threat as one element to inform you about what's likely to happen. You can also work with say, Cal Trans or the County Roads department and find out what their plans for roads are, it's another layer of information that's going to inform you about what's likely to happen. And the more of those pieces of information you get, it doesn't need to dilute any of the natural stuff, it's just additional information that informs you about what's the cost and benefit of working in this area.

JS: The other thing to consider that's related to threats, but maybe a little bit easier to quantify, is how much is it going to cost to manage this piece of habitat in perpetuity or for whatever time period you want? We've done some analyses that have shown that the size of the patch is inversely related to the cost of managing it, or vice versa. And consider that when you're considering maybe not priorities, but value. And sustainability.

TL: Here's where we have a unique challenge. If we take that approach we end up with a vision in which you get big parcels next to other big parcels, they're all connected. This is what we need, but if we only do that then we further reinforce the patterns of inequity – for people, in terms of access to open space, access to nature, and in terms of the types of habitats that we protect.

JS: But those are two different objectives.

TL: As hard as it is to plan, we have to be particularly aware of the other objectives and the other portions of the plan, because there's going to be multiple uses. It's some of the small areas that may play a part in managing storm water, for example. Storm water is big bucks, and avoiding storm water costs, and avoiding engineers constructing higher levees on the Los Angeles River is big bucks. So there may be ways to make trade offs.

JS: Habitat value is not small change.

TL: No, no. But you measure habitat value in tens or hundreds of thousands of dollars. You measure engineering construction in millions of dollars, and avoiding the cost of storm water management in compliance of laws in millions and millions of dollars. We always undervalue restoration, but compared to the cost of storm water management and compliance and all the added other benefits in the other parts in that particular part of the plan, I think that there's more money available in a relative sense than we might imagine.

JL: here was a 3rd point I wanted to make, and I have to take issue with constantly calling urban development a threat. And maybe that's again because I come from the "dark side" of the planet! It's also a huge opportunity, because urban development raises land values, and creates property values to the extent that you have a plan in place to skim off all of that increase in land values or to require the developer to do mitigations, at the end of the day you may get more out of urban development located in the right places provided you skimmed off or required the development to do mitigation consistent with the plan.

So I think this view that only bad things come with more people, is incorrect. I don't think you're taking that view, but usually that's the view. Only bad things come with more people. But we ought to understand that this does create opportunities, and one of the things that a great vision can do is learn how to take advantage of those opportunities.

JRW: If it really is successful in an urban space, you're going to be worrying about gentrification – which the LA River projects that are materializing could actually generate. It's kind of a good problem to have but not necessarily in this kind of housing market.

JHT: It is going to leave you with the dilemma that is inherent in your basic conception of this as both a recreation and a restoration process. And how you value those, and how you've assigned value to different types of opportunities matter. The Chrissy Field project that you brought up before is a good example, since we did the hydrology for that, I have to discuss that a little bit. This wasn't an experimental issue, actually. This is a land use choice. This was a restoration on the Presidio in San Francisco. There was a historical 70-acre wetland there, a tidal marsh, and, so we said, "Let's build a 70 acre tidal marsh and restore the natural system." There was a whole contingent of the landscape architects who said, "No, let's just have a larger grassy field," which is what they've done with most of the Presidio, making a giant grassy open area. And eventually they said that we could have 10 acres, and so we said, "If you build a 10 acre wetland there, it won't stay open all the time, you'll have to go in and keep dredging the opening, because it will want to close off with the sand." And they said they could live with that. And so what you've ended up with is a system that is not a completely sustainable natural system. On the other hand, it creates an urban tidal marsh in the middle of a very dense urban area. So it's exactly the criteria that you were just describing, where it's a tradeoff.

Now we're trying to tell them, give us another 20 acres, then it will stay open. But now we've got a precedent. We've got a 10 acre marsh that everybody likes, so it was kind like getting the shoehorn in there and getting started. So it's actually a good example.

The other thing I was just going to mention real quickly, and this goes to the other end of the temporal scale on the threats question, is the benefit of your historical study. And it's really worth some thought on how you're going to use that historical information. Again, I would recommend you looking at the Bay Area Goals Project. The team, particularly Robin Grossinger who's a historical ecologist, really has a lot to offer on how you go about doing that. You may want to bring him down here for a few days and fund him and you'll gain a lot on how to do that. But what that did for our Goals Project was establish a reference point, a reference scale for what was there historically. But it also became a constituency building process. The byword of the Bay Area is "we've lost 90% of our tidal wetlands." That actually carried a lot of weight for many years in terms of generating interest, at least in a certain group, for restoration. And it also gives you that kind of a parameter to say OK, we've lost x, we had 20,000 miles of first order, second order riparian streams. Now we've got 200 miles. Our goal is to get 600 miles back by now – it gives you a kind of a reference system. And also for some of your "lost" landscapes, just as you were describing earlier, those come out of the historical record. So there are a lot of benefits, but setting that up and spending your money and focusing it is really worth some time.

And it makes great maps, everybody loves them. I tell you, you get a lot out of that as your first slide. Everybody says, "God, that's where my house used to be." You know, people can really relate to historical maps.

DS: I'm going to get back to Jennifer's question about including threat or risk. Another use of tools like this is not just putting this or that threat in as an input, but actually being able to explore different scenarios beyond just conservation and looking at the impact on conservation opportunities. So how do those scores change under different land use choices, Dense Development vs. Sprawl Development vs. Let's Go North Instead of East Development or a Cal Trans new freeway proposal that wasn't on the table before. So using it for impact assessment or evaluation, is really what planning is, even as a process more than a plan. So if you have a mechanism for including threat, and then begin to plug in different people's visions of what that threat – or development opportunity – is.

That could work for conservation plans as well as for somebody coming in with their own project or conservation vision. And then look at how much you get for your conservation goals and then how much more would you need to do under those different scenarios. So you've got the same tool set and you can use it in multiple ways.

JRW: So you could build scenarios into the tool, to show what would happen with an urban limit line, without an urban limit line, what would happen to, have built densities and so on.

DS: That then changes your scorecard map.

ALS: There are different possibilities, and here are the impacts of each. So you're basically providing information as to what the difference scenarios would provide. I think that could be politically more acceptable.

DS: This development scenario has less impact on conservation values and would cost less to implement versus this other one. And how substitutable then are your conservation benefits? Sure this parcel has some habit in its inner vision, but this other parcel is 98% as good so we could replace the original parcel if necessary, even though that parcel was not in the original plan.

MH: There have been other regional planning exercises like this that don't necessarily resolve in a map or a document. They have a series of stakeholder meetings in which they have interactive tools with people that can allow them to choose different things and see what the picture looks like, and it informs the stakeholders about what the possibilities are, and where the sensitivities are. Maybe you may not want to argue between whether you need 15 rare species vs. 10 rare species, it may not make a difference. By exploring different scenarios in a public setting, in other places they've developed tools that allow people to become more informed about what the impacts are. So it's a different kind of approach.

TL: This may also be beyond the scope but I think it is useful just to ask, on this type of scorecard, where or at what time does the economic valuation of the parcel come in? Even if it's a rough estimate, it can help. It may limit you from going down a road that would just not make any sense because it's just beyond cost. Or is that beyond Phase 2, is it really more for the Conservancies once the Plan gets back to their office?

I can be contradicted by someone else in the room here, but I see our goal as putting together a vision for habitat planning. At this cut, we're not going to worry about cost. The vision isn't going to worry about cost. Now, can somebody come back and look at cost? Well, yes. But especially when we have a number of focal species, rare and endangered, given the goals and values that we've stated, we need to know what's necessary to protect them.

- MW: Are there any other threats that you might worry about than just development threats? We're aware of excessive fuel loads and that sort of thing that have pretty immediate implications to the quality of habitats if something's done about it.
- TL: A great example there as well is invasive species. One of the real opportunities here is to provide the regional vision that Los Angeles County and much of this area is lacking. Kelly Schmocker always uses the great example of Arundo management. There are projects that take out Arundo in midstream, not starting at the headwaters. That sort of thing is one of the general policy issues that need to be addressed.
- MW: But it's also true that there are areas that are protected today that you have the potential for losing in the future because of a particular threat, and so the sand is slipping from your hand on one side and you're scooping it up in the other. So you want to have a sense, if you're distributing resources, of where do you focus? I think doing a threats-assessment – trying to get some sense of threats – would probably be a pretty important step.
- JHT: It seems like the pattern of this development, unlike many in Kern County or Riverside, where it's peripheral. Here, we have questions of urban infill in the long run, and how that occurs and it's a little different model than Orange County.
- TL: An example of this is 'weedification' of the wildlands, from dry weather deposition of nitrogen from combustion engines. Of course this sort of issue – cars – we have really no power and control over and are large social issues. But it is possible to see a policy coming out of this. In fact I was writing a draft of a recovery plan for a Bay Area butterfly, and one of the recommendations of the plan is to support emissions control in the Bay region. Because one of the threats to this species is all that pollution coming out of tailpipes, it's fertilizing the grasslands, it's causing invasive grasses to grow that's eliminating the habitat for the species. And so the solution is a much bigger one. I'm not sure how to get behind some auto emissions legislation, but you could certainly draw the connections in the process of these discussions and say look, some of these threats really are threats, they are correlated with more people, more cars, and more pollution, and they need to be addressed for the sake of the wildlife.
- MW: Or maybe you're identifying some habitats that are particularly sensitive to some of these threats and it's back to this issue of management. The Rivers and Mountains Conservancy isn't probably going to do anything about emissions, but if it means funding more active weed control measures on a particular piece of property, that is something that's under your control.
- JHT: I just can't let that comment about the economic side of things just drop like that quite so quickly. Because at some level, it's one thing to be in your data collection and analysis phase, but as soon as you start talking about your planning phase, you have to decide what level of infrastructure removal or whatever (especially if you're talking about hydrologic systems), you're going to take on and whether it's cost or change in the way things are done, that's going to come up so strongly. And I'm sure you've thought about this a bit, about how you're going to address that? But to say that you're not going to deal with it in the planning process, that it is only going to be only in the implementation process, is just impossible. You can't say, OK, we need large-scale non-concrete rivers back, so we recommend removal of all concrete lining from the rivers in the LA Basin. That's a vision for a restoration of river systems which you could put out there and then say OK, it's up to you, RMC, to implement that. But at some point along the way, you've got to start dovetailing that with where you're going to focus your resources and how you're going to

prioritize things. So perhaps that can be a separate discussion another time, because it's such a huge issue.

JS: I totally agree that that has been the biggest failure of most conservation plans that I'm familiar with now: they don't really consider the implementation phase during the plan, because it's a great plan and we're going to conserve this piece of land. But here's all the things that you have to do, they're not economically feasible to do, in order to conserve that piece of land. And I just don't think that has been integrated in the planning process as well as it should be.

JHT: Everyone that works in this knows this. I'm working on the Rio Hondo right now and there's this vision: people would love to remove the concrete lining and of course as soon as you go to the LA Public Works Department, and start looking at that, you're talking about \$10s, 20s, 30s, 40s of millions of dollars to do that. It's not that you shouldn't consider it – we've been looking at restoring the LA River now for 20-25 years in our firm. We may get there, and it may happen someday, I'm not saying it's not worth talking about. But I'm just thinking about how you bring that into your planning process is obviously a real key issue down the line.

JS: That's the difference between a vision, which should be totally biologically based, ideologically based, whatever, and a plan, which says OK, this is really what we want, but this is what we can do for now. And keep that vision up here, and show the way that you got to this vision, and here's all the justification for that, but here's what we can do today in 2005 or whatever.

KS: You've got this scorecard, created by the USC group, keep doing that. But don't put blinders on. Somewhere at the Conservancy there should be similar Excel tables that have constraints with costs, showing moderate, low, high coordination projects across county boundaries – all these things that end up having complication and expense. And that's a separate exercise that may not have to dampen the vision, but can go on separately.

TL: But there does need to be some limit of feasibility. Because if there were not, we'd just say, we've got our historical vegetation map, let's go! We hate people, it was much better when it was ground squirrels and grizzly bears!

JS: One of the rationales for keeping the vision up there is that on the other extreme you're going to have people who don't want you to implement this plan. And so if you end up somewhere in the middle, you have to have that vision up there to try to skew the reality into something that is acceptable.

JRW: I'm still not clear at what point some of these cost considerations should come in. Yes, the cost-free vision is out there, but as we move forward beyond that, should discussion of this have any kind of role, should there be a rating even if it is only qualitative, e.g., high, medium and low? In other words, some kind of scaling so that even though some things may seem really expensive, if you save a bunch of ground water, suddenly that doesn't look very expensive, because we're spending huge amounts of money importing water. So some of those kinds of metrics would make sense to bring into play a little bit earlier to have people not discount what we suggest.

I'm thinking about the experience with TMDLs released without cost information by the Water Board. The Coalition for Practical Regulation got together and had USC economists determine that meeting the TMDLs would cost more than the war in Iraq. You know, that's not helpful. So other people in this room have been working on how to come up with estimates that shoot that sort of argument down. But I am concerned that, early on, there is a sense that some things are

actually doable.

JL: This is why what Mark said before is so incredibly important. And maybe this is the core of the plan, if there is a regional plan, because again I'm just concerned about the implementability of a regional vision. But what Mark said before is: make your plan a series of incentives for financial and institutional collaboration. Because any one of these ideas is probably going to end up costing more money, be more difficult than we can imagine. But if you go back and say the plan is organized around financial institutional collaboration between 5 cities and 3 Conservancies, and if they get together and collaborate and meet these goals, we're going to free up some resources to leverage that and magnify that. If you just say what's feasible, what's not feasible, right up front, you're going to rule out a whole bunch of things that really are feasible once you bring a whole bunch more people to the table.

MB: What happened in San Diego, in the sharing of information about the private and public cost of building the reserves, there was the same kind of scenario modeling of the different development pathways. And then discussion of who would pay – it is important to answer the question of how will this be paid for, and who will pay. And if I'm hearing the discussion right now, this linking of growth management, for lack of a better word, and conservation, is a new nexus that we're making in this overall discussion about how to solve the conservation, open space and access issues that we have. And who pays and how we're going to pay for it is really important, and it is important now. Because it will affect feasibility and implementability. And it will also show that after we spend \$6 to 8 billion dollars, the bulk of the land's going to be in private ownership still. Where there are threats and where we care to manage it, then some of these issues come up about infill and tradeoffs, making us think about transfer of development rights, linking development, infill and urban service development with conservation, etc. So maybe we do have to ramp that up and start that now. In California, the California Dialogue, sponsored by Bank of America, offered a figure of \$12 billion dollars, in the late 90s, and it was path-breaking. It actually led to the notion that a billion dollar bond measure was not unthinkable.

We were at the \$10s of millions dollars level, and we immediately went to the \$100s of millions and billions of dollars level. Given the cost of the reserve and the transit, San Diego is proposing to raise potentially a half billion dollars for the transportation related and other infrastructure related improvements. Which is just a portion of the \$1 to \$1.3 billion that was part of the vision and the planning, so the community could know what they were getting themselves into. And then breaking it down into pieces, it became almost conventional wisdom. So \$500 million dollars ten years ago was a preposterous figure. In the Bay Area we've done the same thing. The Bay Area Open Space Council has come up with price tags, and how to share this obligation, and it's been useful.

ALS: It is probably wise to avoid issues of what is feasible and not feasible and exerting a value judgment. But on the other hand it would be useful to, to have some kind of a unit cost for certain things, certain types of projects or infrastructure. In addition to that as a final product, it would be useful for the Conservancies to have an initial identification of what possibilities for funding there are, what parties could come together in a proposal. But avoiding a value judgment – saying “project x isn't feasible” – is important, because as you say, that might not be true five years from now. But the unit cost is a different thing.

JRW: I agree with that. I'm thinking about a lot of the cities in this region that are trying to compete for bond money, that don't know how much a nature park costs, and who might pay for it and what the sources are. So, a unit cost for a storm water park or a nature park that a land locked

jurisdiction could utilize, then be able to effectively compete for bond funds, would be helpful. This is very different from what Mark's talking about.

