

EMERGING ISSUES IN CONSERVATION SCIENCE

PEOPLE MATTERS



Case Studies of Experience With
Social Science Tools on the Ground



AUGUST 2001

The Nature Conservancy is an international conservation organization dedicated to preserving the plants, animals and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. With more than one million members, the Conservancy has protected over ten million acres in the United States alone, and owns and manages the largest network of private nature reserves in the world.



About this supplement to the report:

This supplement is part of the second in a series of Emerging Issues Reports from the Nature Conservancy's Applied Research program. The full report examines the current role of social science in guiding and shaping the Conservancy's work and identifies a number of issues for future action. By detailing a series of case studies from TNC and from other organizations, this supplement provides concrete examples of how, where, and to what effect applied tools from the social sciences can play a role in the Conservancy's work.

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The background of the page is a faded aerial photograph. The top half shows a range of mountains with some snow patches under a clear sky. The bottom half shows a residential neighborhood with houses, streets, and green spaces.

PREFACE

This supplemental volume to the TNC report *People Matters: The Nature Conservancy's Experience With Tools From the Social Sciences to Understand and Work Within the Human Context of Conservation* presents 32 case studies. These case studies provide a graphic picture of how applied social science has or potentially could contribute to the Conservancy's work. They also include practical advice from TNC staff for readers interested in using these methods.

Twenty of the case studies come from TNC and demonstrate the organization's already rich experience in this area, particularly with polling, focus groups, socioeconomic analysis, spatial analysis, stakeholder analysis, situation diagrams, and Pathways. Four of the TNC examples focus on less frequently used methods — community profiling, community-based mapping, issue forums, and site marketing — that nevertheless appear to have near-term promise. The final section of this supplement presents eight case studies involving individuals and organizations outside of TNC. These external examples provide a glimpse of the kinds of thinking that the Conservancy might benefit from by deliberately looking outside, importing and adapting the innovations of others.

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I. CASE STUDIES FROM THE NATURE CONSERVANCY

A. Polls and Focus Groups

TNC staff have most often used polls and focus groups in considering, developing and managing state or county government-level conservation funding initiatives. They also have more generally helped site staff better understand the attitudes of the community in which they are working. Polls usually cost from \$10,000 to \$15,000, while focus groups cost from \$3,000 to \$4,000 per group. Multiple polls or focus groups often are conducted.

Staff involved in the case studies below offered three pieces of advice. First, find a good professional. They will add objectivity and can be critical in shaping meaningful questions and interpreting data. Staff suggest caution when relying upon academics. The interests of professors often are not aligned with TNC's and, because of public funding and/or a need to publish, they may not be committed to confidentiality if that is desired. Second, get polling data in a searchable format. A notebook is not enough. An electronic database facilitates more sophisticated analyses and can save hours of hand work. Lastly, think of polling or focus groups as monitoring tools. From the outset, staff ought to build in at least a subset of questions they or another staff member may return to in five or ten years to sample changes in community attitudes.

Kachemak Bay, Alaska

As part of a community profiling exercise, Randy Hagenstein (Associate State Director) used a poll at the Kachemak Bay site in Alaska to better understand community attitudes toward land use changes and growth, land use planning, conserving fish and wildlife habitat, and alternatives for economic growth. He thought prospects for compatible economic development planning looked promising at the site and he wanted to gauge this objectively and begin to outline an effort.

In mid-1998, working with Gloria Fauss of Home Office Government Relations, Hagenstein began planning for a poll and soon engaged an Alaska-based polling firm, Craciun Associates. The firm helped Hagenstein and Fauss develop and administer a 25-question poll to 415 residents in the southern Kenai Peninsula, an area with a population of approximately 12,000. The results of the poll were presented to the public after it was completed.

The poll's results revealed a powerful sense of quality of life among people with 85% saying the quality of life was good or very good. It also yielded some surprises about land use planning. Before the exercise Hagenstein and his colleagues believed that it would be impossible to talk about zoning, but 76% of those surveyed said they wanted to see improved land use planning. Not all of the results were straightforward; for example, while 76% of those surveyed said they favored increased land use planning, 61% said property owners should always be able to develop their land as they liked. Staff discovered that conducting the poll had a significant "process value." By relying on direction by a steering committee, the Kachemak Bay survey raised TNC's profile within the community and built relationships, understanding and trust. In addition, the poll's results proved to be a key base of information for a new citizens' group that TNC helped foster, the Southern Kenai Peninsula Task Force.

Platte River, Nebraska

On the Platte River, Brent Lathrop used a poll and focus groups to gauge the attitudes of a human population of some 200,000 on social, economic, environmental, and water quality and quantity issues. The poll was conducted first, with the results serving to inform and deepen the questions discussed with the focus groups. In the spring of 1997, with help from Gloria Fauss, Lathrop engaged the Kitchens Group and worked with them to develop the poll. Kitchens conducted a 35-question poll of 500 individuals and later facilitated two one-and-a-half hour long focus groups, one with nine residents from two cities in the area, and one with ten farmers from small towns.

The poll and focus groups helped reveal inherent conflicts within the community. They found that more educated, newer, urban residents were more responsive to pro-environmental messages, while older, long-time farming residents were more resistant. On a deeper level, farmers and utility company executives indicated in the focus groups that economic self-interest drove their support of economic development, while a deep appreciation of the river caused them regrets in its over-use. Generally, though, people were not aware of the potential conflicts between water use and environmental protection and believed that the river could satisfy all

of the demands for economic growth, agriculture and wildlife. Overall, these results played an important role in TNC's participation in a tri-state Platte River water agreement. One significant result is that land acquisition is major part of that agreement.

Clinch Valley, Virginia

Bill Kittrell had been project director at the Clinch Valley Program for several years when in the mid-1990s he began to consider launching a compatible economic development planning exercise with one of the counties in the project area. With funding assistance from Home Office Government Relations, he conducted focus groups and a poll to learn more about the beliefs of his community to inform his efforts. The consulting firm Cromer Associates worked closely with Kittrell to design two two-hour focus groups – one with ten men and one with ten women. Then Cromer and Kittrell refined a 90-question poll that the consultant conducted with 400 people from local counties. TNC's identity was not disclosed in either the focus group or the poll.

The Clinch process revealed a clear difference in the community related to gender: the women were far more optimistic than the men about balancing social, cultural, economic, and environmental goals. The poll also revealed the strength of religious values. The information on attitudes that came out of the focus groups and poll prompted Kittrell to recruit women to join a committee planning a compatible economic development process (a move that contributed significantly to its success). It also helped him strengthen community attitudes toward water quality and river protection. This move contributed significantly to transforming a proposed industrial park into an eco-industrial park.

(In addition to the case studies above, see also the use of focus groups and polls as part of the community profiling effort at Edge of Appalachia, Ohio, p. 9).

B. Socioeconomic Analysis

Various kinds of socioeconomic analyses have been used by planners as part of ecoregional or site conservation planning to help identify conservation threats and design strategies. Typically they assess factors such as land use patterns, land ownership dynamics, demographics (population size and growth rate, ethnicity, age, gen-

der, income), major sources of employment, prospects for new jobs, government structure, relevant regulations, key players/decision makers, and community attitudes. Most data for these indicators come from the US Census, state and county planning departments, and other local sources (e.g., libraries, interviews). A basic socioeconomic analysis for a site requires several days of staff time. More extensive analyses can take longer when outside assistance is engaged.

Conservancy staff who have conducted socioeconomic analyses offer the following recommendations. First, though extrapolating current trends is often useful for identifying and prioritizing threats, projections of socioeconomic factors can have limited accuracy. Assumptions behind the projections must be thoroughly understood. Second, if staff do not clearly focus, define, and manage a socioeconomic analysis, the enormous wealth of data available and the sheer range of things that *can* be known can give the analysis a life of its own. A basic socioeconomic profile should be tightly scoped, with the justification and logic of detailed lines of inquiry carefully laid out.