JHT: Maybe that would be one part of the data collection effort here. I think individual Conservancies do, when they look at a Bolsa Chica or LA River project, know how much did that cost, just with planning, but include that in some of your data collection, the cost of implementing projects, it'd be great to see. Individual consultants kind of know about their own projects, but don't often step back and look at how much all these things cost together. And then you can derive unit cost from them.

But the other thing that you could do, following this, or in the sample scorecard is (even if you didn't try to put it in actual dollars) provide a matrix of benefits and costs in scalar terms. This project, on a scale of 1 to 10, this is a 10-cost, 10- benefit project, versus this one which is a 10-cost but it only 2-benefit project. these costs and benefits could be stated in terms of your criteria, what you're valuing, either habitat value or urban access to a wetland or something like that. But just some comparison allows people to prioritize down the line. If something's a big infrastructure removal undertaking, it's still worth doing because it's going to get us something that we just can't get any other way, versus, removing pavement where you get maybe a grassland back but you can get that somewhere else. Whereas a riverbank or a tidal wetland you can't get anywhere else and so it's worth that level of effort. So some kind of benefit for your cost on a qualitative scale would be useful.

DS: I think it's valuable to the extent that those unit costs are spatially varying. Let's say there are substitutes for meeting a specific goal, for example, habitat representation – an oak woodland, and a grassland. They've both got equally good benefits, but if the cost of one is an order of magnitude different from the other, then that would definitely guide even a vision approach. So even if it's not very precise in terms of costs, when you actually start negotiating with landowners your estimates may be quite different but a rough benefit-cost ratio may help guide some choices.

KS: Taking this cost issue a little bit further, it's hard to put a value on the benefit of some of the restored functioning of the ecosystem. But things like groundwater you can put a cost on, and so you can start identifying some of your benefits, and that may help.

TL: Thanks for increasing our scope, guys!

JL: Where this leads us, is where Mark was talking about, which is some of the work that Frank Davis started on the Legacy project. Which is looking at spatial portfolios, looking at the substitutability, doing something in one place versus another place, and how do you evaluate that. And that isn't part of the vision, but it's part of the toolset that you need when somebody comes in and says, is my project part of the plan? You need to evaluate this thing as part of the spatial portfolio.

DS: It also gives an opportunity for landowners or others proposing a project to say, you know, your regional cost estimate for my land was x, but I'm willing to donate it or I'll sell it for whatever, or I've collected additional information than your regional maps had, and so it gives a landowner the chance, to adjust their score, at least they know how it's going to be evaluated, and what kind of things that would enhance their proposal.

JS: I guess I'm questioning whether this is increasing your scope, or is your scope today to create the vision, or is it to create the vision and the plan that evaluates different tradeoffs?

- TL: I was half flippantly joking. I've gotten the guidance, at least on the habitat side, to determine what the science tells us we need to do to achieve these goals. Not the cost to achieve them.
- JS: Right. And I think that we still need to do that.
- TL: I agree. Now, the question is, how much effort are the Conservancies willing to pay to add these various costs and mechanisms?
- PB: I'll support your original thinking. You don't want to go get into those costs at all. Because for one thing, they're going to change, the cost of restoration is going to change, the cost of water, dealing with nutrients flushed in the rivers is going to change. So you might want to quantify the benefits, in terms of how much storm runoff will be abated by action in these particular areas. But I don't think you want to get into cost. The folks who are going to spend the money are going to get the cost. So we have this plan that benchmarks scientifically what we can do. When Belinda comes to spend RMC money, she's going to look at the checkbook. She's going to find out what the costs are today. I think too much consideration of costs is a diversion of our energy.
- TL: But to Jeff's point: I don't think we're going to put out a vision that involves ripping up half of Compton. Or something that is just wildly out of the range. There'll be a feasibility and reasonableness to things. And some things will be aspatial. Some of the people will say: in this region of East LA, we think it would be great if we had 2 acres of nature park/stormwater park in every subwatershed, and maybe we identify the parcels and maybe we don't. But what we need to do is to get at feasibility.
- ALS: What is the test of feasibility going to be? What kind of test of feasibility are you going to do?
- TL: The test of technical feasibility for restoration ideas may be social. We are not going to buy up and demolish neighborhoods to restore the LA River.
- ALS: Unfortunately, from what we hear, projects were not done, not because of technical feasibility, but because of economic reasons. Because the money runs out, or it was too expensive. So, it might be a little bit romantic to say that if the science can do it, we'll do it, without having a sense of costs.
- PB: Not everything we want to do is going to get done but it's great to have that vision out there. Your coastal prairie vision probably has a 0 percent chance of occurring, but it's great to have it out there. Then, you can say: "That costs \$20 billion dollars, we didn't do it."
- MW: But to give Conservancies a tool to estimate the costs and benefits of any particular action is important.
- PB: And there's all these pots of money that are specific. There may be the 'Coastal Prairie Conservancy' that's born next year! And it may argue that there nothing more important in the world, and \$20 billion dollars is a great price!
- MB: It may be that it's not the USC team that does this analysis. There's other professional staff that can take this and make it instrumental to our needs in the short term. But relative to the economics, the next bond act, whenever the next bond act is arriving (it could be 2012, not '06),

it's being talked about now. And the only way you get into the bond is to create the vision.

And then the question is, how much do you need, what's your fair share? It will be incredibly important, instrumental, even if it's a really gross bounded range. This is the placeholder by which we establish what the need is in the greater Los Angeles area for these partners, both the state conservancies and their local partners, because make no mistake, we grant a lot of money to local partners, which we do not spend. Primarily we spend through the instruments of local institutions, governmental and nongovernmental. And it is the moment. This is the moment. This is the time to prepare that documentation, in order to be included in those efforts, whether it's TNC or TPL, Coastal Conservancy, or Resources Agency, they're talking about this stuff right now, so at least from an instrumental perspective we need to know what this ballpark figure is, and to get ourselves in line. So it would help us tremendously – but maybe you're not the ones to do it and your scope does not expand, we take it and we produce some kind of document. Because there is a lot of technical competency in the Conservancies generally. We forget there's 8 in the state now. And it's really hundreds of employees deployed through the state. And it's tens of employees, deployed just in the greater LA Basin, with the 4 major Conservancies.

MH: A different kind of question, unrelated to the cost issue. You'd mentioned that you were going to try to take that suite of 30 or 40 different species, and then you were also talking about focal species. What sort of process are you going to use to involve other people to help identify those species?

TL: That was actually the question that I wanted to raise. Certainly, other people have already started looking at and identifying focal species and the Missing Linkages Project had a series of workshops identifying focal species across taxonomic groups to act as indicators of habitat conductivity for the identified linkages within this region. So that's one place to start. We also have a science advisory panel that the RMC has set up, and that's the place that I would want to go to and say OK, here's our list.

But I would like to get some feedback on what rules you might suggest for specific focal species. I'd also like to know what species you know about that are going to be particularly interesting, especially the ones to use that are going to indicate the sort of lower level of function that isn't the whole enchilada in terms of habitat conservation, but rather could help some of these smaller areas. I find this to be an uphill battle convincing people, but just have to come back and remind them that of our endangered species here in Los Angeles County, two of them are insects, the two butterflies, and one of them lives on small patches within a 30 acre parcel. One of them, the El Segundo butterfly, is on a couple of hundred acres and can live on less than an acre, and maintain a viable population, contributing significantly to the species and its conservation.

So how do we pick species that are maybe not the endangered ones, but that might benefit from restoration and/or conservation of small patches? Insects, maybe some birds that might you know serve this function. We need these animals so that we can really articulate, for example, what it is that the Baldwin Hills are doing for us, from a biological point of view, in terms of maintaining biodiversity. And even maybe getting into migratory species.

MH: You might want to start with those kinds of habitats. Just listening to you talking about those are indicative of ecological processes. You might want to start with, what are those habitats and processes that you actually want to maintain? So if pollination is one of them, or migration, what are good examples, what species really represent that type of process? Then work through that and figure out what would be the species that are most appropriate.

- MW: The other way I look at this, Travis, is that you've got this representation piece that's really more of the coarse filter, and so now what you're looking for is fine filter targets. So maybe you are looking at rarity, where are those very unique, patchily distributed resources that may not be well protected? You can go through heritage rankings and then look for overlap of habitats.
- TL: The aquatic species are going to be really important because of their relationship to indicativeness of how well we're doing on restoring hydrological function. Where are they now, where are they persisting, and where might they be if we implement some of the visions for the riparian systems. So, your thought about indicating where habitats – alluvial sage scrub, of course we all know it is being obliterated.
- MW: Night hawks might be an example of that. We can get some of these data on birds because of all the birders out there. I can call 2 or 3 people and probably have a good idea of all the sites where there's night hawks. And the same with burrowing owls. Burrowing owls are as common as ground squirrels out in some of the agricultural regions of the state, but you come to southern California, the Los Angeles Basin, and they are almost done in. So these might be some of the animals that aren't necessarily state listed, but they're certainly a species of concern. And they are going to get us at things like open grasslands, vernal pool areas, etc.
- MH: Some other variations on what Mike's saying. Instead of just looking at the underrepresented habitats, which is the presence of those habitats on public lands, you can also look at underrepresented species. What are the species that are mostly on private lands? This could be an acquisition focus. Other scenarios, you can look at those that are extremely rare, they're only found in LA, endemic to LA. And even a third idea is more like a cluster analysis of species concentrations. What species are mostly found where there's lots of other species that are rare? So there's lots of different ways to play that.
- JS: Have you looked at the coverage of your species database?
- TL: That's got to be one of the considerations in picking things. We know there are some data that are available. One source that we're looking at is the Los Angeles County breeding bird counts. Even though we have Ventura County, and also portions of Orange County, the majority of the area is Los Angeles County. That effort is not yet published, it's going to be published soon, and it's housed right across the street here at the Natural History Museum. We should be able to get access for selected species there.
- JS: But are there large areas of your study that haven't been surveyed really?
- TL: The question is, for what? Say we pick an insect, or arachnid, scorpions. Scorpions are really good indicators of intact, healthy coastal sage scrub. There was one scorpion expert in California and he passed away.
- MH: There is increasingly better integration between the different museums and collections. They are starting to integrate data sets for California. Folks at UC Berkeley, for example, are pulling together data, not only from what they found and from other California research institutions, but they bring in information from the American Museum of Natural History in New York, whose people have done research in California. Bringing that information could help you identify locations of species. So it's a real good complement to other data sets.

- ALS: It's also in EIRs, which are pretty inaccessible.
- TL: I would hate to think about going through all the EIRs.
- DS: This could be part of an ongoing process, the database process. You have to think more about how you would use those data if you had them, rather than do all the data collection.
- MW: Travis, I would ask, why are we using focal species, what is that intended to capture? I think that helps answer the question of what species.
- TL: That's a good point. And that's the question of these approaches: do we need them all? It's a legitimate question to ask. But take things that are declining in representation in urban areas, such as the California quail. Obviously California quail are not going extinct, no problems up in the mountains. If we don't have quail as a focal species, as an indicator in our urban areas, then what basis do we have for saving the Baldwin Hills, for example? This is a constant struggle.
- We can get this or that species in other places, that's the argument. But different species will serve different functions in different parts of a study area. That's a way we can get a handle on what's possible, what's declining within the real urban fabric. Because with these species, it's always easier to 'trade them out' to other, wilder places. We must identify a value, and claim that it's a value to us to have these local species not just out in the hinterland, but actually within the context of this urban environment.
- MW: Couldn't you use a geographic distribution, or a context of some of these resources? So just the fact that it's sage scrub, whether it has quail or not, in this relatively landlocked...
- JS: No, the fact that quail has not been reported in that patch does not tell you whether they're there or not, because you don't know.
- TL: Whether you have to use quail as the focal species to pick this up, is just to say, in this urban matrix we've got an island of sage scrub that should be saved. That's in and of itself a value. That's a good question, maybe we can think through some scenarios, regarding whether or not one could achieve those goals without the focal species approach. Putting together 30-40 species again sounds like half a day's work, certainly, at least! But it's maybe not an exercise we need to go through.
- PB: I was trying to write down focal species and animals that might be sensitive to exotic species invasion and sensitive to light pollution, sensitive to water pollution – and every one of these things argues for exactly what you're trying to avoid, right? Just write off all the stuff in the urban areas, because it's too expensive.
- MW: You almost want the reverse of the traditional sort of reserve design paradigm, which is, what do we do in these hammered areas to conserve what we can?
- PB: This argues for the point Mike brought up earlier, that I didn't quite understand the first time around, which was that maybe a 5th criterion, whether or not we abandon focal species or not, of a "threshold of naturalness."
- TL: And just as a reminder to ourselves, places we haven't surveyed are enormous. There are 12

endemic insects on the El Segundo Dunes, and we know little about the El Segundo Dunes, it's not even fully surveyed. The places where there are unidentified rare species are not just in the tropics. You could go to a Baldwin Hills, you could go to Palos Verdes peninsula, and if you were to do a full insect assay, I bet you've got new species there. You've got unique species, you've got endemic species there. And frankly we know more about the face of the moon than we know about the insects in the Los Angeles basin. So maybe this argues for identifying the naturalness of areas. Even if they're small, there's going to be diversity left there.

PB: Those are going to be some of the most important parcels to accomplish your recreation goal of trying to connect some of these urban folks with nature.

DS: They also have a longer-term biological value too. Just because we're creating reserves for things that are there now, having some of these other places available for the future is important too. In the framework we proposed to Legacy we tried to do this, although I don't know we necessarily quantified it very well. The idea was to allow space for the ecosystem's evolutionary processes to unfold. Species are going to be moving around, over time. Just having a few isolated places where there isn't necessarily a lot going on today which haven't been totally hammered yet, may have that longer term value perhaps.

MH: You might want to look at an urban habitat classification that tells you what habitats within urban areas to protect, and have a different set of thresholds for them.

MW: Along those lines, you might consider stratifying the study area into an urban zone and a wildland zone and treat those differently analytically?

TL: Certainly the first level of integration comes in the hydrological system. And that can't really be divorced from anything. But in the urban matrix, it may not be species driven, or habitat driven but rather have some other considerations.

KS: As you start to bring in or integrate or plan the biological component, the hydrological component, and so on, what's going to come out are physiographic or geographic blocks, that have already been alluded to already – whether it's your coastal dune zone or Palos Verdes that operates like an island, or the Verdugo Hills Mountains area, or Santa Susanas, or, these different pockets start operating in their own little integrated system. You have a methodology for biology and a methodology for hydrology, but before you can get into that, there may be an integrated or geomorphic or physiographic task: how do these little sub-units work as units? Where it becomes important is in bringing in the urban matrix. You get up to the fringe there, around the base of the San Gabriels, and you have these spotty mountain type developments, and then you kind of get out of that and you're up into the canyons. And there are certain hydrologic relationships when these flows come out of canyon mouths into the alluvial fans or into their detention basins mostly now, wherever. But that type of first cut approach may be a good way of integrating the two pieces of the scope.

JHT: The more you could convert species into habitat criteria, the easier it will be to map habitat and develop criteria. It is easier to create your plan around habitat than it is for individual species or specific species requirements. So, as much work as you could do on species to convert those into specifications, on either an aerial extent or type of habitat basis, that's going to be a lot easier to work with than the actual species themselves.

MW: Just to follow up: another way of getting at that is again, talking about representation. You can

talk about representation from slope and aspect in geology and this whole array of variables that theoretically predict distribution of some species.

MH: The idea with the physiographic issue, when you think about representation, is there representation on public land anywhere in the study area, or do you want representation scattered across the study area, in these different physiographic areas?

KS: This region, while very big, is still small enough to start considering places as the “Upper Western LA River Watershed” vs. calling it “Encino.” As you start identifying these physiographic regions, they can actually cross your Conservancies. But it’s OK, they’re working together on this.

TL: Thanks very much for your comments.

AFTERNOON SESSION: WATERSHED HEALTH

JRW: I think we've had a really interesting and challenging discussion about issues that actually cut across all the areas, and not only related to biological resources. We're going to move a little bit faster this afternoon and start on watershed issues with Joe Devinny.