The most commonly asked questions encountered during this study include:

- Who owns land?
- How is the land used?
- Who lives here?
- How do they make a living? What sort of living do they make?
- Who and what governs public policy making?
- How have these factors changed over the last 5 to 10 years? What might they look like 5 to 10 years from now?
- What key factors drive significantly different outcomes in projections/scenarios of future?

Chico Basin, Colorado

The socioeconomic analysis in the Chico Basin, Colorado site conservation plan highlighted the differences between the northern end in El Paso County (closer to fast growing Colorado Springs) and the southern end in poorer, less dynamic Pueblo County.¹ These differences were important because an overall land use history revealed that present ecological condition was bet-

ter in places where land ownership had been continuous.

Specifically, the conservation planners' analyses showed that land use is rapidly shifting from ranching to commuter homes in the Colorado Springs area where urban encroachment is increasing. A population analysis showed that El Paso County was adding residents at twice the national rate, placing it among the fastest growing counties in the country. Income statistics quantified the wealth gap between the two counties, El Paso being far the wealthier (average income \$29,604 versus \$21,553; poverty rate of 8.1% versus 16.7%).

Nassawango Creek, Maryland

Nassawango Creek covers about 44,000 acres, and includes about 8,000 people. As part of its site conservation planning process, the TNC Maryland Field Office developed a comprehensive picture of the site using information developed by the Maryland Department of Natural Resources as well as Wicomico County planning documents. A staff analysis of how the changing value of farm land relative to farm income might affect projected population growth and land use (e.g., by affecting the likelihood that farmers would sell land within the project area) played an important role in the design of the site's conservation strategies.

The analysis took about 4 days of work. Along the way, staff found that various types of data resources differed in quality and usefulness. Some data compiled by the state DNR were assembled in ways that did not match the TNC analysis. TNC staff could not confirm other datasets when they ground-truthed the information with people in the community.

Arizona-New Mexico Mountains ecoregion

The Arizona-New Mexico Mountains ecoregional planning process identified inappropriate livestock grazing on public lands, and specifically on lands managed by the United States Forest Service (USFS), as a key source of stress.² Specifically, grazing emerged as a stress in 90% of portfolio sites and was a root cause of other

stresses such as fire suppression and altered hydrologic regime.

The planners suspected that several factors were changing the nature of ranching on public lands. Understanding these factors would be essential for targeting conservation action. To fill this information gap, they issued a "call for proposals" for a socioeconomic analysis of public land use trends across the entire ecoregion and subsequently selected a group of university researchers to conduct the work. A key goal was to develop predictive models that would allow them to explore the effects of such trends on conservation targets and the potential impacts of alternative strategies. The planners also anticipated that the analysis could help in planning for other ecoregions where similar forces were at play.

Overall, the project yielded mixed results. The university researchers' analysis of a limited data set essentially confirmed the planners' previous suspicions about the decline in both the number of ranchers and the number of livestock grazing on the USFS lands. It did not, however, go further and create the predictive framework needed for comparing alternative conservation strategies.

Staff involved in the project attribute this outcome to a mismatch between resources and expectations. Specifically, to succeed, the project would have needed a more sophisticated and experienced research team, more time, and an order of magnitude more funding than the \$30K that the field office was able to allocate. Moreover, countering the researchers' drift toward questions that piqued their own interest rather than serving TNC's needs proved difficult. Having a TNC staff person involved in the project who had some previous experience in the social sciences might have helped. Staff also say that the original questions about trends in public lands ranching remain critically important for implementing the ecoregional plan, and they are still seeking ways to get the work accomplished.

¹ The Nature Conservancy. May 17, 1999. *Site Conservation Plan for Chico Basin, Colorado: Appendix 3, Human Context*. Internal TNC report (contact Betsy Neely, bneely@tnc.org).

² The Nature Conservancy. 1999. *Arizona-New Mexico Mountains Ecoregional Conservation Analysis: Final Report*. Internal TNC report (contact Gary Bell, gbell@tnc.org).

Central Shortgrass Prairie Ecoregion

When the Central Shortgrass Prairie (CSP) Ecoregional Team began planning in 1996, they knew little about the people, key industries, and related socioeconomic issues of the 90,700-square mile ecoregion covering portions of Colorado, Kansas, Nebraska, New Mexico, Oklahoma, Texas, and Wyoming. For instance, they were superficially aware that European companies were purchasing land to establish pig farms, but they needed to better understand hog farming and how it was changing the ecoregion.

The team worked with a Master's student at the University of Michigan, P.J. Parmar, to develop a research project that would serve the ecoregional plan's needs and provide the basis for his thesis. Parmar completed an assessment of the threats and human context of the Central Shortgrass Prairie Ecoregion in December of 1997.³ Betsy Neely, Team Leader and Director of Conservation Planning in Colorado, incorporated his socioeconomic analysis throughout the final plan.⁴

Parmar's analysis of socioeconomic trends revealed that the two major industries of the area, traditional farming and ranching, were on a downward trend. Hog confinement, beefpacking, and telecommunication enterprises were on the rise, and large-scale corporate operations were displacing a number of family farms. Colorado's Front Range was experiencing a decline in agriculture, residential growth, and a booming construction industry. Populations were growing around the new beefpacking plants of southwestern Kansas. With these changes came shifting threats to biodiversity. For example, the Ogallala/High Plains aquifer which lies beneath much of the ecoregion and is widely used for agricultural irrigation, experienced significant drawdowns since the beefpacking area became established in southwest Kansas.

The Colorado Field Office normally conducts human context assessments for their site conservation plans, but no one on the planning team had experience conducting one for an entire ecoregion. Betsy Neely says

that the socioeconomic analyses made a significant difference and brought important new perspective to their conservation planning. For example, the information on burgeoning populations brought a sense of urgency to many sites in Chico Basin. Information on new industries, like hog farming, focused the team on new questions such as how will these large hog operations affect water quality and impact biodiversity targets? Parmar's thesis provided important background for State Directors developing conservation strategies based on the ecoregional plan.

Madre de las Aguas Conservation Area, Dominican Republic

The 1,445 km² *Madre de las Aguas* (Mother of the Waters) Conservation Area encompasses five protected sites comprising about 5% of the Dominican Republic. The coniferous pine, montane broadleaf, and cloud forests host rich assemblages of species, many of them endemic, as well as headwaters for most of the Island of Hispaniola's rivers. Conservation efforts here focus on the roles of local communities and stakeholders in the area's management.

In preparation for site conservation planning, TNC staff enlisted a team of local researchers to conduct socioeconomic analyses of two of the protected areas in *Madre de las Aguas*. First they used various participatory tools — focus groups, transects, calendars and participatory mapping (see also p. CS-17) — to gather qualitative information and develop case studies about the distribution and structure of key settlements in the area. The researchers then surveyed a sample of the local population to develop quantitative information about demographic patterns, economic activity, land tenure, local organizations, and people's perspectives on the protected area and resource use. Among other things, results of these analyses showed that more people lived within the protected areas than previously estimated. Also, the boundaries of the protected areas were unclear to local residents and other stakeholders.

Every step of the site conservation planning process ben-

³ P.J. Parmar. 1997. *Threats and human context of the Central Shortgrass Prairie*. Master's of Science Thesis. University of Michigan.

⁴ April 10, 1998. *Ecoregion-based conservation in the Central Shortgrass Prairie*. Central Shortgrass Prairie Ecoregional Planning Team. TNC internal document.

efited from the participation of the socioeconomic assessment team. The team was instrumental in integrating information and insights regarding the threat-based social dynamics at the site during the stakeholder analysis phase. Information from the socioeconomic study and the team's participation in the planning process also contributed significantly the development of strategies.

Outsourcing the socioeconomic assessment with local researchers had the benefit of bringing in necessary information on land use activities, organizational actors, migration, and residence patterns. The analysis of human context also generated specific recommendations for improving conservation actions. The downside was that it did not help to build the capacity of TNC's partner organization for conducting such analyses, nor did it allow TNC's partner to "own" the research and its results.