JD: Thank you. We are going to talk about watershed health as part of the objectives of the Green Visions project – what we can do to restore the Los Angeles River, San Gabriel River, Santa Clara River and a great network of tributaries into something more like a natural form – something capable of giving us a much greater value for society in many ways. The goal is to restore the functions of the hydrologic cycle and to maximize the benefits of that cycle – restoring groundwater, supporting natural ecosystems in their great variety, and perhaps helping us protect against floods. We have done two things to change the environment here in Los Angeles: we have sealed over much of the ground with pavement and buildings that prevent the water from getting into the ground water, and we release pollutants into our local environment. So instead of the natural regime, we have polluted water running to the ocean. And we live in an environment that is asphalt-black and concrete-gray instead of green.

An important aspect of this is the geomorphology – the shape and characteristics of the streams have been tremendously changed. Los Angeles is unfortunately infamous for what we have done to our rivers, to create rivers like the one on the slide, which is a concrete box with square sides and a flat bottom. It is, we have to remember, very effective at carrying water to the ocean and preventing flooding. We would really like to find out if we can find ways, consistent with flood protection, to make rivers more like the second picture with a greater natural habitat for organisms within the stream or around the stream, and a greater geomorphological diversity.

An important part of this must be reduction of water pollution. I think in a way we have a unique opportunity right now, because all the municipalities in this region are facing the need to meet the new regulations that are coming from the Los Angeles Regional Water Quality Control Board. They're going to have to spend a lot of money to do that. Jennifer mentioned this morning briefly a report that I have prepared, with some others, for the Water Quality Control Board. I can tell you now that our estimate for the total bill for everybody, governments, private sector, and all is between \$2.7 and \$7.4 billion dollars for the entire business of cleaning up storm water. That's a huge expenditure, but it's certainly something that can be borne over the next 10 years or 15 years, and I think it's important that if all that money is going to be spent, we do it in a way which is consistent with all the goals that we've talked about here. I think it's a unique opportunity for us to piggyback the goals of this project on the goals of the Water Quality Control Board and to accomplish it all in a multiple use approach. We can gather a great deal of support that way that we might not otherwise have. Part of what we're referring to here is upland management – facilities like stormwater parks and treatment wetlands, which I think will be an important part of the solution. We're not capable of removing all pollutants, and we certainly will still have to do source control for pollutants like pesticides and trace metals, but we'll be able to help ourselves greatly using facilities such as you can see in the upper picture on the slide – parking lots which are designed to be infiltration systems so that the pollutants and the water from the parking lot do not go into the flood control system but instead contribute to the groundwater resource. Facilities like these two at Pan Pacific Park, which are grasslands designed as detention basins or as pervious pavement so that water can infiltrate, will certainly contribute to the solution.

An important aspect of what we want to do is infiltration of stormwater, to transform it from a river and ocean pollution problem to a substantial groundwater resource. Our methods for approaching this will include study of historical hydrology – what the rivers looked like before human modification – and we'll use this as a guide to tell us what mix of ponds and rapids, narrow

streams, broad streams and braided streams might be appropriate. This will provide the basis for the associated riparian ecosystems that should be restored.

To do this, we're going to use GIS modeling tools. We would love to have it finally put together so that we can click on a parcel and have all the information come up about whether that parcel is appropriate as a habitat restoration site – in terms of the soil type, infiltration rates, which watersheds it might serve, and what land uses are immediately upstream. We will link that to hydrological models. If we make a global plan, we would like to know what effect that will have on water quality and on flows and possible floods in the system.

The core of our approach is the multiple-use concept. Any particular facility that we propose would serve multiple purposes. The example that I am showing here is a detention basin, but it becomes a vernal pool and supports an ecosystem. It reduces the hydraulic load on the downstream flood control system. It is an infiltration basin that will contribute water to the ground water. The infiltration part of this is quite important. I mentioned at the start that in our earlier study we're predicting the cost of stormwater control to range from something like \$2.7 to \$7.4 billion. But if the maximum installation is developed, the net present value of the groundwater infiltration might be on the order of \$6 billion. So there is a major payback from that secondary use. And we all know how desperately important it is to maintain and extend our water supplies here in Southern California.

We want to emphasize that we're considering not just to the main courses of the river, but also what can be done for the tributaries – daylighting of the streams and that sort of thing. Very often the best opportunity for ecological and habitat restoration will be on the smaller streams. It will be possible to open them up and turn them into more naturalistic streams without so much fear of floods. We're thinking in terms of the geomorphology – the shape and size and characteristics of the streams—and we would like to restore some of the historic variability and diversity. We would like to link the habitat restoration to our control of runoff and runoff quality, and emphasize the multiple use facility approach.

This will take a lot of data. John Wilson has assured me that it's all available and they'll have it ready right away! More seriously, the data we're thinking of assembling are not outrageously difficult to find. We will look at the topography, the existing flood control systems and the flows and the hydrographic characteristics, soil type, depths to groundwater and areas of groundwater pollution (which might prevent the use at the site of an infiltration system), land use and vegetation types, which will allow us to evaluate parcels in terms of their usefulness as a hydrological control site.

I have asked many questions here and I hope that we can get your help. We're interested in which hydrological models might be most useful and how we can integrate those into the GIS model, and in general, what methods, data and criteria we should use to assess the value of each of these possible sites. This should be not only for the individual sites, but for overall plans including groups of sites. We want to assess their appropriateness and value as a regional system. So that's my introduction, and I'll be happy to hear what you have to say.

I should stop for just a moment. We have one new member of the panel here – Michael, could you introduce yourself?

MD: Hi, I'm Michael Drennan. I'm a civil engineer with Brown and Caldwell – although depending on the audience sometimes I introduce myself as a recovering civil engineer. I'm also a founding

board member of the Los Angeles and San Gabriel Rivers Watershed Council, which has been pretty successful. I was just at a meeting of theirs this morning. We were just celebrating our eight-year anniversary in Los Angeles.

JD: Thank you.

JHT: I'll just start off with two observations. The first is the kind of a comment I made earlier this morning, but I think it's particularly appropriate here. As you're developing your program you should ask yourself, what can we achieve at this regional scale that's not already being dealt with at an individual small project or watershed scale? There are many locally funded watershed projects – Rio Hondo, the Arroyo Seco – all of those individual watersheds and streams have projects going on in them right now that are looking at restoration opportunities, percolation opportunities and things like that.

So the first thing I suggest is to look at the whole basin at one time. What is different is the ability to look at the whole basin. You should start with the historical characterization of the stream channel network, and both the hydrologic cycles and the sediment cycles, and give an overview: how this whole region functioned under natural conditions and how it's changed. And that's where your GIS data on all the miles of concrete can be put into a regional context. I think that will really set a good stage for what you're trying to do. Then the question would be not just: are there individual projects that you could do in each specific watershed? But which watersheds should receive more attention than others in terms of their potential? One might contribute to providing sand to the beaches where it has been cut off and coastline erosion is occurring. Look at these processes on a regional basis before you get down to the individual opportunity level.

JD: I agree. I think you've given a good summary of the issues in the physical sense. I want also to emphasize there are matching political issues which may be more difficult. If we imagine a project like a storm water park that's going to solve the water quality control problems for a certain watershed, for example, there's a good chance that that watershed goes into two or three different municipal jurisdictions. Those entities must cooperate and they will have to involve the parks departments, because it's a park. They will have to have the sanitation districts cooperating, because they're the ones with the responsibility for groundwater control. And if the facility is also a natural habitat, they might need the Fish and Wildlife Service. It would be really good if they could say, we're putting a lot of water into the ground, so the Water Replenishment District really ought to put money into this as well. Then you can very quickly get a tremendous list of agency stakeholders, and with the resident stakeholders involved, the political integration of this going to be very difficult. I think our product might help with this, because if we display the facilities and their effects on the computer, we can show each group how their interests are served and it may help develop political support.

JHT: You'll find that there's a lot of political support for water quality issues because that's now such a regulatory issue. Your recommendations for localized BMPs or other measures that can improve urban runoff will go over very well. There's much less constituency for restoring the hydrologic cycle or the sediment transport regime, despite its important role. I think that's where you'll find it harder to garner political support, because there's no regulatory process to speak of that drives that one.

Everybody knows they're getting hit with urban runoff treatment rules and so they're willing to support that. But the idea of actually restoring the natural rainfall runoff regime or the natural sediment regime to a watershed is much more controversial and difficult.

- JD: I think that's true—it's what I meant when I said that's our opportunity to piggyback. The drive for municipalities to improve their habitats is weaker than their drive for water quality control.
- MH: I'm not quite sure I understand some of the hydrologic models. Would they allow me, if I wanted, to compare two riparian restoration projects in two different watersheds, or maybe within the watershed but in different parts of it? Would I be able to use this to decide whether a project would be a worse investment on my dollar because upstream there are all these different factors causing pollution – roads, sources, sedimentation – all these things that might really damage my project downstream? And to make a comparison to another watershed? Is that where you're going?
- JD: Yes, I think so. And we should learn benefits as well.
- MH: So one of your questions about other data sets is what are the sources of pollution that are upstream, not only the point sources, but also the nonpoint sources, like irrigated farmlands.
- JD: Right. I would be happy to hear your opinions on this. Our current plan is to use a model that predicts water quality from land use. I know that the City of Los Angeles has such a model that they're using now and I've contacted them to see if we could get access to it. I'm not entirely sure how good such models are and how they might be supplemented if we have some specific knowledge of the local site. But water quality will be an important part of it because you can't have an infiltration site if the water coming in has high concentrations of trace metals. It might be OK to have some bacteria, or fertilizer because the soil has a substantial treatment capacity for these, but not trace metals, or chlorinated hydrocarbons.
- MH: It may not be a perfect science but you could use some of these data sets that exist simply to say where there are known toxic waste sites. You can calculate so many types of these sites per watershed. You want to do it even in a very rudimentary manner.
- KS: I have a couple points I wanted to get to concerning the overall purpose. But before that, just to comment on water quality, LA County developed a land-use-based water quality model. They actually pioneered it and a lot of other counties – Orange County, San Diego County – look back to the LA County data because they've done some type of verification with it, and sampling and testing. So the watershed division over at LA County is a good place to go for that. GIS lends itself to land use analysis. The parameters used to relate a certain type of land use to a certain constituent yield, whether it's copper or whatever it happens to be is something that they've been collecting data on for a while. You should have some comfort going into that.
- But on some of these other things here (in Wolch et al, 20004, p. 18) – this seems to be the statement of the purpose – it says, “overall it's expected that the plan will provide a general plan of multiple use sites for storm water, dry weather runoff control, habitat enhancement, and recreation. It will provide a tool to help municipal authorities determine which watersheds fall within their boundaries and which parcels are the best candidates for restoration sites.”
- It seems like there are two parts of the objective. The first part is really an identification of sites. The second part is determining where watersheds fall, their boundaries, and which parcels are the best candidates. So you've identified candidates, and you're starting to prioritize according to what things make sense.
- That is a different kind of effort, the way I'm seeing it, than full-blown hydrological assessments.

Now, someone has mentioned that there has already been a lot of that type of local modeling at the watershed scale. And if we consider the relationship between the regional scale and the local or watershed scale, the plan can include these watershed models that have been derived for the Tujunga wash, etc. But creating a complete model regionally for rainfall runoff or hydrology —it's a tremendous effort. It's in people-power, and it's hours and hours of very, very expensive labor.

So my question is, if this is really the focus of where you want to go? Site identification – creating a kind of inventory, identification of which things are happening in which watersheds – prior to getting actually into analytical modeling, which would be tools for simulation, this is more critical. It's modeling but again it's more descriptive. This is a bit more analytical or prescriptive, and it's different levels of magnitude in terms of cost and effort. It may be that you can go into the GIS and the descriptive type models at a lower level of effort to get what you need out of it. Then where these things don't exist in other watersheds, then maybe you can focus some energy and resources on that. It's really about prioritizing where you're going to put your efforts.

- JD: I have in mind a tool that would allow somebody in a city that's facing water quality control regulation challenges and wants to accomplish the other things as well like parks and habitat, to test various scenarios. So they can say, well what if we acquire these 10 parcels and create stormwater parks – will that solve our water quality problem? Or these two big parcels instead – how would that work?
- KS: When you're at the point of actually designing something you need a certain level of accuracy and precision. You need that certain level of quantification of results to size facilities and locate them. For planning purposes, you may be able to arrive at a reasonable amount of information that will help direct your decision without necessarily going to that level of quantification. So for example, you're looking at an upper watershed and are serious about source control, and you're going to look for areas to enhance or improve local infiltration. And you're going to start with our land use information in GIS and look at availability. And you're looking for areas that can be converted or maybe it's a pavement that can go porous that doesn't have water pollutants feeding into it. You might find, here's one over here, it's a nice spot, it's an area next to a basketball court, it's used as a soccer field, let's route some more runoff that way and it will provide a degree of control. So you can go through that kind of exercise for identifying sites prior to developing a full rainfall runoff model. If you want to know the results, you can still do a number of analyses prior to doing the full hydrology model. Now when you decide you need to design a weir or other specific flood control device, you're further down the project process and then you may need more quantification.
- JHT: As an example of that, we just had a proposal in to Cal Fed for some work on the Arroyo Seco River, where we were looking at the benefits of removing some concrete channel. We need to know the benefits of increased percolation and improved habitat along the river. That was about an \$800,000 proposal to look at one portion of the Arroyo Seco River. And it's a linked surface water and ground water interaction model. That's the scale at which you need to be modeling to really quantify some of these benefits. And that was with a firm down here that was already very knowledgeable about that particular groundwater basin. So the cost associated in the level of detail is what Ken is getting at. It's probably great for you to try to take on the whole region. But a lot of that information is out there already, and I think in your data gathering process you'll suddenly become very knowledgeable about that and be able to make regional recommendations, without actually doing all of the modeling yourself.

Napa County right now is looking at a similar challenge. They want to update their general plan. There are lots of vineyard expansions and residential developments and all going on around the

county, and they want to know how much of this could we let go before it really starts impairing our groundwater and water quality and our aquifer hydraulics. They said, "We really do need an integrated groundwater hydrology water quality model." So we're creating a model for them. It will cost over a million dollars, or a million and a half dollars for that effort, and it's very focused around just a couple of key questions. So it's a great approach, what you want to do, but you have to consider the expense side of it.

The other place as far as the regional level of information that's out there is the Department of Water Resources. I don't know if you've gone to some of their inventories – what they call portfolios – for the South Coast Province. Their area bridges over a little bit further into Ventura County, and somewhat more into Orange County. They have regional portfolios of water balances for this whole region. Their data management unit, up in Sacramento includes people you should talk to. They may provide some information for the regional level.

JPW: Can you give me an example of the descriptive modeling approach?

KS: We're looking for multiple use sites for storm water, runoff control, habitat enhancement, and recreation. So those are three things you're looking for, and so, how are we going to do that? That's what you're getting at, without going into full analysis.

JHT: One example would be if you just did a GIS map of the groundwater basins and showed where there's active groundwater infiltration occurring now. There are places where that's very effective. Then just overlay that map with a parcel map of available land. That would immediately identify areas that are candidates for use for percolation. You'd probably find those areas already have policies encouraging infiltration. You'd at least be able to say that these are good areas to look at. You could not say exactly how beneficial it would be, but at least it would start you down that path.

KS: Jeff and I did that on the Tujunga wash. We identified these places, and there were some recharge basins already operated by the county downstream at Hansen Dam. The idea was to determine what could be done to restore these sites. Right now they're just sand and gravel, and are pretty barren. The habitat quality of those areas could be improved, and they could be made more effective infiltrators by getting water into those sites more often. So those places were pretty easy to identify because they're there. The quantitative analysis of how much water you're going to get in there, and at what frequency was determined through a hydraulic modeling exercise. We asked where should the weir be built, and at what level? The same kind of thing happened on the Taylor Yards Conservancy Project, where all sorts of feasibility or design analysis was done to determine how much water to treat and how wide the wetland restoration should be. But again if you are seeking identification according to these three objectives, you can do it with GIS analysis and then deal more specifically with the site once you have selected it, using hydraulic or hydrological analysis. So while Los Angeles is a big area, once you do the GIS analysis, certain areas are going to fall out. Taylor Yards was a case where there was an opportunity, because the land was available, the hydrology made sense—it was possible to put a weir in the Los Angeles River. What almost became the deal breaker was that the water is so contaminated from previous use. Ultimately the state wanted to go for it because it was a great opportunity.

MH: Can you tell me a little bit more about some of the biological elements, like hunting and fisheries, and how that would play into some of this watershed analysis? I don't know much about fish issues down here, but up north fish distribution and fish population health are important elements. I don't know if that plays a big role down here or not.

TL: It doesn't yet, but there has been discussion about listing of rivers all the way to San Diego for steelhead. Right now it just goes to Malibu Creek. There are definitely native fish populations that are of concern.

WF: I just wanted to make an observation about the kind of policy choice that local officials might face on water quality. I think very often with respect to environmental goals such as this, local officials are faced with a choice of land use related regulatory mechanisms to try to improve environmental conditions, and sometimes they are helped by being able to balance that against the alternative possibility of acquisition of certain parcels. So as a local elected official, I'd much rather figure out how to buy a vacant piece of land to maintain or improve my water quality than to try to get the homeowners in the city to stop washing their cars on Saturday afternoon. It's a much easier thing to do, obviously. And of course, if I can quantify those alternatives, also then I can assess a developer fee for water quality and create a revenue stream to buy land. So if your goal is to create a situation where you do the most for the least, with the least amount of political pain, and in addition to that you come up with yet another revenue stream and yet another reason to buy open space for alternative purposes, the ability to model the water quality impact of regulatory vs. acquisition alternatives would be helpful. I'd much rather nick developers for a fee to buy land than make everybody who voted for me not wash their car!

JD: That's really an issue that arises in the whole question of water quality control and management. I think the present policies of the Water Quality Control Board have tended to favor requiring individual parcel owners to do things, and there are a lot of disadvantages to that approach. There are all the ones that you just described, plus the fact that the rules tend to apply to new building or reconstruction, which means it's going to be a very long time before most of the parcels have anything done to them. And finally, in our analysis, we found that there's a very strong economy of scale. You save money by building water quality control facilities that serve watersheds on the order of at least a square mile. You go below that, total costs just skyrocket.

WF: Going back to the importance of the regional approach – from the point of view of a local government, getting the same bang for the buck by acquiring a piece of land in somebody else's jurisdiction is more appealing than imposing regulations on my own homeowners or my own property owners. And probably the host jurisdiction would just as soon have me pay for it, too. I'd rather have it in my jurisdiction, but if there isn't an alternative in my jurisdiction, buying land in some other jurisdiction is more appealing than imposing a regulation on my property owners or my developers or my homeowners.

MD: Do you think that's a common attitude among local elected officials? If their city, for example, isn't bordering the San Gabriel or Los Angeles River, would they be more willing to support land acquisition along those rivers even if it's not in their city? As a regional benefit?

WF: They would if the alternative looked worse. If the Regional Water Quality Board is on your back, and you're going to have to do something really draconian in your own city and that's the only alternative, yes. But that would have to be the condition. I'd obviously rather have a piece of land in my own town than in somebody else's town. But I'd rather buy my way out of the problem in somebody else's jurisdiction than impose a regulatory burden on my own constituents that they won't like. And if I have to impose a regulatory burden, I'm going to make sure that lots of federal bureaucrats come to town and publicly tell me I have to do it!

MD: I like his comments – if we're trying to think about what is the best product from Green Visions to

help folks like him support municipalities, I'd love to have more discussion about what would be the output of your project. I'll give an example.

We're working for the City of Santa Monica right now and they asked us what capital improvements would be needed throughout the city to manage all the storm water runoff to comply with all the existing water quality regulations – including future TMDLS. We "quilted" the city – broke it down into 13 watersheds. If you retrofit this school and put a new park here and do all these things, you could actually come into compliance with water quality regulations, but it would be about \$225 million in a city with a population of 80,000 people.

And they actually said "OK, that's interesting! But if we're going to spend that kind of money, is there another way that could accomplish that water quality objective that would also accomplish some of these other objectives that we're all interested in?" And so we're looking at daylighting the Pico-Kenter storm drain through their city and using a good chunk of that \$200 million to do a much more strategic land acquisition along these historic creeks. In this way a multipurpose project accomplishes those water quality objectives and also creates parks and tangible benefits that the community might actually even be willing to pay for if you show them a picture of it.

Each time I've looked at this problem in a heavily urbanized watershed – and I've done it in Arroyo Seco and Ballona and LA and now Santa Monica – I keep coming up with the same conclusion, that it actually makes a heck of a lot more sense to do strategic land acquisition along these urban creeks. This is better than a sort of a diffuse set of land acquisitions throughout the watershed. And if there's a way of generating data that helps decision makers to come to that same conclusion, I'd like to help with that. I'd like to figure out what are those data, and certainly, looking at benefits as well as costs is appropriate.

JD: Yes, I would hope very much that's one of the results. The GIS tool should allow people to sit down at their computers and test scenarios. They'll be able to test the scenario of large acquisition along the stream rather than scattered small acquisitions. They would also be able to determine the benefits of getting together with adjacent cities, because the best site is downstream from the group, which can share the cost. They could see if it would cost the group acting together less than if they all act individually.

WF: The water quality stuff is going to drive cities toward working together whether they like it or not. We're already seeing that in Orange County. This kind of analysis might subtly promote a more regional perspective on the part of local officials by showing them that their problem, and also perhaps their solution lies either upstream or downstream from them in some other jurisdiction. And I'm generally in favor of doing anything that subtly infuses a regional perspective into pinheaded narrow-minded parochial local elected officials such as myself!

KS: When you imagine a romantic kind of aerial flight, and this is what it looks like coming over the coastal dunes, looking across the flatlands and going up the river and you'd have sage here and riparian willows and all – you can think about reconstruction of the vision of where we want to go.

In the vision part of the geomorphology – it was one of the four things, there's a comment or statement about description of restoring or rehabilitating those natural geomorphic processes. And again, that's a good vision. Let's think about what that vision is in Southern California. Unlike a lot of places where they write geomorphology textbooks (England and France, which have these quaint little streams that never do a whole lot), this is one of the most geologically dynamic places after the very steep ranges in South America. These streams across the plain, whether it's in the

San Fernando Valley or here, if allowed complete restoration under natural processes, would be very, very wide, as you mentioned. They would be braided, and you wouldn't know where they were going to be in any given event. So restoration of geomorphic aspects of natural processes has a frequency or magnitude that's associated with it. So how much do you want to bring back? What type of event are you comfortable with letting go?

Many habitats are very much tied to occasional disturbance. An arroyo toad needs this churning of sediment and sands and gravels and new deposits on the benches that occurs at a certain frequency and magnitude. An extreme flood event that blows out the whole thing occurs at a certain frequency. The LA River very successfully conducts that water down to the ocean. When you think of doing some restoration on that constrained system to bring back more natural geomorphology you must consider how wide are you willing to let the river spread. You're reducing depth and increasing width in the channel. Again, not to be negative, but the vision of what Travis was saying earlier about the biological landscape, leads us to ask: we may never fully achieve that braided stream system, but what pieces of that can we do?

TL: The riparian species and the aquatic species are inexorably intertwined. What hydrology we can get is really going to determine whether or not you can have recovery of some streams. And my question is, what models do we need to run, or can we run, or can afford to run, to assess this on a regional level? I'm learning that there's a difference between stream course models and runoff models. You mentioned the MIKE model for the Napa example – what are your thoughts about achieving our biological objectives? What's necessary in terms of modeling, say, to tell us whether we are going to create arroyo toad habitat or threespined stickleback habitat?

MW: Arroyo toad habitat may not be realistic to achieve, but just a willow riparian corridor that may have some migratory birds moving through it is a different situation entirely.

KS: This is where you come back to those earlier tradeoffs, where you say: for that type of process, it's going to be really hard, if not impossible to recreate a hydrologic regime. You're better off acquiring that in a creek leading into the Santa Clara River, or in the San Mateo watershed in southern Orange County, where it exists now, and preserve it. What you can maybe get more in the urbanized part of the LA River and the adjacent flood plain are inundation wetlands like they're trying to create at Taylor Yards. For groundwater infiltration off Tujunga Wash, or in the Sepulveda Basin or Hansen Dam, or Arroyo Seco, or San Gabriel Dam complex – upstream of any of these detention facilities, in a big storm, you see how crazy it is. When water comes into a detention facility it stops. Then everything gets channelized, so that's what you have to work with.

JHT: One possibility would be to characterize the streams as either dam control or not dam control. You could define some fairly simple criteria early on that would identify the hydrologic regime. Then the bigger question becomes, how much of the actual habitat and channel morphology, can you restore or obtain? Maybe just two criteria – is it concrete lined now, or not? And if it is, is there a reasonable opportunity to remove the concrete, and is there much of the hydrologic system still intact in terms of the variability or the annual flows? With those fairly simple criteria, you could make some pretty good decisions about where to apply your efforts. That actually lends itself more to a GIS-based assessment and the lookup table that was shown earlier. The other thing is to think about, just in terms of structuring your analysis, would be using channel order as a structure. This is something we did, Ken and I, in Southern Orange County recently.

First order, second order, and third order streams each tend to have certain habitat characteristics and vegetation regimes associated with them. You could develop that table for historical

conditions and then existing conditions and categorize the impacts that way. And then look at what you've lost and then use that as a way of guiding efforts. Perhaps we've lost all of our 7th order streams. They're all concrete and channelized. We've still got a lot of our first order streams, because they're up there in the mountains. So our emphasis should be on at least restoring a few of the higher order channels.

One of my observations is that the best opportunity for dealing with these concrete channels—still not an easy one—would be to take the concrete bottoms out. In other words, it's much harder to go laterally than it is to go vertically. In the long run, if you have opportunities to get a soft bottom, you can get a lot of aquatic habitat back that way and still not have to be destroying houses in floods.

The most important thing would be to gain back a full mile wide of flood plain right through the heart of LA. OK, that's probably a little ambitious for this first study! But maybe you can naturalize the bottom of your channel back and then later start pushing out on one side or the other. So there are kind of ranges of restoration that you could look at.

It would also be important to look at the mouths of these rivers at the coast to determine what opportunities there are for going from fresh to brackish to saline habitats. Estuaries include unique habitats, although they're very small in size. I think they have been mostly lost. Even though they're small, they're worth having as part of your plan.

KS: At lunch we were talking a little bit about the Conservancies' plans in Ventura County, where they are pursuing a pretty aggressive restoration project at Ormond Beach. They're looking at conservation at the mouth of the Santa Clara River. They will eventually include the Ventura River, and maybe one day Mugu Lagoon. Eastern Ventura County from the Santa Clara River mouth all the way down to Mugu Lagoon could become an operating system of coastal wetlands. That's pretty exciting. It will take a lot of money and time, but it is doable in someone's lifetime.

JL: I'm just overwhelmed by this. I'm going to tell you what I think the dilemma is, and propose one way out of it. Maybe it's the wrong way, because I know nothing about this! I'm hearing that, to understand the entire system, we need to take a comprehensive view of the hydrological cycle – modeling the hydrological cycle and modeling habitat – and we just blew the GDP of the country, to do it right. And even if we spend the GDP of the country, we're not sure we've done it right, because to do it right we've got to focus on the small project.

So I would say, let's look at some archetype or prototype interventions, and look at some archetype locations where those interventions might occur, and develop a rough order-of-magnitude benefit-cost framework tool for some typical locations and some typical interventions. If we can calibrate that tool we can put it in the public arena and let the stakeholders work on it.

That was the original vision of the EPA basins model. But nobody's ever been able to make it work at the local level. But if you can produce a tool that addresses the archetype intervention at one of the archetype locations, then you can consider the result for other locations. We could hope that it is representative of a common type of problem we're going to face in this region, and types of interventions available, and the tool that will let us come up with the order-of-magnitude benefit-cost ratio. The benefits and likely costs are really what we're after. We have to avoid spending \$100 million, or \$200 million, just to analyze a mile of river.

MB: That's more expensive than a freeway!

- JL: The problem is that you're going to have all this GIS data, which is highly precise as GIS data, but completely inaccurate for the application at hand. The necessary accuracy may be achievable if you focus on some particular types of interventions in particular areas.
- JPW: I once did a groundwater pollution project for a county. The first criticism was that we hadn't used an appropriate model – there was another model, and for one site you could run through \$350,000 and that got you one result on maybe one soil series, and they have 150 soil series in the county. So when I asked my question earlier about what did you mean by descriptive modeling, I was just querying you to find out more what you meant then. I didn't have any models, I just wanted to see what their models were. And you know, we were using 'model' in a slightly different framework.
- KS: Right. You can see it in all types of scientific or applied environmental work now. Sometimes modeling is just a thing to organize data, and sometimes it's a thing to ask the data questions, and at other times it's actually going places you don't know, where it really is a simulation. And so, it's almost like we need different terminology.
- JHT: I think John's point about taking a prototype area and applying your methodology to that before you start on the entire region, is particularly important. I have more of a comfort level with some of the habitat mapping and habitat assessment at the regional scale than I do with the hydrology at the regional scale. I think it's a different animal that doesn't lend itself quite as easily to spatial analysis. So trying the methodology of choice in one site, or one watershed, and just testing your work products, will help you a lot. It will show whether the approach is workable in terms of level of effort.
- JPW: That might actually be an observation more about the two cultures than about reality. Ecologists have gotten themselves comfortable with a certain level of analysis with a certain sort of map resolution, and they've done reasonably well or reasonably poorly with it. In your domain, the tools have become quite a bit more sophisticated and developed, and so people have become less comfortable with it.
- KS: We don't get sued if our species goes extinct!
- DS: So far, we have discussed accommodating or restoring the existing level of impact. I've also been thinking of all the future impacts that are likely to happen because the world's going to keep changing. So preventive actions, like protection of sensitive lands along stream zones before they get under grounded should be considered. Have you considered this? Another example might be the need to acquire a headwaters property to prevent impacts that would be more expensive to mitigate by engineering downstream?
- TL: Yes, definitely. I think that's something that goes in the biological scorecard as well because there is research (not done in California) about the relationship of impermeable surface in the watershed and the natural community. Once impermeable surface reaches about 6%, pollution intolerant macroinvertebrates are lost. So priority should be given to watersheds and subwatersheds out there that are below 6% impermeability, and there's another threshold at about 12%. Those that are at very low levels of impermeability, if you're looking to preserve biodiversity, should get high scores. And we can use that hydrological tool, hydrological watershed boundaries combined with the land use to get at exactly some of those issues.

JPW: What you mean is to describe the current hydrological assets.

DS: Preventing future loss to the whole hydrologic system may be very cost effective – preserving the assets we have, rather than fixing them later at a hundred-fold cost.

BF: Exactly. We don't want to buy 200 yards of the upper Santa Clara River in 10 years.

DS: I thought that was partly what Bill's comment was about, buying in another jurisdiction, although there are other implications of that as well. That might be one example of not buying land here for restoration of a site for something over there.

JHT: Will that fall out of your land use mapping? Will you define already urbanized areas, where the general plans allow future development, areas that are pretty well off limits? That might focus you in real quickly on just those specific areas that you're talking about that are at risk of development.

KS: One parameter may be more indicative than anything. Slope tells you a lot about how that stream's going to behave and what hydraulic conditions will be, but you'd have to have some field truthing work to develop the relationship.

MB: But you could then combine a lot of different land use and land cover factors and score sub-basins on how modified they are, with best-scoring basins supporting, presumably, natural hydrology. And you'd want to try to maintain those areas when you have those assets.

KS: On the bright side, it was once the case that a lot of the models developed in the pre-GIS world included parameters that were kind of clumped together. Now in the GIS world you can go back and use those same models and show that with development you're actually going to lower your flows. This is because you can show that under the high flow condition – the flood event – it's not that much different. In the built environment or non-built environment, things aren't hanging that much, and actually with some of these other features that are part of the development effort, you're actually lowering the flows. But that's not what this is about. The good thing is that a lot of the other models that you've listed there like the MIKE models are now developed in the post-GIS world and they're made for that granularity. They can actually make use of some of that, and continuously run over a longer time series as well, so with respect to the modeling and simulation, we're in much better shape than engineers were ten years ago.

JHT: In terms of scoring things, if you're seeking methodologies that evaluate aquatic habitat parameters, you could consider some of these methodologies like the HGM methodology. This is a checklist-based scoring methodology that characterizes habitat function and species support, but does not require actual detailed modeling.