C. Spatial Analysis

TNC has worked with maps since its founding, but using spatial representations to understand the human rather than the natural landscape is a new approach for the organization. TNC staff have found that spatial depictions of human data can be a powerful tool — enabling them to see dynamics that are not readily apparent through a socioeconomic analysis or to envision future change. Some spatial analyses have helped to clarify thinking about threats that affect multiple sites and potential strategies to address these threats. Most have been part of ecoregional or site planning. Maps produced as a result of spatial analyses of human context data have additionally been used in fundraising.

TNC staff estimate that, by outsourcing, an ecoregion could have the capability of looking at socioeconomic factors affecting any priority site for approximately \$25,000 in roughly six person-months. Costs for the Rocky Mountain West Division's spatial analysis (described below) were far lower because they relied on in-house technical staff.

Experience from the examples that follow show that scale is a key consideration in the design of any spatial analysis. Data compiled at too coarse a scale may mask important patterns, whereas increasing the resolution of

an analysis is bound to involve additional effort and cost. Analyses that project future change will need to be carefully evaluated for accuracy and underlying assumptions, since they have the potential to significantly affect which sites are selected for conservation and what strategies are put in place.

PEOMAP — Sonoran Desert Ecoregion

In 1998 the Summit Foundation awarded a grant to the Latin America and Caribbean Region to conduct a pilot study evaluating the usefulness of mapping and analyzing population data in conservation planning and implementation. That effort, called the "Population-Environment Overlay Mapping Project" (PEOMAP), ends in 2001. Larry Gorenflo coordinates the various projects that comprise PEOMAP, including a number of U.S. and international ecoregional and site-specific applications. One project supported the Sonoran Desert Ecoregional Plan that was led by Rob Marshall.

The Sonoran Desert includes areas on both sides of the border between the U.S. and Mexico. Human populations in this region have grown considerably over the past few decades. The PEOMAP began with developing an historical picture of the ecoregion's demography by mapping data for U.S. counties and Mexican municipalities for 1970 to 2000. It also projected population for 2010 and 2020. The analysis identified large geographic areas of relatively high density and rapid population growth — some with annual growth rates as high as 10%. Although this approach yielded insights into population trends, the county/municipality approach lacked sufficient detail for evaluating population encroachment on potential conservation sites or patterns of population distribution across an ecoregion. A second analysis solved this shortcoming by using finer scale data on U.S. census tracts and basic geostatistical areas in Mexico as the mapping units.

The PEOMAP went beyond identifying areas of population growth to determine the underlying reasons for the change. Specifically, it found that migration due to various economic factors accounted for most population growth on both sides of the border. Moreover, population growth patterns followed roads and were related to accessibility.

PEOMAP was begun too late in the planning process to

contribute to the selection of sites for the Sonoran Desert Ecoregional Plan. As the plan is implemented, however, PEOMAP may help identify areas of high population-related stress and provide a basis for developing abatement strategies.

Rural Sprawl analysis for Rocky Mountain Division

In August, 1998 Bruce Runnels, Rocky Mountain West Division Director, began working with state directors in his division to develop multi-site conservation strategies. He asked the state directors to pull together lists of priority sites in their states. In areas lacking completed ecoregional plans, they relied upon Phase 1 “no regrets” sites. The state directors came back with a total of 61 landscape-scale areas that would be priorities for TNC action over the next five years.

The group met in November 1998 and February 1999 in a mini strategic planning exercise in which they went through the “five S” framework for the 61 sites. They found that for 47 of the 61 sites ranching was the dominant land use. The planning also revealed that maintaining intactness — both of ownership and ecological processes — would be critical for ensuring the long-term viability of priority conservation targets. Simultaneously, the Packard Foundation approached the division and asked how sprawl was affecting their conservation sites.

GIS staff from the western office of the Home Office Conservation Science Division put together maps that combined county-level census data on population growth and second home development (using unoccupied housing as a proxy) with locations of the 61 priority TNC sites. The resulting maps enabled the group to see the proximity of sprawl to conservation areas and the extent, trajectory, and spread rate of exurban/rural sprawl in a way that could not have been seen by simply driving through these places.

The work spurred development of a \$100 million Conservation Buyer Venture Fund as well as a proposal for a Rangeland Institute to help inform conservation buyers and share best practices among current and aspiring ranchers. The maps also have helped in other fundraising efforts across the division. A second level of GIS analysis is underway. Note that the Rocky Mountain West’s process for identifying multi-site strategies may not be

directly replicable in areas such as the Great Plains and East where patterns of land ownership and ecological landscapes tend to be far more fragmented.

Other Spatial Analyses Under Development

PEOMAP II and Borderlands. A proposal recently submitted to the Summit Foundation would build on the PEOMAP experience. The study’s goal is to identify the *impacts* of population growth by incorporating additional socioeconomic data, land use/cover information, and key information about natural resources. Population and population impacts will be examined over time, providing a basis for projecting future impacts of population changes. PEOMAP II would include five global regions or sites. A related study currently being proposed would focus on the eight ecoregions of the U.S.-Mexico Borderlands — one of the most rapidly developing areas of North America and one that is particularly vulnerable due to aridity.

Social and gender mapping. Another extension of the PEOMAP project has examined census data from the Dominican Republic at the sub-municipality level for past and projected population changes, and the spatial relationships between shifting populations and conservation sites. Data from PEOMAP on gender distribution showed a nationwide pattern of surprisingly high rates of female outmigration from rural areas. The research team that conducted the *Madre de las Aguas* socioeconomic analysis (see p. CS-4) found particularly high rates of female outmigration in local communities in and around the conservation areas. The same team is now investigating whether skewed gender ratios alter the ecological impacts of human populations. The current study will demonstrate how gender mapping might be used in conservation planning to anticipate human impacts on biological diversity and to develop conservation strategies.

Rural sprawl. Through its relationship with Bill Riebsame, a professor at Colorado State University, TNC recently partnered with American Farmland Trust on a Hewlett Foundation grant to more extensively analyze growth and its effect on rangeland areas. This work will test the hypothesis that rural sprawl is most likely to occur in areas that have great topographical relief, are wide open, and are located within a reasonable distance from an airport and a town with modest

amenities. The results may make it possible to better anticipate where growth is more likely to happen next.

A second analysis focuses more deeply on a few counties where rangeland is a major land use. By reviewing property records of who is buying and selling land, they hope to be able to identify which lands are switching from rangeland to a different use, under whose ownership such change is occurring, and to what use(s) the land transitions. The analysis will help test the assumption that rangeland is being lost at an accelerating rate and lost to development. Results of this work should provide a stronger foundation for developing conservation strategies and make a compelling case for potential funders.

Smith fellow. Dave Theobald began a Smith Postdoctoral Research Fellowship in 2000. Working with Betsy Neely, he is building a model that uses forecasted land use change to help evaluate ecoregional portfolios for the Southern Rocky Mountains Ecoregion (from southern Wyoming to central Colorado to northern New Mexico). Theobald plans to ask whether considering projected growth (housing density — ideally over a ± 50 year time frame) will affect which sites TNC selects for ecoregional portfolios. He also plans to evaluate whether, when projected land use is incorporated, certain networks of sites yield greater conservation benefits than others. Theobald expects to have the model ready to analyze the results of the Southern Rocky Mountains plan in 2001, to then build a GIS-based tool for broader use across the Conservancy, and to present his results at a TNC forum in 2002.

D. Stakeholder Analysis

Stakeholder analyses are typically conducted as part of site conservation planning. TNC staff report that the method is relatively straightforward and easy to use, but caution that if done too early staff may not know who the real decision-makers are at a site. In addition, analyzing all stakeholders may be overly time consuming and daunting to update periodically. The range of stakeholders and the depth of analysis should be carefully defined at the outset.

Altamaha River, Georgia

The Altamaha River runs about 137 miles and the project landscape incorporates a human population of about 250,000. The site conservation planning process for the lower part of the Altamaha River included a stakeholder analysis that examined some thirty stakeholders. The process identified who they were, how they would be affected by TNC's programs, how they might affect TNC, what staff knew about the stakeholder, and what staff did not know. Stakeholders included county commissioners, a nuclear power plant, timber companies, state agencies, a group trying to launch a development project that would have withdrawn a substantial amount of river water, and others.

The exercise helped tease out who would have the greatest or least effect on TNC's conservation efforts. Along the way, staff began to understand that a wide range of landowners fit a common profile — floodplain landowner — and were key stakeholders. Staff began to see these landowners in a new way and to help the landowners understand their common connection to the river. An outreach and communications plan was developed for engaging each stakeholder. The stakeholder analysis also led to subsequent investment in polling and focus groups to better understand the values and interests of the floodplain landowners.

(In addition to the Altamaha case study, see also the use of stakeholder analysis as part of the community profiling effort at Edge of Appalachia, Ohio, p. 9.)

E. Situation Diagram

Situation diagrams usually are done as part of site conservation planning. Costs of this approach may be as low as expenses for running a half or full day workshop. Sometimes, an outside facilitator may run the meeting — particularly when people from the local community are involved rather than just TNC staff — adding additional costs.

TNC staff who have participated in situation diagramming exercises report mixed results. Some have found it very helpful for identifying the most important stakeholders. Others report that the results can be complex and confusing if the analysis is conducted at a broad

geographic scale or at a site with too many stakeholders. Conversely, situation diagrams may be largely uninformative at smaller sites or sites where staff have been working for many years. Importantly, even when the tool identifies the ways that stakeholders are related to different targets, more information may be needed to assign an overall importance to a stakeholder.

Staff who recommend situation diagrams advise doing one as early as possible in the life of a project. They also suggest revisiting it periodically, because relationships between stakeholders change as does staff understanding of stakeholders. Because stakeholders may be sensitive about perceived links between them and the stresses to a conservation target, involving local partners and stakeholders requires care. Including only close partners may add important knowledge. But building close relationships takes time, and involving prospective partners too early at a site is not always productive. A trained facilitator may be essential to manage the meeting process if, for whatever reasons, a broader or contentious group of people participates in developing a situation diagram.

Guadalupe Nipomo Dunes (GND), California

The 4,000 acres of GND is home to numerous sensitive species, most importantly to ground nesting birds. But the dunes in GND are heavily used by the roughly 150,000 people who visit the site each year. TNC staff put together a management plan for GNP in the early 1990's. Outside input was not sought in the planning process, and reaction of the local community was highly negative. A new TNC staff person was charged with implementing the plan and addressing the unhappiness in the community. The first step was to undertake community outreach efforts, such as a volunteer program, guided hikes on the property, engaging preserve users in workshops, and conducting polls about user needs and perceptions. After hearing about several social science tools at a Government Relations conference, the project staff invited Gloria Fauss to GND to facilitate a community assessment.

In 1996, Fauss led a one-day session with key partners, including people from the state parks department (who dealt with off highway vehicles), the Santa Barbara County Parks Department (TNC had a lease with them), the California Coastal Conservancy (a state organiza-

tion helping to fund the project), and several community leaders. Fauss used situation diagramming to better understand the people who used the beach and dunes and how they interacted with the species. In the morning the group listed all the stakeholders in the site. Then they diagrammed the interactions between the groups. The afternoon focused on details of the relationships among various partners.

The process helped TNC staff see the relationships among the different stakeholder groups. The many relationships between one major land owner and the County had not been apparent previously. Also, several "eureka" moments occurred as the group began to better understand the perspectives and interests of the Hispanic and Anglo parts of the community. For the group overall, the experience had a process value — strengthening some relationships and helping people to understand that the challenges for the preserve were not just TNC's problems. According to one of the TNC staff involved, using a simple tool like situation diagramming *early* in the site planning might have prevented some of the difficulties that arose later. (TNC has since transitioned out of GNP.)

Lower San Pedro River Valley, Arizona

Located east of Tucson, the Lower San Pedro River valley is about 100 miles long with a human population of about 5,000. Site staff used a situation diagram in the site conservation planning process during a workshop facilitated by Jeff Baumgartner. The planning team included the conservation planner, the site staff person, an ecologist, the director of protection, the director of stewardship, and others from the field office.

The exercise involved thinking about the major conservation targets and threats. The group listed the stakeholders causing stresses to target or working to mitigate the stresses. They then discussed strategies and how these strategies related to each stakeholder. The result was a thick set of lines and arrows on a board.

The situation diagram got the staff talking about the stakeholders and enabled them to share their individual perceptions about working with these stakeholders. They also developed a common picture of on whom to focus efforts. The exercise was particularly useful for staff new to the area.

San Luis Valley, Colorado

The core issue in the San Luis Valley was contention over water use. TNC's ownership of a 3,500 acre isolated wetland put it squarely in the midst of water use discussions with a local economic development group and local ranchers. When a new staff person was hired, they needed to understand the water problem quickly. Nicole Silk and Jeff Baumgartner assisted by facilitating a quick, two-day site conservation planning workshop. The workshop developed the site's first situation diagram with assistance from David Harrison, a water lawyer and former chair of TNC's Board of Governors. The process created an opportunity for the new staff person to download knowledge from Harrison, in addition to quickly coming up to speed with the people and issues at the site and setting some priorities.

F. Community Profiling

A community profile is a comprehensive look at the attitudes, values, knowledge, and behaviors of a community. It can include widely varying kinds of information that are relevant to conservation targets and to engaging the community in conservation action. The profile can act as a catalyzing tool for community planning and visioning and provide valuable information for outreach and education efforts.

In 1996 TNC began working in collaboration with the Environmental Protection Agency's Office of Sustainable Ecosystems and Communities to test community profiling techniques for TNC's Edge of Appalachia Preserve in Ohio and TNC preserves along the Platte River in Nebraska.⁵ In 1998 two additional sites were added to this pilot project: the Altamaha River in Georgia and Kachemak Bay in Alaska. These pilot community profiles integrated results of several social science tools including surveys, focus groups, interviews, socioeconomic analysis, stakeholder analysis, and others. In addition to developing information for TNC staff, these community profiling exercises engaged local community members in conservation work and advanced project activities at the sites.

Edge of Appalachia, Ohio

The Conservancy has been working at the Edge of Appalachia for nearly 40 years. The project directly involves 13,000 acres, but the overall site design is two to three times that size. About 200 to 400 people live within the site, but the population connected to the project includes all of Adams County, about 27,000 people. Pete Whan, the TNC Preserve Manager, was considering initiating a compatible economic development planning process in the community. He wanted to better understand the attitudes and knowledge the people in Adams County had about their economy and environment, the Edge of Apps preserve, and TNC and other environmental groups.

A community profile was put together as part of the EPA project. Seven social science tools were used: focus groups, surveys, one-on-one interviews, newspaper content analysis, stakeholder analysis, asset mapping and concept mapping. The tools were used in sequence and, for the most part, information learned through one exercise was used to inform subsequent activities.

With help from Home Office Government Relations, Whan selected the consulting firm Belden & Russonello to assist with the focus groups and surveys. Together they decided to first conduct focus groups and then a survey. The consultant ran two hour-and-a-half long focus groups, one with large land owners/farmers, the other with non-farming residents. TNC's identity was revealed at the end of each focus group. These results helped target the 24-questions asked in the subsequent survey that was conducted with 400 randomly chosen people in the county.

An Ohio University professor and graduate student then conducted 24 one-on-one interviews with key informants. Survey questions were based on focus group and survey results and tested with a local resident prior to the interviews. Using a "snowball" sampling method, respondents were chosen from a pool identified by TNC and local contacts. This resulted in a diverse set of respondents.

⁵ U.S. EPA and the Nature Conservancy. November 30, 1999. *Community Profile of Adams County, Ohio: The Edge of Appalachia*; U.S. EPA and the Nature Conservancy, December 7, 1999. *Community Cultural Profiling: A Case Study of Kachemak Bay, Alaska*; U.S. EPA and the Nature Conservancy. November 1, 1999. *Community Profile of Nebraska's Central Platte River Region*.