KS: The Los Angeles District has been very active in their watershed efforts. It maybe outside your realm, because it gets into Orange County mostly and even San Diego and Riverside Counties, but they've done a lot of this HGM work and there's now an HGM in Santa Barbara County. I don't know how much is being done in Ventura County.

JHT: It would give you some kind of a scoring mechanism. We always criticize those methods ourselves.

KS: They were developed for rapid assessment over big regional areas. The problem occurs when

they're taken to project scale. But they're actually pretty good at big regional areas.

JD: Thanks very much for your comments.

AFTERNOON SESSION: RECREATIONAL OPEN SPACE

JRW: When Belinda and I had a conversation way back when, recreation was the first thing we talked about. As you are probably aware, there was a significant amount of local and state bond money for recreation and the mission of the Conservancies really is linked to recreational open space and meeting recreational needs. What we want to accomplish in this part of the effort is to address some very severe problems both in terms of lack of resources overall and also inequity in access to open space of various kinds, including recreational opportunities. In particular we want to try to make some of the areas in the region that are now very park poor into at least more livable communities.

The maps you see are taken from a study that was done by John, Jed Fehrenbach and myself. We looked at LA City only. The lower one shows park acres per 1,000 children in Latino dominated communities. And we did this for African American communities, Asian American communities, white communities and also low- and high-income communities. The level of disparity is very severe, and if we did this with the entire plan territory, we'd see similar kinds of disparities. Indeed, one of the major social movements that's going on in the region is around park equity, access to open space, and using some of the resources for conservation purposes, making them do double duty to provide more access to open space.

We're hoping that this planning effort is going to be in some ways different, again, because of our focus on the environmental justice questions. We are focusing on densely urbanized areas, as well as metropolitan fringe zones, and using recreational open space to enhance connectivity, particularly at small scales. This is the kind of scale Travis meant when he talked about making little things count, small and local species, species that don't need lots of space but for whom the provision of some kinds of habitat in parks and open space in the urbanized area can actually make a difference.

We want to emphasize retrofitting existing open space to make it have higher habitat value, and doing joint use projects. There's a lot of rhetoric about joint use with school districts and other kinds of institutional entities, and parks, and this is getting more and more important, not only as many schools need to be built and need open space and parks associated with them, but also as the budget cuts hit and parks departments themselves also find themselves in greater disarray in terms of financial straits.

The methods here that we're thinking using about are fairly straightforward. We need to characterize the existing supply of parks and open space, including beach zones, by size, by type and by location, and we also need to look at where demand is located. Who has access to parks, who doesn't have access to parks (using perhaps quarter mile or half mile buffers as a criterion), and also looking at certain sub-populations that have experienced inequities historically with respect to access to parks and open space and natural areas. Then of course we'll need to do a kind of gap analysis and look at opportunities. Both in terms of public land that's available that could be brought on line, but also private parcels, because even in the most built up, hardscaped areas, there is vacant land. It's often in the form of small parcels, and it brings us to the question Jerre raised, that there's an inverse relationship between size and management cost, and parks people feel the same way. They don't want to deal with anything that's less than 4 or 5 acres. But it's very hard to find parcels that are that big. Smaller resources are important here, and community groups are particularly interested in converting them to a variety of kinds of uses. And so we don't want to eliminate those kinds of opportunities from our asset assessment.

This will lead us to some ability to score parcels on the basis of how many people they can serve, the geographic area, what kind of open space they might provide, what kind of recreational

opportunity they might provide in the context of what else is available in any particular sub-area of the region. Here, we would be going back to Anastasia's point about being able to look at a potential opportunity and see what's within a certain buffer, in terms of other recreational opportunities, and scoring it in that way.

We will also attempt to develop model ordinances and guidelines. One of the things that Travis for instance has been involved in with the City of LA is working with the Recreation and Parks Department on landscaping parks with native plants, with a native plant palette, to increase habitat value. And we think that other cities might be interested in these kinds of guidelines or model ordinances for how parks should be landscaped, and other parts of the public realm that could add to conservation value.

In terms of data requirements, we will use Census 2000, and/or updates of that data, an inventory of vacant public lands, parcel data from the county assessor's files, and information on parks themselves. For the park equity study that I referred to earlier, we simply had information about the size and location of park and open space facilities, not what facilities or programs they actually had (a swimming pool or a basketball court or a trail, after-school programs, for example). That work really needs to be done to characterize the kinds of resources that exist now. We also will need information on road and traffic volume, for a network analysis to be able to characterize accessibility. Planned projects from the general plans and other kinds of plans for particular places, what local communities envision, will also come into play, so that we can be able to rate parcels on the basis of whether they actually meet an articulated local need. Information about the actual landscape, topohydrological features, elevation and so on, will allow us to be able to understand the extent to which a particular recreational opportunity might also fit in with watershed objectives. And presence and absence of local species of course, and current land use to understand the land use context. And if we build in the growth modeling aspect, future growth scenarios.

The key questions that we would really like help with, besides general feedback, includes what kinds of facilities should we really be looking at when we do this kind of analysis of existing facilities? Historically the Conservancies have been most interested in recreational open space, not active recreation. In this kind of urban context, what mix should we be looking at? Scale, how big? This gets back to my pocket park vs. other kinds of opportunities statement. How big should we require potential open spaces to be such that they have not just recreational value, but also value in these other realms that we're concerned with? How much should equity be rated when we're looking at potential recreational opportunities, and also should we be looking at things like how much money have different communities received from past bonds? One of the things that we found when we looked at the City of LA was that areas that needed more open space didn't necessarily get very much local city park bond money. Should that kind of historic inequity be factored in here as we move forward? And then how can we build in urban-wildland linkages through a recreation approach? Should certain kinds of washes that connect the Valley with the Santa Monica Mountains for example, be developed as part of trail systems that actually go right into the heart of the urbanized area? So those are some of the questions that the team faces and that we'd like feedback on.

WF: Jen, for the trails project that we're working on, I went to that Robert Wood Johnson Foundation Active Living research conference in January. And I think there are a number of research projects being undertaken as part of that effort. Active living research might help to look at what small pieces of urban recreational space might be targeted for acquisition. There are a number of

studies going on, some of them in poor neighborhoods, not in California, about what types of facilities do people walk to most frequently, and also what are the neighborhood characteristics like, what are the attractions in the parks themselves? I can't remember the specific studies. One is from St. Louis. But there are a number of them. The main thing that I remember is that people are much more likely to walk to a restaurant, than to a park that's equidistant. In a poor neighborhood of course there won't be any restaurants to walk to. But I think you might want to take a look at some of those studies.

- ASL: For this particular component of the project, the concept of need is extremely significant, because we are being faced with very different needs. I mean, everybody wants clean air and clean water, but the type of needs that different communities may have in regards to recreation vary significantly. And quite often there are limits as to what you can offer. It may be very contextual. We see a lot of clashes in terms of needs. The Cornfields is a recent example, etc. So I think somewhere in the methodology you need to identify, to inventory somehow these needs and how they may be different in terms of ethnic characteristics and income characteristics, age characteristics, where you have more children who do not have access to private open space you need more active recreation. That's kind of a gross generalization again, but an umbrella approach in which everyone is similar and has similar needs, is not going to work there. And I agree with Bill very much in terms of the size of the parcel. Especially for inner city urban areas small parcels are very significant, because these are highly built areas. So I think that the size might vary, depending on the area and the need.
- WF: Another question I had is, if you're trying to kill 8 birds with one stone in these acquisitions, which clearly everybody wants to do, if you have a small piece of urban space that's going to be devoted to a recreational park, what are the birds you can kill with that stone? And I honestly don't know the answer. Maybe none. But that would certainly make the argument tremendously more powerful. I think that's probably one of the things the LA River's got going for it, right. But small urban spaces, I don't know.
- MD: You certainly accomplish storm water pollution reduction objectives quite easily in any open space. There are lots of examples. We even have one in the City of LA, the Pan Pacific Park. It's a park 99% of the time, but it's actually a storm water detention basin that also serves as a park. But it's a lot easier to make a storm water detention basin a park than to make a park a storm water detention basin.
- KS: Trying to separate rural vs. urban recreation open space needs is hard, you really need to treat them very differently. So the question about size: I assume what you're talking about is sort of minimum size on that. So it'll be very different in an urban area than it will be in a rural area.
- JRW: I'm mostly concerned with the bottom or lower end, in urban areas.
- JL: This is another topic I don't know enough about. Everything that's been said so far is really important, but I want to ask a question about what the implementation model downstream of this is. And coming from Northern California, if I'm thinking about how do I get more recreation space, I have 4 models in my head. The most common one is that some private developers do a subdivision and dedicate a park. That's by far the most common. The second is, I have an operating agency, in our case it would be East Bay Regional Parks, that has a mission, and there's a parcel that comes up and it's consistent with their mission, and they acquire that from some bond money or from some contributions or whatever. This is the 2nd most common form

of getting additional recreation. The 3rd is to actually go out and buy a parcel when it becomes available, in an inner urban area, but that happens almost never, because usually there's no institution looking out to do that. The city isn't looking out to do that, the Conservancies, at least in our area, don't really focus on the urban areas. Maybe they do around here, and even if they do, they don't have a net that's looking for those opportunities.

So I'm trying to figure out how you would actually organize this, this approach to acquisition. Even assuming you could prioritize or you could identify it. The 4th model is city redevelopment agencies, which by and large think of open space as a green space buffer around another project of some sort.

WF: They don't think they're in that business, but they might be.

JL: But they might be. So, before we come up with a grand scheme to figure out what types of things we should acquire, I think we have to have a much clearer understanding of what the delivery mechanism is going to be. Because if there's a mismatch here it's never going to work.

ASL: There may be a 5th model, and that's what Jennifer referred to as joint use, but it doesn't really exist yet. And this might be very important to look at in light of the fact that the LAUSD is planning to create a hundred new schools in Los Angeles – it has been quite difficult, to bring together the park and recreation districts and the LAUSD, but maybe some of these discussions need to start happening.

MD: If you were to identify urban creeks as a possibility for land acquisition, it seems to me that if that plan were available, or that goal were available, that Conservancies and other park agencies could make use of that as one of their criteria for whether they would purchase one parcel vs. another.

JL: That's true. But most opportunities are so rare compared to the other types of delivery mechanisms that it's developers who are doing dedications and existing parks districts wanting to expand within their mission that are key. It maybe different out here.

JRW: The problem with the developer model is that it doesn't address the existing areas. We don't have any analogues to East Bay Regional Parks. But EBRP didn't do downtown Oakland either.

JL: But you could easily have the joint powers authority or you could easily have an urban open space district that you could establish for the purpose of doing that. We don't have them but you could do that.

JRW: Correct me if I'm wrong – maybe you should respond to that, Belinda – but the RMC's mission is at least in part directed to this.

BF: Yes, it incorporates urban open space. So we definitely are looking at some of these smaller projects that we can get involved with. We're absolutely there. We do a lot of our projects just like the Coastal Conservancy is doing them, through local government entities. So we are going to be looking at some of these smaller projects where you can incorporate multiple benefits and have recreational open space. Not the soccer fields, not the developed ball fields, but passive recreational uses, absolutely.

- JL: I think that's a great mission. I just don't know what the opportunity set is, and if I look at the Bay Area, for example, unless you were to partner with redevelopment agencies, the opportunity set, even if you had substantial amounts of money, would not be great. How many sites can you reasonably expect to go out and do?
- BF: One of the things that we're hoping to look at is underutilized public open space like Cal Trans right-of-ways that are not being used. Again, you have to get creative about it. There's right-of-way adjacent to the Rivers also.
- JL: What I'm suggesting is that you spend a little time up front looking at the delivery model and then looking at the opportunity sets and see how they relate to each other.
- MH: So if there are no opportunities for a particular delivery model, then don't even try. If you've got wall to wall houses in an area, what are you going to do, how are you going to do urban open spaces in a place that's wall to wall houses? There's no opportunity, unless you take that house out.
- JRW: Sorry, but there are opportunities. For example, there are 12,000 alley segments in the City of LA – most of them not used for anything except dumping trash. It's 3,000 acres of potential open space that would create safe routes to school and other kinds of places for neighborhoods, link them to large green spaces. Nobody's doing anything with that.
- JL: But Jen, what's your delivery model that goes along with that?
- JRW: The delivery model is probably a local department of public works, which would think about these spaces not as recreation facilities but as ways to manage stormwater.
- MH: So you may use an alley for a bike lane to the school and what you'd have to do is figure out how to get the trash out of there and then some night lighting or something like that?
- JL: I'm very struck by this. We're talking about environmental justice and particularly recreation justice in these infill areas, which are going to be densified. The big problems that we face when we've looked at this are: (a) how do you organize to actually do the acquisition in development management, and then (b) how do you finance it, assuming you've been able to organize the project? Unless you've figured out what I'm calling delivery mechanism or implementation mechanism, you don't have an efficient search.
- JRW: One of the models for doing this is the community land trust, which came out of the experience that there are a lot of small parcels, and sometimes you want to be able to do swaps and you want to be able to bank them and so on. And that's actually happened in the City of LA. It's a model that generates grassroots support, but it is also a delivery mechanism that's important. But that's a really important suggestion, John.
- MB: John, going back to the comment you made before about demonstration projects, template building projects, I want to answer your question a little bit and give a little background to how we work, because there's an issue here of linking regional, statewide needs and local needs. We have a project in Los Angeles with the local EDC, which is in the councilmanic district for Watts and the LA Harbor area, what we call the LA Harbor-San Pedro urban waterfront public access area.

We have required them to develop the coastal trail, which is a linear continuous trail along the entire coast of the state of California. You have these inland communities that we want to tie to the coastal trail. They want community parks. We want gateways to the coastal trail, both for regional visitors going into Wilmington, Harbor City, and San Pedro, and Wilmington residents, Harbor City residents, and San Pedro residents getting to the shoreline. When we partner with the local EDC and the City of LA Recreation and Parks Department, and the councilmanic district and the CRA and the Trust for Public Land, and the parks districts from Wilmington and San Pedro, in a partnership or collaborative, we build into the same landscape all these functions. As many functions as we can. So we have regional serving coastal access destination features on one end of the park, we have kind of storm water detention, bio swales in the middle separating, and then we have soccer fields for the Wilmington residents because that's what they need and want. And as much as we can take 7 to 10 acres and put it into the one site, which is a converted railway line, the East Wilmington Greenbelt, we've done that.

How many times we can replicate that? We have actually 4 demonstration projects in this LA Harbor area. One in Welcome Park there at Gaffee at the end of the 110 Freeway, which is a brownfield and already existing canyon area in the local park, we have the East Wilmington Greenbelt and we have Pacific Avenue Sunken City, which is a city owned park that's closed, which links Point Fermin Park to Cabrillo Marine Aquarium. We're just doing it as a plan area, kind of a sub-area plan under a partnership collaborative.

That is the model we're using. We're using existing institutions and for implementation and for community stewardship, we actually have a proposal which ULA came out with about a year and a half ago, to create a Harbor Area Land Trust. Smaller than the citywide land trust, like a community conservancy almost, to be the long-term steward, to be the Friends of the LA Harbor Area, to assist the city's Recreation and Parks Department. It's not really a replicable model every place, because everybody is different. But as a process oriented delivery system, it's the state of the art and it's the direction in which we're all moving. We've done these assessments of open space kind of like we're talking about already, on a sub-regional basis, to identify potential location opportunities and then we're drafting up plans for specific implementation.

JL: That's a very different model than the one Jen suggested. That's sort of an opportunistic approach with a collaborative program, right? And Jen was saying, let's look at the needs and distribution of needs.

MB: What we built on for the LA Harbor, is a one quarter mile, or one half mile concentric analysis of under served populations, and opportunities together. So all our work is somewhat needs based and somewhat opportunistic, because just the way real time works. But I think it incorporates both. It doesn't specify all the delivery mechanisms or opportunities, but it's moving in the direction of where we're all moving, towards these community based management structures.

BF: These connection opportunities are going to be the key to all this, because as we look at how we're going to connect through bikeways that are already planned, from the San Gabriel River to the LA River, which then gets you to the coast, there are going to be some opportunities there to have some of these local community open spaces. It's going to have to be opportunistic – a vacant lot that could be converted materializes, and so you just fit it into that node. But you have to know where these regional connections are and where it makes sense to do it.

JL: I know I'm beating a dead horse here, but this goes back to this idea of looking for these

opportunities and then building these collaborative mechanisms around opportunities as the plan, rather than having a normative plan to start with. I'm repeating myself.

JRW: Can I go back to Anastasia's initial point about needs? I understand that I presented need as a homogenous thing. And at some level it is, in that everybody, no matter who they are, should be able to walk to some kind of open space. But first of all, how would you go about characterizing need without getting essentialist? That's a big problem. Second, how do you design or think about these facilities in a way that accommodates what can be extraordinary rapid demographic change? For example, Monterey Park in ten years goes from one dominant ethnic group to a completely different one. Age composition shifts rapidly. How do you think about these places in a sufficiently flexible way, and how do you avoid that essentialism? You hear it all the time with respect to this group or that group. If they are Latino, they must want soccer fields, etc.

ALS: This is a very good point. As I was reading the plan and making notes, my question was, how do you incorporate the public into this process of articulating what the needs are? I've done a little bit of recent work with children in inner city LA vs. the Valley and it's very clear that the needs are different. And what people have in terms of private open space is highly variable. And what is the meaning of the park? You have inner city families that go to the park every day, and then you have the Valley parks, which get a lot of use, but primarily on the weekends or for the different sports, organized sport. This is kind of important to know. Some of these socio-demographic characteristics that have to do with income, for example, could be fed into the calculation.

Now in terms of the issue of how do you create something flexible, also, if you look around you see these parks, you go into Southgate and it has a golf course that almost nobody uses, and it doesn't have a soccer field, so this is a constant issue of how do you create things that can be changed in the span of a generation? That's something that has to do with design. I don't have an easy answer right now, but one approach is to incorporate more of the communities into this process. Two, take into account income, which is very important. Three, if you have a larger amount of space, provide different uses, so that there is something for different people. So you can have part of the park for people to plant flowers and greenery, or another part of the park that it is more for active recreation, so you try to put different layers into the park.

MH: Has there been any research or public surveys in terms of what different interest groups are looking for in recreation?

ALS: Yes, there has.

MH: It seems like there's enough information that you could tap into it and you'd have a better sense of need.

JRW: There is some. And there's a lot of normative thinking about parks. Parks as diversion, and what kinds of kids need what kinds of facilities. They rarely are perceived as needing access to nature, they need something else to keep them out of trouble. There are many social control aspects of parks research and planning that a lot of people want to try to get away from.

ALS: It is that not only the physical infrastructure which is much more difficult to change over the span of a generation, but it is all the different services and activities that the park can provide that are easier to change. And so you can have woodwork and crafts workshops, painting, and all kinds of things, so that a responsive park district should be able to adjust to the different needs of the

population. It's not something that is that difficult.

The other thing is the quality problem. The size, the facilities, the existence of the park is important, but when you're talking about issues of equity, there are tremendous differences in the quality of these parks and in the maintenance of these parks. You have parks that are dangerous for people to play, they have all these needles and there is not enough maintenance to clean up things, and then you have other parks that belong to the same park district that are wonderful.

- MH: Is there a way to capture maintenance costs per park to just get an idea of where they're putting their money?
- ALS: There has been a study that looks at how much money goes into the parks per council district and then how many children are in each council district, inequities in the City of Los Angeles.
- MB: I don't believe that we know what people either want or need in the way in which you just said. But maybe I'm mistaken in that. I actually believe that we need to do survey or community outreach. I don't think we've specified needs of the various user communities. When people say low-income Latinos want soccer fields, that's pejorative – that may or may not be the full range of what they want. We do the same thing to beach culture kids that I grew up with, assuming they just want skateboard parks, and that may or may not be really what they want and need, although it's probably some of what they need. I think we need to kind of get this information again currently and then in real time from now on. It would be extremely important to surface all of that information. I think we'll find that lots of people like lots of things and lots of different things, and need lots of different things, and we need to break them out of some of those boxes. But if need is really important we should be asking people in detailed and systematic ways, what is it that they really want?
- JS: If people have never experienced an open space park, how do they know that they need it or want it?
- MB: You have to start that conversation, but the more detailed you get into it – this is both anecdotal from my agency's point of view but observational as well – is that people have more intuitive sense about the breadth of their own psychic and emotional needs than we give them credit for. Though the hierarchy of this may be off, I know a lot of young kids and they're active and the boys need soccer fields, but they need just as much unstructured play area that's nature based, and they will say that to you. If you look at the poll results that just came out in the last couple weeks, that TPL and TNC did, if you look at the Prop 40 poll information that we got 2 years ago, the support for the variety of activities went counter to conventional wisdom. Low income, non-white communities actually like the beach, and know how to use the beach. And they have a very sophisticated sense of what that a public commons is. But we often throw that aside.
- ALS: You may not ask exactly what they need but there are ways of eliciting responses like, showing for example pictures of different environments and asking people to express preferences and offering different possibilities. Quite often if you ask someone that may be, they cannot imagine all details of a design that they would like to see, but we should give them credit, that they know what their needs are and they could articulate them. So it is really the survey instrument, the way that it is designed that can elicit this need in different ways, in verbal and non-verbal ways.
- JRW: Part of that is also eliciting more information about barriers. Some of the work that we've been doing here in the Santa Monicas with the people who don't use the Santa Monica Mountains

National Recreation Area, that are low-income, monolingual, Spanish-speaking people, shows that they see that space as ringed by rich white neighborhoods that they have to penetrate to get in. It's seen or coded as white space, and so how do you get over those kinds of things? I think that you can create new opportunities, but they may not be used because of perceptual barriers. So we have to think about how to design strategies that get around those barriers.

ALS: How you provide substitutes – I have in mind a park somewhere in the inner city, where you could fish, which was the most popular activity because it was so difficult for the people to go to the beach? And so that was the substitute. It's not the real thing, but at least it was very enjoyable.

MH: Something on top of the survey you might want to look at is previous elections. Either local elections or statewide elections or whatever, and look at voting records to find out where there was high approval for certain kinds of activity – certain bills, or bonds or whatever. And you could compare that with whether or not those areas actually have those sorts of facilities. It's just a different way of looking at the issue.

WF: I have one question and a couple of observations. The idea of a community land trust is such a great idea that if it didn't exist, somebody would have to invent it for precisely this circumstance. And part of the reason is that in the case of urban recreational open space, both the funding sources and the uses are much more subtle and varied and dependent on other things. So you're going to leverage off of a school bond or something like that. I don't know whether the community land trusts that exist overtly try to "gang" or bundle different obligations and funding sources from different agencies, but maybe in this case, unlike other cases, the need for recreational urban open space needs to be a prism through which one looks at all kinds of different public initiatives, particular capital leverage. But you've got to figure out how you can leverage things off of all those other projects and resources. Maybe that's the way you have to look at it rather than a discrete set of projects that you go buy with its own money.

The 2nd thing is that land markets tend to be thin and landowners tend to be weird, just generally. That's a huge problem for land conservancy acquisition to begin with. And urban land markets are weird, as are landowners, and they don't respond with the market behavior they ought to – for a variety of complicated reasons. How do you turn that into an opportunity? Mostly landowners are holding out for an unrealistic price. And you have to compete with low end but profitable uses. And, in addition, is there a way to "gang" a series of urban open space land acquisitions into a headline? The great thing about land conservation and land acquisition generally is it's such a great headline. The state saves Ahmanson Ranch, with \$150 million bucks – three days before the recall. It's such a great big headline: Donald Brand walks into a press conference one day and says, "I'm not going to develop that 10 thousand acres, I'm going to give it away." It's big stuff. It's big numbers and big dollars and big acres. Is there a way to find landowners who own lots of little pieces of land, and want to be Donald Brand and stand up with Mayor Hahn and say, "I own 180 of these acres, I'm going to give away 50 of them, to the Trust for Public Land. We're going to have urban open space all over town and I'm great and I'm going to get a headline." There's got to be a way to do something like that – to take the model of the big numbers and the big headlines and translate it into lots of little parcels that together amount to something big.

That's why you need to have the land ownership patterns in the GIS, and figure out who owns the most land and match that up with what you want and you go find the guy who owns 300 of the properties you want. And tell him to give you

MB: But wouldn't it be a tragedy, if for the first time in 50 years, in Greater Los Angeles, there were

going to be 200 new community sites that happen to be called schools, and we didn't force the issue on this? This will never happen again in our lifetimes. This is \$3 billion of time and money.

ALS: There is a political reason for things to happen because neighborhoods are objecting. They don't want schools in their communities, because of the traffic and this has become an issue. But if the school becomes a community institution with open space that is open for the community after hours residents would be much more accepting. And so there is kind of a mutual interest there if it posed like that.

JL: One of the things you have to be very careful with is this: not all recreation spaces are as multiuse as we often assume. I'm going to use a very impolite four-letter word: dogs. For example, open space used for dog walkways is pretty incompatible for habitat for wild animals. In the suburbs, open space that developers dedicate to subdivisions or homeowner associations or even cities, is not meant by the residents of those subdivisions to be used for hiking and biking and things like that. It is meant to be visual relief. Just to assume that all open space can somehow be multifunctional is a mistake, particularly in the urban areas. Habitat restoration and high levels of multi-use recreation are very difficult to do together.

MH: Golf courses are a great example. Ever tried to walk on a golf course?

JRW: But you have raised an interesting issue, and that is the number of dogs in the city. The number of dogs that live in urban households is very, very high. Nationwide there are as many households with companion dogs as children. We don't plan for them, and so dog parks actually should be part of the mix.

WF: What are dogs compatible with? I would take John's question and turn it around: what are the seemingly incompatible uses compatible with? I mean, dogs and fertilizer, or something?

MB: I think the question becomes what is the habitat restoration project targeted at and what can it reasonably be expected to achieve? If we're talking about tearing out a concrete channel and using that as an infiltration basin and getting some willows to grow, the dogs are welcome. Because you're not going to get a whole lot that the dogs are going to disturb, frankly, beyond the homeless that are living there and the people that are jogging by and everything else.

JL: You probably won't get some bird populations.

MB: Birds and dogs may be perfectly compatible.

JPW: Where this seems to hit though is that we've typically treated the park as a single entity. Notwithstanding the need to assess what the need for the different resources are, just the supply side needs to be handled with a substantially different granularity than we've previously done.

WF: Jen, the point you made is very good and goes back to the earlier point that we have to be realistic about what the nature and level of our restoration is. And maybe a comparison that some urban policy makers would understand is the comparison to brownfields cleanup. You don't have to do the same level of brownfields cleanup to accommodate every new use on a piece of land. You're going to do a mill industrial use, it's a different cleanup than if you do a residential use. And this might be the same thing. Maybe it is acceptable that there are different levels of restoration that are both feasible in a particular situation, but also desirable in a particular setting. And if you

do a lesser level of restoration, which is more feasible anyway, maybe it's also more compatible with other uses and that's the way you begin to kill more birds with one stone, if you admit that the Garden of Eden isn't coming back at least in some places.

JRW: That's really valuable, and there's quite a bit of research on wildlife recreation and conflict that could inform what kinds of uses can be tolerated in different kinds of habitats.

MB: Some of this was discussed earlier, the constraints on what kind of functions you can reasonably restore, must be dealt with. You take what you can get and say it's an improvement over what was there before.

MH: We were talking about lower income people and park access. What about public transportation networks, how are people supposed to get to these open spaces, if they can't walk and if they can't really afford to drive as gas prices go up? What's the public transportation network look like, and how does that help people get from where they want to go?

JRW: Our accessibility analysis would actually look at where public transportation does and doesn't go, and because obviously, just looking at proximity doesn't get you very far.

We have to move on now. Thanks for all your excellent advice.

AFTERNOON SESSION: GIS TOOLS

JPW: We've got one major task and that is to talk about the GIS tools. I've been doing this too long, 16 or 18 years, and so one observation is that what people want in terms of the end results should drive the development of the tools. So I don't get too excited about doing some kind of GIS data scan, because I can make that task as big as you want me to make it, or as big as your pocketbook will let me make it. But ultimately it is a means to the end. If you can't find the end then there's really no point in doing it, right?

So this is the study area. Last year we did a large version of this map, some versions were 8 feet by 5 feet, some versions were 16 feet by 10 feet, for a growth visioning conference that was run by the Urban Land Institute and the Lusk Center for Real Estate here on campus. And it generated a lot of interest, and sold many maps because real estate developers around the region were interested in this sort of regional perspective. Just what they made of it I'm not quite sure, but most of them wanted to buy a copy that was covered in plastic that you could write on with a marker and look at the best prospects. It's true of all GIS projects – they go on and on and on and they never die. They sometimes grow larger, they change focus, but they don't die!

We have in mind here developing a set of customized products that serve the task and audiences at hand. One conspicuous task is the Plan itself, and its vision, and it's written largely to serve the needs of Conservancies. The second group here is the general public – the person who sees a plot of land and has an idea that they can start a social movement to convert it to a set of urban gardens or soccer field or a baseball diamond or whatever it is they want. But there's an intermediate user group: 100 or so cities across the Plan area. They vary tremendously in terms of their GIS capabilities and their data access and so forth. How you handle that group and serve their needs is a challenge.

Then there's also the issue of what you plan for. We could treat this as a snapshot. We've got to do all this to develop a plan, or vision, and we need to sample a bunch of data sets, add some value and then put them on a website or a map server and that's it. Right? It would be like a census. But while it's fantastic in 2002, a couple months after the 2000 results are just released; its value and currency diminish all the way through to 2012, when if you're lucky the next census is released. Or you could invest in some organizational structures that build coalitions that organize and update data and so forth. From a technical point of view, there aren't too many substantial issues here, it's all about people and goals.

What's different here is probably that there's an idea that different tools and information products are needed for different groups. We've spoken to Belinda and her team, and they are anxious that we don't generate and distribute the set of tools that would give somebody the idea of what the 10 top priority parcels are that we ought to acquire for recreation, or the top ten for watershed protection, and so on – because of the speculation that would ensue. But on the other hand if you want to generate a movement for change from the bottom up, the tools need to help people decide about whether this is a viable site for a particular use, or not. Given all the different issues involved here, we've come back repeatedly to the idea of a scorecard.

The emphasis is not on the parcel itself but on some geographic area around the parcel. If this was in the context of hydrology you might think about the parcel being embedded in a sub-watershed. If the context was recreation you might think of it in the context of some distance from which you could reasonably walk to that parcel, or if it was mass transit, that there's a mass transit route and so forth. In other words, there would be flexible map analysis boundaries, and there might be flexible weighting schemes. This would enable a user, if they didn't like the Conservancy's weights, to use their own scheme to look at how attractive or viable that place was. This is the sample

scorecard we showed you this morning.

There are key questions around: What types of GIS tools should one build for the general public? What parameters should we use? Should we poke all the way down to the parcel? What would be the minimum mapping units for buffers, for sub-watersheds? Should we employ weights, and if we do how would we employ them? And then there are the data maintenance issues.

KS: I like the scorecard approach, because everybody has their own weights, and it's a waste of time for us to even attempt to assign weights.

JPW: What we had in mind was a set of sliders, to let them determine their own weighting scheme. I didn't actually want to specify their weights either. In the recreation field, this would help get around some of the problems we mentioned about surveying to find out what people really want. You could use the weights to let them specify what was important to them. It wouldn't be exactly what you were saying but it would address some of those issues.

JRW: Or the locality could use this as a public participation tool to generate information about need, about demand.

DS: One comment about the parcel data is that at least for a lot of the natural resources data, unless you have some more specific stuff for the LA and Ventura Counties, a lot of those data sets are at 1/24000 scale or greater. Trying to overlay this with parcel data, which are small parcels, just isn't very appropriate. You need a larger area.

JPW: Remember that the subtlety here is that really, the parcel is only used to serve as a center for a circular buffer. And that buffer might have a length of one-quarter mile, a third of a mile or some larger radius. So it's just a way to start the analysis. You probably are not going to query a GIS by querying habitat values specific to that parcel, but you would about some area that's centered on that parcel.