EPA staff members analyzed two newspapers from a three-month period for references to the environment and conservation. The goal was to understand how the community referred to the environment and conservation and how some of the key issues were dealt with through the print media. Two people spent six hours scanning the papers and noting the relevant content.

A workshop was held with the community profiling team made up of representatives from the EPA, local partners, the consulting firm, and TNC local, state, and national offices. Team members carried out a stakeholder analysis at the workshop. They also conducted two kinds of situation diagramming exercises: asset and concept mapping. Prior to the workshop Whan made a list of key people or groups who had a stake in the strategies of their site conservation plan. When considering who might have an impact on the site, the list became far longer. At the workshop, each stakeholder was considered and information such as how they impact site activities and how they are impacted by TNC's work were detailed. Additional information needs were noted and the group began developing a strategy for working with one key group – county commissioners.

For the asset map, team members chose the preserve as the main subject. They then identified local entities (individuals, groups/organizations, and institutions) with assets that could be used to create beneficial change. Specific assets of each entity were identified. A map was drawn to illustrate the relationship of these entities to the preserve, taking note of relationships that might need to be established. The concept map identified the interrelated causes and effects of the decline of the wood rat population in the area. The team mapped the relationships between various attitudes and behaviors to the decline, as well as the effects of the decline. The resulting map helped to illustrate the complex relationships that affect conservation issues and suggested areas that might be addressed to reverse such trends.

The community profiling exercise revealed numerous surprises. Whan found that the preserve had very low name recognition, and TNC's association with it was

even less-well known, even after substantial efforts to promote the preserve. People thought the preserve took property out of the local tax base and therefore was too big. Most did not know that TNC voluntarily paid \$20,000 a year in local property taxes. (Subsequently, TNC worked with a local paper to develop an editorial noting this fact.) TNC staff also were surprised to find that illegal dumping was second only to job creation as a concern in the community. Most important, the poll and focus groups indicated overwhelming support for the initiation of land use planning. Whan refers to this analysis often when considering which people in the community will be affected by what he plans to do next.

Whan found that sharing the results with community and opinion leaders helped to build relationships. Findings about land use planning encouraged Whan to work with others in creating PACT, Planning Adams County's Tomorrow, a group of local community leaders who support compatible development. With help from a CCED fellowship, PACT subsequently drafted a strategic plan that called for the development of a comprehensive county plan.

G. Pathways and Sub-tools

In the mid-1990s, TNC experience at the Virginia Coast Reserve and in other locations was distilled into a strategic planning framework called "Pathways" that explicitly balances community, economic, and environmental goals. The framework has been compiled in a notebook of clear, well-referenced tools that can be used individually or sequentially.⁶ The process is intensive and high-commitment and usually is conducted with extensive support from TNC's Center for Compatible Economic Development (CCED), though CCED support is not a requirement. It requires investment not only of staff time and resources, but also, because it is highly participatory, involvement of sub-teams of individuals from the community. The costs of implementing Pathways include about 20% of a TNC staff person's time throughout the process (~ 1.5 to 2 years) as well as workshop and facilitator expenses (ranging from \$10,000 to \$35,000 in the examples below).

⁶ Center for Compatible Economic Development, The Nature Conservancy. 1999. *Pathways: Building a Local Initiative for Compatible Economic Development*. Internal TNC manual (available at <http://www.cced.org/tools.htm>.) As of July 1, 2001, the "Center for Compatible Economic Development" has become the "Compatible Ventures Group." The change will mean an increased emphasis on the development of market-based strategies for achieving conservation results. Staff anticipate that future support of Pathways by this group will decline.

Site staff use Pathways to engage a community in a compatible economic development planning exercise generally after TNC has been at a site for several years.⁷ Some of Pathway’s tools might be of more general use during site conservation planning, but applications outside of compatible economic development projects have not yet been explored.

The case studies below focus on two of Pathway’s core tools for assessing the local community and economy. Rapid Community Assessment identifies the community’s key characteristics (e.g., values, special places, institutions, settlement patterns), prepares a short community history, evaluates the community’s capacity for collective planning and action, and determines threats to the community. Rapid Economic Assessment compiles selected socioeconomic data (i.e., on population, economic performance, business composition and vitality, and social conditions), compares this with statistical profiles of 8-12 other, similar, communities, and identifies threats to the economy.

Staff who have worked with Pathways say the participatory process is perhaps even more valuable than the information developed, because it generates community commitment. They advise, though, that this process is not appropriate everywhere. The level of community cohesion and sense of place is the most important gauge of whether Pathways is likely to be successful. Experienced staff also have found that technical assistance is essential, because numerous questions arise during the process that site staff cannot answer. Also, they encourage potential users to have realistic expectations: Pathways takes time and the rate of change is slow.

Sewee to Santee, South Carolina

The Sewee to Santee site has an area of about 125 square miles and a human population of about 5,000 people. TNC had not had a formal presence in the area before a local community workshop, led by Greg Low, Tamar Datan and Meagan Gallagher found the community’s interest was strong. Community members signed up for community, economy, and environment sub-teams at the workshop, and each group sub-

sequently met from three to six times.

A five-part strategy came out of the process: manage growth and community character; encourage compatible recreation; attract compatible tourism; sustainably use local natural resources; and promote housing and clean drinking water. While developing this strategy, participants became committed and energized, and the community became united in working toward a common goal. TNC staff gained insight into the community’s values and drivers and developed good relationships that helped in land acquisitions efforts.

Edge of Appalachia (EoA), Ohio

Pathways began at EoA with a community meeting led by Greg Low. At the end of the meeting people signed up for 8 to 15 member task forces to do a Rapid Community Assessment, a Rapid Economic Assessment, and a Rapid Ecological Assessment. The task forces determined how often they met, and four major community meetings brought the various assessments together. Some new people showed up every time, others did not return.

Project Director Pete Whan focused at first on the tools, but came to understand that the tools were simply a process through which local citizens gathered information and created a shared picture of their community. Integrating lay people into each task force helped create broader buy-in to the task forces’ conclusions. For example, conclusions from the economic assessment that challenged conventional wisdom — i.e., that Adams County was the poorest in Ohio and that manufacturing rather than farming was the County’s biggest income source — were gradually accepted by the community. The community assessment ranked the 4H and churches as the best local problem solvers — a results that most likely would have been rejected had it not come from community members themselves.

In the end, the Pathways process helped generate an impressive level of community involvement with the potential for far reaching impacts. Some 250 people directly participated in Pathways, and 750 more visited a booth that showcased the planning process’ results at

⁷ Pathways defines “compatible development” as “the production of goods and services, the creation and maintenance of businesses, and the pursuit of land uses that conserve the environment, enhance the local economy, and achieve community goals.”

the county fair. At least 15 to 20 people have become deeply committed to the strategic plan's implementation, and a new coalition that will eventually be incorporated as a nonprofit (called PACT, Planning Adams County's Tomorrow) was formed for this purpose. Several key leaders emerged during Pathways. One is an Ohio State University extension agent who became a co-chair of PACT and has been appointed by the County Commissioners to head the County's economic development agency as it disperses ~\$20 million from the Tobacco Settlement. Another is the county engineer who also co-chairs PACT and is now initiating the County's first comprehensive plan to address sewer and water needs and land use. Finally, PACT's community profile became the basis for many messages in recent campaigns for three County Commissioner seats, with two candidates specifically talking about land use planning and stopping illegal dumping.

H. Issue Forums

Issue forums are a relatively new approach for the Nature Conservancy. They involve holding structured community forums in order to gauge local attitudes about current and future conditions and to educate people. More than a series of focus groups, but also more than a public outreach program, issue forums are used to understand public attitudes about the conservation problem at hand, to test reactions to possible strategies, and to try to inform peoples' future views and actions.

Based on experience in South Florida (below), 30 to 40 forums cost approximately \$50,000 in staff time and expenses. The issue booklet used to help guide the forums cost another \$20,000 (\$15,000 for drafting and layout, \$5,000 for printing). Staff recommend having at least one person dedicated full time to making the forums work. Having two people at each forum makes it easier to both moderate and record the proceedings .