JRW: Even if it's big and out in the boonies?

JPW: Data density doesn't increase out there, if anything it probably goes down. But you'll see some mapping units that are probably contiguous within that buffer.

ALS: So, for example, for parks, you can point your cursor to the parcel that it is a potential open space and you can then download environmental information. Is this how you imagine the tool?

JPW: I would imagine that you have a vacant site. You say you want to imagine the possibilities for transforming that into a local neighborhood park – with basketball courts, baseball diamonds, soccer fields, whatever. Then you could use this tool and let's say there was a preset buffer that was a quarter mile. We'd be able to get an estimate of how many children there were within a quarter of a mile of that parcel, we might know something about their age distribution, we might describe something about their other characteristics, such as income, those kinds of things. We could tell within that circle whether there are any other parks in the immediate area also.

So we could describe park supply, how far away they were, all of those things such as size, etc., could be computed in the background by the GIS host and then reported as some set of indicators on a scorecard. And so these tools are a way to provide context.

ALS: This is a very important tool, but I have in mind a quite different approach. You probably know the Neighborhood Knowledge Los Angeles website, where the GIS eventually becomes a tool for the different municipalities to put, where they can add more data. And so this becomes something that maybe in 10 years different municipalities can add different data about parks and since this is web-based, it is accessible for everybody to see. Can you do something like that, is it something that is in the works for the future?

JPW: We could.

ALS: Maybe different cities could fund some of this, the parks and recreation districts and, because it is a tool that they can use.

JL: This is a good thing to try, and I could see where you could do it, using mostly existing databases without doing a lot more data collection, it is certainly worth doing. We had something like this: the infill locator for affordable housing developers and community land trusts in the East Bay Area. And we did something exactly like this. The problem we had was intended users didn't find it useful, probably because we didn't spend enough time with them, and that's really, really important. That was an important lesson. We should have spent less time doing computer design and more time trying to understand the decision processes of our users. You know that answer.

But what we found was that it was never a matter of the optimal selection. So you never focused on one parcel or two parcels and said, how well does this score, weighted or unweighted? What you did was you found some parcels that were non-optimal and then you bent the constraints. You said, OK, the thing that I thought was important to me isn't as important as I thought, or I can buy my way around this constraint, or I can design my way around this constraint or something like that. What we found, and when we tested these with people who were nominally our clients, was that the parcels that they ended up selecting were often very different than the ones that we had thought they would choose. We went back to them and tried to get them to articulate this process of constraint bending, and we found out it was very, very ad hoc. And so, at that point we took our marbles and went home. Not quite – and so I think this is certainly worth doing as a way of educating your client and working with your client and providing more information to your client. But you've got to go to a deeper level to understand their decision processes to really make it useful as a portfolio or an acquisition tool. And you do that interactively, not deliver it out of a box.

JPW: In my vision at least, they could conceivably choose any parcel they want, and then get some indication of whether this was a parcel they ought to pursue further, if in fact this is really their goal.

JL: But something Bill said was really true: landowners are weird. And land markets are weird.

JPW: For the general public, the goal is not to actually show them what we might imagine are the 100 best parcels. But to involve them, give them some advice about the parcel they choose and what its value was.

JL: I'm worried about your 100 parcels – about showing the public. The more you call up landowners and say, "we'd like to buy your parcel," they will just keep raising the price.

WF: Is there some way you can measure that off of available data sets, tenure or tax base, or anything like that?

- JL: It's a similar problem that the agricultural conservancies have had. Agricultural land turns over when a farmer has kids who would rather have the money than be farmers. So this is a great first step but I think you've got to get further inside these processes of land conversion and land change. This is an argument for a threat model. Getting back to some ideas that we talked about earlier this morning on habitat, we were talking about focal species, or "keystone" species. You also need to look at "keystone sites." How would we identify the keystone sites that make the whole row of dominoes start to fall? This is a good start, but you've got to be able to go beyond that.
- MH: What would be an example of this "keystone site" scenario?
- JL: I would go back to the "portfolio" idea. It may be better to buy 200 parcels, each of which does something really well but not everything well, than to buy 5 parcels that do everything well.
- MH: Say you were testing a scenario, and the 100 best sites are identified. Let's say I take the top 5 – what happens? If you remove those out of the equation, has this really changed things significantly or not? Do you mean that kind of scenario testing?
- JL: I'm not sure. Doing portfolios is really hard. But let's say you could do something like this and look for the sites that scored the highest and those are the ones we want to focus on. You might be better off with a portfolio approach and focus on quantity over quality, and on 100 parcels that score a little lower. If we get enough of those that are lower scored, but they're highly scored in individual categories (habitat, watershed, recreation), we may be better off. It's the portfolio issue.
- JPW: Take the example of habitat conservation. Let's say you had funds this year to buy one parcel and do something to it that proved its habitat value. You ranked the top ten sites in that first year and bought the top one. It could well be that in Year 2, the site what you ranked number 2 last year is no longer ranked number 1. Since you've already purchased the first one, there might be network connectivity issues now that come into play – in other words, these dynamic relationships. In terms of connectivity, especially in recreation, there are many issues that haven't been thought out very well yet. The case about the harbor area was a classic demonstration of that.
- MH: Regarding the concept of portfolio, for example, if one had these different goals, one might have 5 sites for any one goal. So you end up with a portfolio like you would find in a financial market, when you have growth funds, equity funds, and other instruments for kinds of investment goals. Then you have this suite of sites, and if there are sites that tend to meet a lot of those goals that's great, but if sites don't meet multiple purposes, they could still important for one goal, and therefore still have a high value.
- WF: With respect to portfolio balancing: you have to have asset allocation.
- JL: I don't want to be that strict about it, but it's this idea of balancing across a portfolio rather than optimizing is what I wanted to bring out.
- WF: I actually had a slightly different question for John. A land conservancy that does a top down portfolio analysis like the Nature Conservancy, assumes that eventually they'll get it all, they just have to keep raising money. They buy the sites they can't live without. And then at the other end of the spectrum we have the little land conservancies or the opportunistic ones that will take the ones they can take. How do you go and identify the ones that you can take but that are the critical

ones to make the rest of the dominoes fall? That's not either of those two other models I've just described. That's not necessarily buying the most important parcels nor is it going for the easiest to obtain, but it is shooting for the most critically important one – the “keystone site” – that you can grab in the domino set. How do you figure that out?

JL: Is this a “keystone” ecologically, or in deal making terms? You might have a site that's an ecological keystone site, meaning you can't live without it. So if you're the Nature Conservancy, you wait until 2180, pay \$8 billion for it if we have to, when the owner's great-grandchildren finally die. But an opportunistic keystone site would be the one that you need to take at a particular time for a particular price in order to alter market perceptions. Altered market perceptions would make everything else go.

JL: Right. It's the one that if you don't buy it now, it becomes the shopping center tomorrow and alters everything else.

WF: It alters your ability to buy the subsequent sites even if it's not the most important one, and even if it's not the easiest one to buy.

MB: So how do you measure that? Assume that you may not need one site, you may need a whole stream of sites to do some larger sort of project. So how do you capture it? The answer is for any given parcel, but rather for some bigger area that is crucial.

JL: This is the first step. But when we did this with the vacant sites for the nonprofits, we found that we weren't inside their own business model enough. So the value wasn't as great as we hoped.

DS: One of the things that Bill's getting at is that if you can think about the site in terms of how acceptable its loss is from a development perspective it may change your priorities. An example is a corridor, however one wants to define that, where losing any one parcel in your chain of 5 sites makes the rest of the corridor worthless. The value of any one site is contingent on what happens to the other sites. Every one of those sites is sort of irreplaceable and yet is it more critical to buy that last keystone piece in a chain of this corridor, or to go buy the first parcel? The point is, the value of a site is more than just the value of that site, it's that context of that whole corridor, or where something else really carries the value rather than just values linked to site attributes. That's a hard thing to actually quantify, but a very real issue to deal with.

JPW: Your example speaks to being able to quantify connectivity value. From a sort of a spatial analysis point of view, I could understand how to calculate that in some kind of local window. As long as you know what the other elements of the corridor were and you could recognize the corridor automatically, then you could adjust a particular parcel's rating.

But the example that Bill Fulton raised, which was about how to influence the weird behavior of the weird land market, that's much more problematic. There are a couple of papers in the GIS literature on the real estate market lately that use cellular automata. But the key is not that they did that, but rather they think of these really small spaces. A landowner has a great deal of knowledge about a particular place and they see a business opportunity there, and since the cost/benefit is positive, they act on that. Their domain of knowledge and action is very limited.

You have hundreds of landowners acting in a big urban area like this, and they're all doing that in their own little world. What looks from the outside to be weird, is from inside their little world quite

logical. That speaks to your comment that you couldn't get "inside."

WF: That's an easier thing to understand and try to model. But there are many levels of weirdness in the land market. Once you understand that process, you can figure out how to affect it. I think in the particular case of urban landowners, and agricultural landowners too, they are long-term owners, some often don't have debt, they have high expectations, you never know temporally what's going to trigger their decision to be interested in selling. I think its much more difficult to model than to try to understand and guess the behavior of pretty predictable players, which is what you just described. It may be extremely complicated, but as you say, in each individual circumstance it's pretty predictable.

JPW: My idea was that users would not be able to come up with a list of the top 100 sites, at least not without doing a lot of work on their own part. My notion was they could zoom around a passive database, they could pick a parcel they're interested in, and they could get some kind of relative score, for instance, between 0 and 100. So that the user would get an immediate sense of the habitat conservation value of a particular parcel and its setting or its recreation potential, but without repeating the exercise for every parcel and then comparing the scores, a user couldn't produce that top 100 list.

Is it important to give the public users that top 100 list, or is it OK just to give them a sense of the value of parcels that they select themselves? Because given our in-house discussions with the Conservancies, the big fear is that if users could, in a couple of mouse clicks, get that top 100 list, then there would soon be a court case in which a Conservancy buys parcel #3 and somebody else says "I could have sold you parcel number 1 and how come you didn't buy it from me?" Is it important that the public to be given that rank ordered list, based on your experience?

JL: It's just amazing when you come from the northern to the southern part of the state you're in a new context. You lose 100 IQ points! I don't think such a list would be that useful because again, in my experience, if the Conservancies can get a sub-optimal site cheaply, rather than an optimal site that's expensive, they do the former. That's not opportunism, it's just figuring out how to play the long-term game. For the non-profits I work with it's the same thing. Coming in under that cost threshold is more important than optimizing the scores. And I don't know how you can figure that out.

But we've been talking about acquisition. Early on, in the Legacy project, we figured out that acquisition was just one of the tools. There was going to be a suite of tools, and that the scorecard had to be capable of dealing with the suite of tools.

WF: Which one was best or most appropriate for that situation?

JL: That isn't what I meant. Instead of acquiring a site outright, because the landowner is difficult, we want to buy a 10-year easement or a 99-year easement or something like that. So, you need to get inside these markets a little bit more to figure out how to make the scorecard useful.

MH: One of the reasons why acquisition was not as central as you might think, is that many actions could proceed independent of public ownership. You may find areas on public land that are very high value, and therefore it's a public land management issue rather than an acquisition type tool that you need.

ALS: Wouldn't the scorecard itself have the potential of affecting the value of the land?

- MH: If you start putting parcel data up there on the web, yes.
- ALS: I mentioned earlier that maybe this should be open and accessible, but you know, if the owners of these parcels started finding that they're in the top 10, there goes your chance to buy them.
- JRW: But that's why we don't want any rank lists at all, right?
- MH: Even just providing the shape of parcels on a public website, and allowing somebody to click on it see this kind of information about their parcel, there can be some backlash there and complications.
- JRW: So what's the alternative to this?
- MH: The alternatives are not necessarily displaying parcel boundaries on public websites.
- JRW: Do you mean aggregate it up to a different kind of level?
- DS: Aren't you going to do that anyway, John? Some information is better expressed at different shapes or scales.
- JPW: The parcel here is just being used to identify the neighborhood of interest.
- DS: But that neighborhood might be a watershed sub-basin in some instances and a grid cell in another instance, and a vegetation polygon in another instance.
- JPW: Conceivably.
- DS: Have you made a list of the kind of uses the public might have for such a website? I can think of several. One is: this is my parcel and I want to see how it rates on various measures. Another is: I'm thinking of starting a mitigation bank on my property and I want to know if they think it's a good property, if it's worth pursuing. A third is: I'm a developer and I want to find places where I'm not going to have lots of problems. And those are parcel specific issues. But if the parcels are shown on the website as some hexagon or another shape, so that I can't quite locate myself geographically (perhaps I just see that it is somewhere out in the San Fernando Valley), this isn't going to be much help if I can't find the specific parcel.
- But then are other situations where other users that might find some more general aggregation, like to a census block or maybe, useful.
- MH: As you described your audiences however, the public was really a third level. Conservancies are the first level of users, the local government was 2nd, and then the public. So you might want to decide if the Conservancies and the local government want to see parcels and you could do a password-protected approach so that they can see the parcels, but that the general public cannot.
- They may have different types of uses, so you design it accordingly. The Conservancies are really the first order of user, think about their business process, try to design something there, and then you can do the same thing for the public as well. I wouldn't probably focus too much on the public until you've got those other needs met.

JPW: I know from my previous experience that if we develop a toolbox for the Conservancy, and then cities learn that, that they'll come back and want one too, and some of us or all of us will feel compelled to give them something. So they won't be an easy group to deal with or a homogeneous group. Some cities will be quite sophisticated in terms of their own data resources and GIS capabilities, and they may think it's useless. But some other cities are probably no better off than the general public. So there's a much more difficult design problem to build something that garners general support there.

MH: You may also want to think about, as a different audience, other state and federal agencies that do activity in this area.

JL: I don't want to make your job too much harder, but why not take an optimization approach and get with the Conservancy executive director, and ask her: "What is your objective function long-term for the Conservancy, what are you trying to accomplish?" And then look at the parcels that satisfy this objective function, whether it's for habitat or open space or whatever. But the thing that we want to add is some idea of contiguity or location, which we haven't been able to do until now very efficiently. This may not be the right way to do it, but again I'm trying to get inside the decision making model. And for a conservancy, as Bill said again, I'm in it for the long-term and I'm trying to formulate a strategy and that strategy can be purely opportunistic, parcel by parcel, whatever the method is, or it can be linked to objectives for the long term. You can put sliders on the objective function, and it'd be interesting to see what you came up with, taking that approach. And the reason it would work, is that in this region, most of the administered geography isn't going to change, unlike in the Legacy project, which is dealing with more wildlands, where the parcels don't mean much tomorrow or the next year because they could be subdivided or combined. In this region, most of the parcels have some temporal meaning. Not absolutely perfect, but some temporal meaning.

JRW: So how about optimal analysis that then is sub-optimized on an everyday basis?

JL: Well, it spits out the parcels that meet your objectives, and you can slide and change them around. You put different weights on different things, including perhaps the estimate of cost. And that's the other nice thing about it, since you're in an urban area, you have assessor's data, you can come up with some estimates of cost. They won't be perfect, but you can differentiate the expensive parcels from the cheap ones, which you can't do in the rural areas because you don't have a competitive comparable land market.

DS: From your perspective, Belinda and Mark, you are actually making decisions. What I envision is that you probably have proposals that come in the door, somebody says, you must fund this or that. And you need to know a little bit more about the parcel in question, besides what is in their proposal. So you want to tap into some objective data, and find out if that really compares. That's one way to use this tool. And then perhaps the other way you can use it is, you've just been granted \$10 million for riparian restoration. Where should you look? You want to look across the entire study area and say, well these are the places that leap out best for riparian. Is this the way you would use the tool?

BF: Exactly, those two types of models.

MB: That doesn't lend itself very well to a parcel by parcel analysis. You need to look at some higher level of organization and say, we've got a water quality issue in this watershed, and so if we're going to start thinking about some sort of a treatment solution, this bigger geography is where

we would start looking, and then there may be places within that that you try different sorts of solutions. Clicking around on parcels and getting some assessment of that neighborhood is not necessarily the right way of looking at the problem.