TNC staff who have conducted issue forums say generating attendance can be a challenge. Identifying someone in the community who can stir interest in others helps, as does cosponsoring forums with other organizations or individuals such as the State Attorney General, university classes, civic associations, homeowners, the League of Women Voters, seniors organizations, and Chambers of Commerce. Also important, the spe-

cific makeup of the group can affect the process. If a particularly vocal group on one side of the issue stacks the meetings, rhetoric rather than real views can dominate the discussion. In addition, local officials may tend to speak often and dominate a forum, and engaging such individuals by sending them the forum results and press releases or by providing them with one-on-one briefings may be preferable.

Capturing the full information value of the issue forum is critical. Before and after surveys can help in understanding a meeting's findings and can measure the immediate impact of the forum. Staff also need to listen exceptionally well. After about a dozen forums, patterns may emerge of peoples' shared views. Experts in the design of issue forums generally suggest engaging a single group of people into a series of issue forums over the course of a year. However, in the Florida example, staff conducted issue forums across many groups over the course of two years, because the goal was to reach many people.

Finally, experienced TNC staff believe that issue forums are most useful in very contentious situations that pit conservation against other interests and where no clear solutions exist. They have found that when groups are brought together to share concerns, people often are not as far apart as they may seem. Sometimes, though, attendees have a deeply felt objection to TNC's objectives. This may signal that the time just may not be right for accomplishing certain conservation goals.

Florida Everglades

TNC's Florida Everglades site encompasses millions of acres and a human population of some eight million. At this site, staff began to realize that, even if they got the natural science right, large scale change required changes in public opinions, ideas, and policies. They decided to use issue forums to promote public awareness and discussion that would help pass a statewide initiative for funding the state's share of Everglades restoration costs at a time when local leaders were at odds over the costs of Everglades restoration. TNC staff needed a handle on what the community thought. They also wanted to test potential messages and to educate the public about Everglades problems and solutions in order to enlarge backing for such solutions.

In 1998 and 1999 TNC staff conducted some 80 forums, 27 the first year, 53 the second. The 1999 forums attracted 1,144 attendees. After trying volunteers and contractors to moderate forums, staff hired an in-house moderator.

Typical forums lasted two hours. They began with an introduction consisting of a discussion of sponsors, the purpose and agenda of the meeting, a pre-forum survey, and a ten-minute video on water conservation issues. The attendees then discussed their views of water management and supply. TNC staff talked extensively with the group about three approaches that are expected to be part of the ultimate solution to south Florida's water supply problems: state laws and regulations, technology, and market based approaches. Finally, staff presented various approaches to paying for a solution, followed by a collective discussion of the alternatives. Attendees were asked to fill out a post-forum survey before leaving the meeting.

The Kettering Foundation developed the issue forum approach with input from TNC staff to help write the issue guide for TNC's Everglades effort. The guide was a printed document, made available to forum participants and others, providing even-handed background on water management in south Florida.

Comparison of 830 completed pre-forum surveys to the 740 completed post-forum surveys from the 1999 issue forums suggest some impact on attendees' understanding and support for the environment. While 61% of attendees initially said they were very concerned about their future water supply, 72% expressed this belief after participating in an issue forum. The proportion of participants who disagreed with the statement "New developments should be approved even if insufficient water resources are available to meet the needs of these new water consumers," increased from 40% to 46%. The proportion of participants saying that they felt knowledgeable about South Florida water supply and

management issues increased from 51% in pre-forum surveys to 81% in post-forum surveys.

The forums also helped staff understand what the community was thinking, sometimes yielding unexpected insights. For example, people participating in the forums and the survey said that they support the restoration process and are willing to pay fees or taxes to protect water quality. State funding (to match federal money) will be key to successful restoration in South Florida. Such results have helped to inform community leaders and decision makers in state government. TNC staff have made the 1999 results available to county commissioners.

I. Community-based Mapping

Community-based mapping is an approach that brings together community members from across a specific geographic area to map their geographical knowledge including critical aspects of existing tenure rights and patterns of land and resource use.⁸ The people included in the process may come from a single or several distinct communities in the area and may include various gender, ethnic, age, and socioeconomic groups. The specifics of the mapping exercise can vary, ranging from free-form approaches that generate individual or group maps to hand-drawn overlays on aerial photos or GIS maps. Stakeholders and planners can use the locally-generated maps of past, present, and future activities and tenure patterns to develop a management plan that reflects their shared vision for future resource use, settlement patterns, and conservation goals.

Community-based mapping potentially can lay a strong foundation for site conservation planning. The spatially explicit information generated by the process clarifies the relationships among stakeholders and the natural environment, as well as how these relationships change over time. In the case of the Bosawas Biosphere Reserve below, community-based mapping was part of a

⁸ For additional information on community-based mapping see: Eghenter, Cristina. 2000. *Mapping Peoples' Forests: The Role of Mapping in Planning Community-Based Management of Conservation Areas in Indonesia*. Biodiversity Support Program publication, Washington, D.C. (www.bsponline.org); Poole, Peter. 1995. *Indigenous Peoples, Mapping and Biodiversity Conservation: An Analysis of Current Activities and Opportunities for Applying Geomatics Technologies*. Biodiversity Support Program publication, Washington, D.C. (www.bsponline.org); Slocum, R., Wichart, L, Rocheleau, D. and B. Thomas-Slayer. 1995. *Power, Process and Participation: Tools for Change*. Intermediate Technology Publications. London.

strategy to ensure long-term sustainable use of reserve resources by the indigenous peoples. Activities of these people pose far fewer threats to biodiversity than the encroachment of agriculture, and planning for the reserve needed to integrate their traditional tenure rights. See also the case study below of “participatory mapping” for a related technique (p. CS-17).

The Bosawas Biosphere Reserve, Nicaragua

The Bosawas Biosphere Reserve protects 1.8 million acres of the Mosquitia — a region containing the tropical moist broadleaf forests along the Atlantic Coast of Nicaragua and Honduras that comprise the largest intact rainforest north of the Amazon basin. The Conservancy began working directly in the Bosawas Reserve with the U.S. Agency for International Development (USAID) support in 1993. The advancing agricultural frontier was the greatest threat and had already penetrated the reserve’s western and southern boundaries. The only potential brake on agriculture’s advance was the presence of ~13,000 indigenous people who lived along the Bosawas’ river valleys. These peoples’ traditional low-impact uses of natural resources have maintained the forest in relatively intact condition for thousands of years.

The indigenous peoples’ desire to halt the advance of colonization before it overwhelmed them coincided with the Conservancy’s strategy to halt this advance before it destroyed the forest. TNC in-country staff (under Ing. Brady Watson) teamed up with Dr. Anthony Stocks, an anthropologist from Idaho State University, to launch a community-based mapping effort designed to accomplish both groups’ goals. This process involved documenting existing land use patterns, delineating traditional use zones, and determining management norms for the indigenous territories of the reserve.

Representatives of the indigenous communities came together at a workshop in which they defined five multi-community territories delimited by river valleys or watersheds that together encompassed two-thirds of the reserve’s area. The community representatives decided to seek multi-community titles for these territories (one had gained title several years earlier). Anthony Stocks and several TNC staff then spent 3-4 months in each territory training local people to map use areas with handheld GPS units. The indigenous people created use categories based on their own concepts about how

they use land. Use categories varied among communities, but generally included traditional agricultural areas along rivers and adjacent low-lying areas, areas for hunting and for extracting forest products, sites of historical and religious significance, and gold-panning areas (the most significant source of cash income in the reserve). This effort produced a map of each territory identifying current use zones.

Interestingly, people in each territory independently chose to demarcate an area dedicated to the “reproduction of plants and animals” or “conservation.” These areas tended to be remote and inaccessible ones that are difficult to visit and usually left untouched. Although indigenous peoples’ ideas about conservation undoubtedly differ from those of conservationists, this designation of conservation areas provided a point of departure for TNC staff and partners to work with the indigenous communities towards shared goals.

The agreement among neighboring territories on boundary lines was another important part of the mapping. Through a series of meetings, Miskito, Mayangna, and Mestizo (or non-indigenous) colonist leaders discussed the most serious border disputes and agreed upon a line dividing their lands. These boundaries were incorporated into the maps and other documentation.

Simultaneous with the mapping, indigenous investigators trained by Dr. Stocks censused territory inhabitants and collected relevant socioeconomic information about each community’s population, such as education level, language, occupation, and income sources. The investigators analyzed the data in the field using solar-powered calculators. To ensure that community members felt true ownership of the information, survey forms were left with each community; only composite data were taken away for the purpose of titling. The indigenous investigators also collected oral histories from the indigenous elders to document each group’s historic occupation of the area, documenting these in writing for the first time ever.

The participatory process at Bosawas yielded several significant achievements. It resulted in explicit maps and documentation on the traditional land use and land claims of the 13,000 Mayangna and Miskito people living within the boundaries of the reserve. Although titles

have not yet been granted, due to politics in the current Nicaraguan administration, the existence of mapped land claims and of demarcated boundaries of indigenous lands has measurably slowed agricultural encroachment and hence deforestation.

The effort also helped the communities develop their own land use plans and institute management norms. The territories' management plans have been accepted as part of an overall reserve management plan that the government is currently developing. More than 187 volunteer guards from 66 local communities have been trained to help the small corps of official forest guards provided by the government. Together they manage the reserve and patrol boundaries to prevent settlement and deforestation by agricultural colonists. Finally, the community-based mapping provided a strong foundation for a participatory Site Conservation Planning process that is being led by TNC and partner organizations and includes scientists, government officials, NGO representatives and indigenous community members.

J. Site Marketing

Numerous sites are using public education to influence the attitudes of people who live in or near conservation targets or to start growing a conservation ethic in the community. One interesting experiment is underway at TNC's Oak Openings project in Ohio where staff undertook a year-long marketing campaign. The campaign's goals were to raise public awareness about the site and to lay the groundwork for a new community organization that will advocate for protection of the Oak Openings.

Marketing involves defining and targeting key segments of the population, creating and delivering a series of messages, and organizing and managing the various means of communicating the messages. Although TNC is skilled at marketing, use of this skill as the foundation for a site-based strategy is relatively new.

Oak Openings, Ohio

The 130 square mile Oak Openings outside of Toledo, Ohio, is only half of its original size, because much of the area has been converted to agriculture. Yet most of the areas's 60-80,000 residents are unaware of this

historical change. They also are unaware of the species and natural communities that make the area of conservation concern, because most are located out of view from roadsides.

The area includes a 3,000 acre public park, and TNC owns about 575 acres nearby. Educational efforts to inform residents about the Conservancy and our goals for the area — such as presentations to community groups, walks at preserves, and meetings with land owners — have been a part of the TNC's work since the project office opened four years ago. However, staff report limited success with this approach.

In 1999, Terry Seidel (the project director) and Scott Davis (then Ohio's Director of Conservation Programs, now state director in Tennessee) launched a marketing effort called the Oak Openings Awareness Campaign to increase appreciation of and support for the site by local land and homeowners. Politicians are a secondary target audience. A grant from EPA's Great Lakes National Program Office provided \$250,000 that was matched by local private money. The consumer product marketing firm, Libby, Perszyk & Kathman (LPK) is contributing pro bono services to help develop and execute the campaign. The approximate amount of staff time required to support the campaign is more than .4 fte (project director, communications staff, and part-time outreach coordinator).

The campaign consists of several concepts delivered through a schedule of billboard, newspaper, radio, television and other ads. These include a logo designed for Oak Openings, and a 1-800 number and a website for those who want to get further involved. The initial campaign messages convey a sense of beauty, wonder, and awe. "Globally rare in your own backyard," reads one billboard. Later messages will introduce a sense of urgency. LPK has also developed an artistic poster for TNC to distribute to libraries, businesses, and others. They are developing signs for each park that show the entire region.

An innovative part of the campaign is that it brings the messages down from advertising to reality. To demonstrate conservation behaviors, demonstration gardens are being placed in high traffic areas. One garden is at

Coops Corner, a country store/deli where they are also selling a line of native plants. Winners of a poster contest in the local schools will appear on billboards. Finally, a major festival called Blue Week was organized for the spring of 2000. The name of the festival grew from the fact that many of the different species that are special to the area are blue—blue lupine, blue spotted salamander.

Based on experience so far, the program has begun to yield some benefits. Peoples' awareness seems to be heightened, though how much is unclear. Staff are receiving more calls, more questions, and more interest. They recently closed on a major donation from someone who saw the Campaign's advertising. The Campaign also has helped with initial efforts to launch a local Oak Openings Preservation Alliance by identifying potential alliance members. The Alliance takes a more activist approach to local land use issues than TNC and already has won a positive finding from a township to stop a sand mine next to a preserve.

Several insights can be gleaned from experience with the Campaign. TNC staff say that, even with the level of effort targeted at this Campaign, getting a message to register with the public and to affect attitudes takes time. Based on feedback from the local community, they believe that newspaper ads were less effective than billboard and radio ads. Interestingly, free news coverage gave the Campaign a significant lift and was the source of more comments than the advertising. Seidel now says that he regrets not conducting a poll prior to the Campaign: a poll could have provided a benchmark for measuring the effectiveness of the marketing campaign. Finally, the staff do not expect to maintain the Campaign at its current level because of the expense. They are uncertain what level or type of effort will be required to sustain the gains in public awareness generated by the Campaign.

II. EXTERNAL CASE STUDIES

This section details eight examples of how individuals and organizations outside of the Nature Conservancy are experimenting with methods for incorporating human context considerations into conservation. While this selection is not comprehensive, it demonstrates the energy, resources, and creative thinking that others are bringing to bear on this problem. It also provides a glimpse of the kinds of opportunities that exist to partner with conservation organizations, natural resource management agencies, external scientists, and others to develop and share innovative approaches.

K. ABI Decision Support Tool for Conservation Planning

The Association for Biodiversity Information (ABI) is an important TNC partner in developing biodiversity data, data products, and analytical systems and tools. With funding from the Doris Duke Charitable Foundation, the organization launched a project in January 2001 to create a decision-support system for integrating biodiversity and socioeconomic information into land-use planning.⁹ Although ABI sees local and state governments as the primary customers, the system and modules that comprise the system could have significant uses in site and ecoregional planning by TNC and other organizations. Designers plan to build in the flexibility that will enable users to customize their use of the system on a project-by-project basis.

The system will be a user-friendly collection of desktop and web-enabled software tools and information resources, including mapping, analytical, and visualization software built on a geographic information systems (GIS) platform. Graphic user interfaces and wizards will guide the user through a decision process. An “alternative futures” module will allow the user to create computer simulations showing past landscape changes and projected future changes based on different growth scenarios. Another module will allow single or multiple users to express and integrate their land use values and priorities regarding biodiversity and open space as well as development options. And a “biodiversity explorer” module will help users find, access, and integrate biodiversity information, such as the locations and status of rare plants and animals.

ABI is working with several research and development partners in designing the decision support system, including the Florida Natural Area Inventory, Wyoming Natural Diversity Database, the NASA Center at Prescott College (Arizona), the Biogeography Lab at the University of California at Santa Barbara, the Policy Center of the US Geological Survey, and ESRI — the world’s leading developer of GIS software. Expected completion of the ABI decision support system is in early 2004; some modules may be available as early as late 2002.

L. Participatory Mapping

The Rogue Institute for Ecology and Environment has used participatory mapping to identify issues of importance to local landowners and to generate ideas for how to address some of those issues.¹⁰ Members of the local community prepare the participatory maps, also called “resource actiongrams.”¹¹ Participants focus on issues within the context of their relationship to resources and then look in particular for leverage points or actions that may create major positive or negative impacts within the system.