DS: The other way I'm talking about is that you have a question in mind, in terms of riparian restoration, or you want to do water quality across the study area, so you basically push a few buttons and it would create a map with some information about the sources of water pollution, where fish passage barriers are located, etc., so you can begin to see the picture of what is important and what's not. You don't necessarily have to have the computer give you a list that says number one, number two. But you can begin to see the pattern that's there, and make some decision about what is important, but is too isolated, doesn't really contribute spatially to the whole solution, etc.

BF: Right, because then we can look at different, other aspects. For example, there is an area that is very low in open space so we need to increase open space, so in addition to creating some riparian habitat, we'll also be able to add to the open space in this particular area. So there might be lots of different variables that we can look at.

MB: John, the other way of looking at it, is rather than scoring parcels by the scorecard, is scoring the landscape by those factors. And so, where are the endangered species? And the whole map lights up. Where are there water quality problems? I don't know if that tells you anything, but now you can start to overlay different layers of information.

JS: Using the same unit of analysis?

MB: Not necessarily. There are going to be areas of your region where endangered species conservation is going to be a priority, or that restoring a linkage is going to be a priority, and so you can look at those issue areas, and select an issue area and find a place rather than selecting a place and seeing what the issues associated with that place are.

DS: So there's a kind of a hybrid here. The scorecard needs to relay the value of that site in some kind of context. What is the contribution of that site to the goal in some reference region, which may be different for different criteria? If it's the only occurrence of some rare species, it's obviously very important or more so if there are two of them, but both those sites have important value in that reference region.

This is as opposed to the situation in which there are 50 occurrences of a species, and instead of just saying that there are 2 endangered species in these 2 parcels, or what's the contribution in terms of the water quality or watershed values within some watershed reference region, you could combine that with the context that gives a surface of values for every place. It really helps distinguish parcels, and as you do conservation or development and lose some of those, those values change and you can keep track of that.

MH: There is one other consideration when you're taking multiple different elements. Suppose you wanted to take this list and say, what are the best places for action based on this simple kind of approach, in which you just add up all the values for every unit cell that you're interested in? You might want to talk with Frank Davis and David Stoms, about the problems with additive models, and alternate ways of looking at that, rather than adding things up.

JPW: The hybrid has got three levels. This is a big complicated area. Let's say a person is interested in

habitat conservation, it's really difficult for them to click on a parcel and – even if we give them a contextualized answer – to put them in a water context (for example). If they could first see a series of maps that they may click on themselves, endangered species or special ecological areas, or whatever else, that may be instructive as to how they would then refine where they might look for those parcels of interest. So there are two levels.

And then there is your example of looking at those parcels in a continuum. For example, you need to look at 30 parcels and you suddenly see the beginnings of a pattern. And then you want to see what that surface looks like if you had used all those weights to score the whole area. And you would want the criteria to score parcels separately if they are grouped or a contiguous area, or isolated spot over here or over there. Is that a fair assessment?

JL: I have an off-the-wall suggestion that would be costless. I'm supposing you convened a focus group with your board or looked at a bunch of parcels. Then you gave them the real situation, you gave them all the data and you asked them in this focus group to score them from 1 to 5 in terms of priority for acquisition or conservation. And so what you would get out of that is a synthetic scoring, and then you tried to model those decisions. It'd be very easy to do. What were the characteristics of the parcels themselves? What were the objectives of the people playing this game? Because I'm still back on this idea of trying to get to a tool that is useful for the institution that's actually going to use it. You could probably do that pretty easily in a discrete choice framework.

MH: I am thinking about some of the other audiences. It depends on if local government's going to be an important audience here. I've never worked in a local government office, but my sense is that local government has the ability to change zoning, ordinances, or the rules rather than do something here, something there. And so for an audience like that, they would actually not need a look-up feature or the big pattern, but a scenario-testing tool. If I change this rule, what would happen? If I downzone this area here, where would the growth squeeze out? It's complicated.

JPW: It's certainly complicated, and one very important take on this is we haven't given enough thought to it that whatever set of tools we develop, even if they are sort of a first generation set of tools, we want to develop a design strategy that gives us the best chance possible where a significant group of people will see them and see that they're useful. Because from that stage, you can build a second set if that's what everybody desires, whereas if you build the first set and the cumulative consensus is they're not useful, then you didn't progress very far. And so we should give more attention to this.

JS: That argues for stratifying the study area into smaller regions, because you'll probably have different goals for different regions and study areas.

JPW: I already had this in mind because I had the sense before today that if you gave users a set of weights on a set of sliders, there would be some default that you're giving them to start with. And with 12 sub-regions, you might have 12 different sets of defaults.

JRW: The decision process in some of the outlying areas, with different kinds of land owners, a lot more public land ownership, agencies involved, Bureau of Land Management, and so on: the decision environment is going to be totally different.

MB: Acquiring a parcel for conservation is a different exercise than determining if you're going to rip out the concrete in the LA River from one end to the next, and the engineering constraints of that and the feasibility of with that.

BF: What's different from my perspective is that the Plan will have separate goals and objectives that are all part of the vision. What you might want to get out of the GIS tool will just help your analysis process. I want the GIS tool to help inform that decision making process, not to identify the projects particularly.

JPW: We are out of time. Thank you for all your comments and ideas.

AFTERNOON SESSION: CLOSING COMMENTS

- JRW: On behalf of the folks that have been working on this – Travis and John and Joe, and myself, the folks from the Conservancies, and the research assistants that have been coping this semester with weekly meetings and deadlines and all kinds of tough work – we are extremely grateful for all the input you have provided. And for taking time to come – even from the Bay Area into this other world, losing IQ points! – to help us think this project through analytically. We really appreciate it, and it's been terrifically energizing as well as daunting to hear all the challenges. But we're going to be moving forward, and we hope that we can call on you for more advice as we do so.
- BF: We really appreciate all this fantastic advice. You've given us some great additional direction and the feedback we needed to take our next steps.

LITERATURE CITED

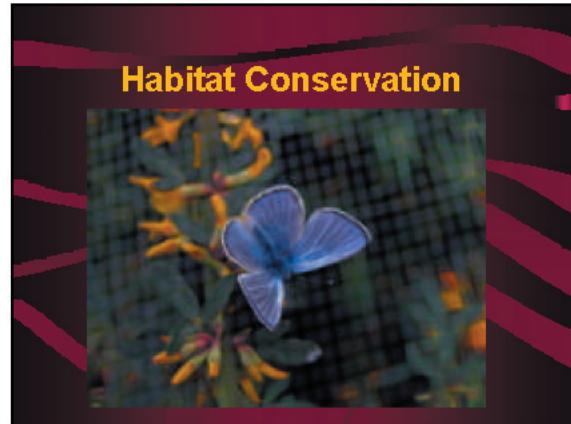
Wolch, J., J. Devinny, T. Longcore, and J.P. Wilson. 2004. *Green Visions Plan for 21st Century Southern California: A Guide for Habitat Conservation, Watershed Health, and Recreational Open Space. 1. Analytic Frameworks for the Green Visions Plan.* University of Southern California GIS Research Laboratory and Center for Sustainable Cities, Los Angeles, California.

APPENDIX: POWERPOINT PRESENTATION



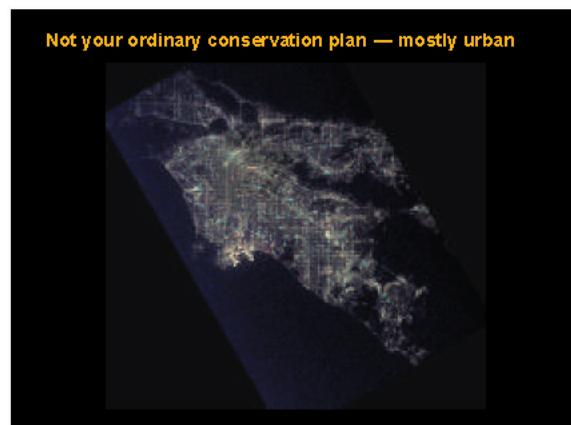
Green Visions Plan

Health, and Recreational Open Space
Presentation to Scientific Workshop
April 21, 2004
University of Southern California



Goal

- Protect and restore natural areas to ensure the persistence of native biodiversity and reintroduction of historically present natural communities



Multiple Species Approach

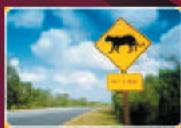
- Choose focal 30-40 species
 - broad taxonomic and life history breadth
 - includes rare and endangered species
 - also includes indicators of sensitive habitats
- Develop natural history profile and geographic incidence information
- Prioritize areas based on representation of focal species

Representation Approach

- “Noah’s Ark” of vegetation types
- Develop historic vegetation map from existing sources and topoclimatic classification
- Rank vegetation types by rarity and percent lost (including those 100% destroyed)
- Assign parcels value for representing rare habitats

Umbrella Species Approach

- Apply reserve design principles for large carnivores — “Missing Linkages”
 - connectivity
 - minimum area
- Urban twist
 - connectivity for lower trophic levels as stepping stones



Urban Matrix Approach

- Model ordinances
 - fuel modification, lighting, human/wildlife conflicts, tree trimming, etc.
- Local Nature Parks
 - percolation theory
 - target migratory birds and other mobile organisms



What's Different?

- Species reintroduction vs. preservation
- Restoration
- Multi-scale conservation
- Basic ecological processes disrupted
 - must work within constraints
 - re-engineering of natural processes necessary where possible
- Little things count



Data

- Vegetation
- Soils
- Topography
- Wildlife (esp. focal species)
- Land Use
- Hydrology
- Climate
- Disturbances



Key Questions

- Are the four approaches sufficient, or is another methodology more appropriate?
- Focal species selection — urban vs. wildland?
- Historical reconstruction suggestions
- Urban “connectivity” species
- Other matrix considerations and targets

Watershed Health



Restoration

- Watershed geomorphic processes should be restored to allow for a self-sustaining network of rivers, tributary networks, and the ecosystems that depend upon them



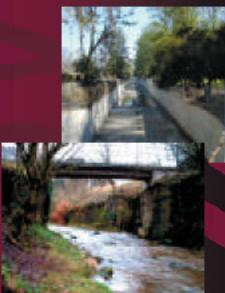
Goal

- Restore natural function to the hydrological cycle to maximize groundwater recharge, improve runoff water quality, and minimize flood hazards



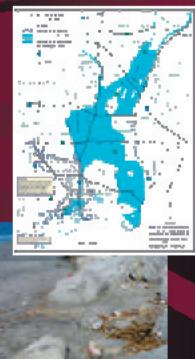
Geomorphology

- Current urban hydrology and flood control should be modified to facilitate restoring geomorphic processes as well as desired on-site and downstream hydrology



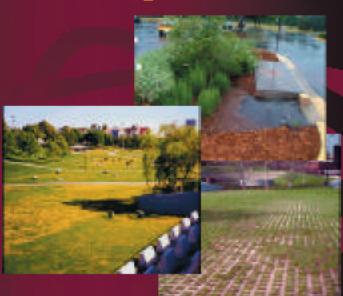
Reduction of Pollution & Flood Hazard

- Source control, runoff detention, and infiltration should reduce the discharge of pollutants, protect the coastal environment, reduce floods, and recharge groundwater



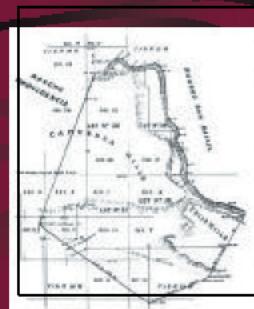
Upland Management

- Upland urban landscapes should be managed to promote watershed health



Methodology

- Study historical hydrology and ecosystems
- Develop suite of GIS hydrology models that characterize watersheds and sub-watersheds, and the storm drain system, and help assess potential for restored drainage patterns



www.gisforhob.org/.../Glossary.html

Multiple Use Approach

- Emphasize a multiple-use approach: restored sites should simultaneously serve as hydrological features, restored ecosystems and stormwater treatment and infiltration facilities



Kelly Creek facility, Gresham, Oregon: vernal pool ecosystem, park, detention pond, and infiltration system

What's Different?

- Emphasis on tributaries as well as channels
- Geomorphic regime
- Linking habitat restoration to runoff strategies
- Multi-use facility approach



Data

- Topography: current and historical
- Existing flood control system: channels and storm drains
- Hydrology: streamflow, water quality, rainfall, hydrographic records, channel characteristics
- Soil type
- Depth to groundwater and groundwater pollution
- Land use and vegetation

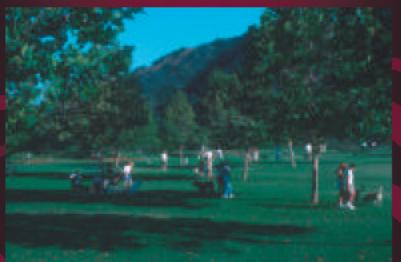


NASA

Key Questions

- Which hydrological models are most amenable for use in a heavily urbanized environment?
- How can channel and watershed models be best integrated?
- Are other data needed to make the best decisions?
- What other methodological approaches to assessing watershed health or restoration potential might be applied to this environment?

Recreation



Goal

- Increase and ensure equitable access for residents to a range of open space types and recreational opportunities, and thereby reduce socioeconomic and geographic disparities in present-day patterns of access to these types of resources



What's Different?

- Emphasis on environmental justice
- Focus on densely urbanized area as well as metropolitan fringe/wildlands
- Use recreational open space to enhance habitat connectivity at smaller scales
- Retrofitting existing open space
- Joint use planning and environmental education



Methodology

- Supply: Characterization of existing parks/open spaces (including beaches) by size, type, location
- Demand: GIS park accessibility, aggregate and by subpopulation (race/ethnicity, income)
- Gap analysis
- Opportunities assessment and scoring – parcel level
- Model ordinances/guidelines



Data Requirements

- Census 2000
- Inventory of vacant public lands
- Parcel data from County Assessor files
- Park, open space, and recreation facilities by size/type
- Road/traffic volume for network analysis
- Planned projects by acreage and type
- Digital Elevation Models (DEMs)
- Topohydrological features
- Presence/absence of sensitive/focal species
- Current land use

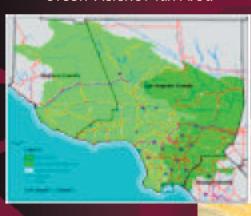
Key Questions

- What types of facilities to include in analysis (e.g., recreation vs. open space)
- Scale: how big should parcels be in order to be rated?
- Relative weights for social criteria, e.g., access and/or bond funding equity?
- How to build in urban-wildland linkages?



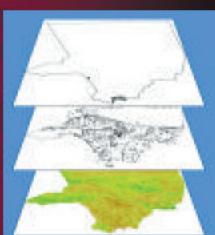
GIS Tools

Green Visions Plan Area



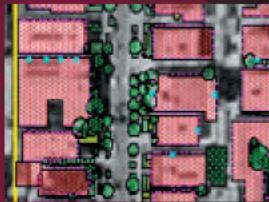
Approach

- Develop customized maps and products that serve the tasks and audiences at hand
- Identify one or more feasible strategies for managing the geospatial data sets used to support the development of final Green Visions Plan and associated tools



What's Different?

- Different tools and information products for different groups – with one set for the conservancies, another for the general public, and perhaps a third set for local cities and regulatory agencies
- One option under discussion would provide parcel scorecards, flexible map analysis boundaries and weighting schemes, and various web mapping capabilities



Sample Habitat Scorecard

Number of endangered species	No
Number of threatened species	No
Presence of recovery area for endangered species	No
Presence of recovery area for threatened species	No
Presence of habitat for focal species	Yes
Restoration potential for focal species	Yes
Identification as part of landscape linkage	No
Identification as part of local linkage	Yes
Identification as part of "stepping stone" linkage	No
Presence of rare vegetation/wetland type	Yes
Presence of vegetation type not represented in public lands	No
Presence of unique hydrological feature (e.g., vernal pool)	Yes
Measures of connectivity (% natural habitat within certain radii)	6%
Measures of natural hydrological function	Moderate
Measures of natural fire regime	Low

Key Questions

- What types of GIS tools should we build for the general public?
- What parameters should we use?
 - Parcel level tools?
 - Minimum mapping units for buffers, sub-watersheds?
 - Weights and/or scorecards?
- What approach should be used to manage the geospatial data sets that are compiled and used to prepare final Green Visions Plan and the associated tools?