Small groups of five to seven participants who live or own land in a specific area draw the area’s natural system. The map shows the resources in the system and the relationships among the resources. The participants then identify leverage points, particularly those they may be able to do something about. By thus focusing the discussion, participatory mapping spurs people to make connections between different parts of systems and examine how they can or could affect them. This can lead to identification of specific actions that individuals or communities can take to impact the resources. The entire process takes a few hours.

⁹ For further information about this project, contact Patrick Crist at the Association for Biodiversity Information at Patrick_Crist@abi.org

¹⁰ Jeff Fields of the TNC Oregon field office formerly worked for the Rogue Institute and contributed to this analysis.

¹¹ William, R.D. n.d. Resource actiongrams: A discovery learning technique to move people toward action within natural resource systems. Horticulture Department, Oregon State University.

This tool helps people to understand connections that affect resources within the local natural system and to generate ideas on how best to address identified issues. Whether it is the maps or the discussion that catalyzes action is unclear. Regardless, the process helps people to see different sides of an issue and to move forward in devising strategies to address those issues.

The Rogue Institute used participatory mapping in 2000 with members of local watershed councils at a workshop entitled “Landscapes and Leverage.” Various groups at the workshop identified potential actions for addressing important issues. For example, the maps helped a group that was already working on road siting issues to further define what activities they could undertake and with whom they should consult to address road problems. The next step will be to see whether and how this information is used in the groups’ future actions.

(See also the TNC case study of Bosawas Natural Resources Reserve for the related approach community-based mapping on p. CS-14.)

M. Regional Economies Assessment Database

Larry Swanson at the O’Connor Center for the Rocky Mountain West has developed a Regional Economies Assessment Database (READ).¹² READ is a spatial database of economic and demographic indicators. It already covers the 22 states west of the Mississippi River and plans exist to expand the database to include the entire United States and eventually Canada. The database’s purpose is to help users, primarily planners, assess the economic dynamics in an area. Data can be examined in a spatial display for specific sites, and more importantly, for each site in various kinds of regional contexts. Data are available at scales including national, multi-state regions, individual states, Bureau of Economic Analysis Economic Regions, counties and sub-counties. Data are largely from federal sources including the U.S. Bureau of Census and the Bureau of Economic Analysis.

The database design assumes that planners and decision-makers often must consider sub-state regions larger than a county. An understanding of the economic context within which an area falls is essential for devising strategies to improve local economies. The READ system allows users to examine the range and scope of their local economy and evaluate its place in larger, regional economies.

Specific uses of the database include:

- Mapping important regional patterns in the economy. Users can view and download maps of individual indicators and examine aspects of the economy of the desired region using maps, tables and graphs.
- Tracking changes using “benchmark” years. Much of the data are organized around “benchmark” years – the years of the Census of Economic Activity – allowing comparison and trend evaluation across time as well as space.
- Creating “peer” economic reviews. Areas with similar characteristics and attributes, known as “peer” regions, can be identified using the data. These areas can then be compared with the local area to examine conditions and trends.
- Identifying and measuring progress using regional benchmarks. Key indicators of economic change and activity can be identified and tracked using the database. Comparisons can be made between similar regions or across time.

The Center for the Rocky Mountain West has been working with the U.S. Forest Service to use the READ system to better understand the economies of regions near to Forest Service land. To assist in Forest Service planning, data on regional demographic and economic trends are being studied for counties within a certain proximity of Forest Service lands.

N. Extended Gap Analysis

Researchers at the University of Idaho have developed an extended gap analysis technique for including socioeconomic data in gap analyses.¹³ Gap analysis is a technique for assessing the protection status of biodiversity

¹² CRMW (O’Connor Center for the Rocky Mountain West). 1999. www.crmw.org. Accessed 03/31/00.

¹³ Forester, D.J., G.E. Machlis, and J.E. McKendry. 1996. Extending gap analysis to include socioeconomic factors. Pp. 39-53 in J.M. Scott, T.H. Tear, and F.W. Davis, eds. *Gap analysis: A landscape approach to biodiversity planning*. American Society for Photogrammetry and Remote Sensing, Bethesda, MD.

within a given state. The method involves collecting a wide variety of ecological data (e.g., species distributions, habitat types, etc.) and the protection status of land. These data are entered into a geographic information system (GIS) and then analyzed in various ways based on different ecological criteria. The results of gap analysis include a better understanding of the status and distribution of biodiversity as well as the identification of important areas for future protection efforts (i.e., “gaps” in the current system of protected areas where current biodiversity protection is insufficient). GAP data sets have been integrated into a number of TNC’s ecoregional plans.

Extended gap analysis involves collecting data on various indicators of human action including such things as population growth, economic conditions, and conservation policies. These data are entered into the GIS. A critical zone is delineated around each gap identifying the broader area encompassing socioeconomic factors that are likely to influence biodiversity within the gap. Related sociospaecconomic indicators for these critical zones are combined into indices based on a model of human impacts on biodiversity. An overall index of vulnerability is calculated for the critical zone around each gap. The index is a measure of the relative risk of future biodiversity loss in the gap based on the socioeconomic criteria. The results of extended gap analyses have application in land-use planning, monitoring threats to biodiversity, and devising strategies to mitigate human-based threats to biodiversity.

A pilot study of the technique completed in Idaho in 1993 resulted in a prototype atlas.¹⁴ The technique was also used for the Puget Sound region of Washington in 1996 and a CD-ROM atlas produced for use by county planners and other interested parties.¹⁵ Research projects to explore other methods for including socioeconomic factors in gap analyses are underway by several research teams.

O. Identifying “Hot Spots of Vulnerability” for Conservation Planning

Researchers Robbyn Abbitt, Michael Scott, and David Wilcove at the University of Idaho and Environmental Defense have examined the potential value of integrating information on human population growth, habitat loss, and the distributions of restricted-range species to identify areas vulnerable to future species loss.¹⁶ The scale of their analysis was the conterminous 48 states.

First the researchers mapped the distributions of restricted-range bird and butterfly species (defined as those species occupying a breeding range of $\leq 50,000$ km² for birds or found in ≤ 15 counties for butterflies). They then identified areas of overlap: U.S. counties that are home to restricted-range species of birds *and* butterflies. The next step was to identify the spatial distribution of “vulnerability” to human population growth and habitat loss. This was estimated by calculating an index for each state that integrated information on future population density projections, recent past changes in developed land area and urban road mileage, and undeveloped nonfederal land (as a surrogate for the amount of land available for future development).

Comparison of the distributions of restricted-range species to states with high vulnerability indices revealed “hot spots of vulnerability” — 19 counties in California, Florida, and Texas. Such information could be used to help set priorities or to sequence implementation of strategies for site or ecoregion-level conservation. Abbitt *et al.* suggest their analysis would be more robust if it integrated data on population growth and habitat loss at a finer scale of resolution, such as at the county-level, and on a wider range of taxa.

P. WWF Guide to Socioeconomic Assessments for Ecoregion Conservation

The World Wildlife Fund (WWF) has developed a guide

¹⁴ Machlis, G.E., J.E. McKendry, and D.J. Forester. 1993. *Idaho: An atlas of biodiversity*. Unpublished atlas. University of Idaho, Moscow, ID.

¹⁵ Machlis, G.E., J.E. McKendry, D.J. Forester et al. *Puget Sound biodiversity: An interactive atlas of Extended Gap Analysis*. (contact Gary Machlis, gmachlis@uidaho.edu).

¹⁶ Abbitt, R.J.F., J.M. Scott, and D.S. Wilcove. 2000. The geography of vulnerability: incorporating species geography and human development patterns into conservation planning. *Biological Conservation* 96: 169-175.

providing non-prescriptive advice to WWF projects on how to integrate “socioeconomic assessments” into WWF’s general methodology for ecoregion conservation.¹⁷ As in the Conservancy, WWF’s ecoregion conservation teams vary in how and to what extent they integrate socioeconomic analyses into their planning, actions, and measures. They rely on a mix of internal and external expertise in conducting these analyses.

WWF’s general methodology involves selecting priority ecoregions for conservation that harbor the “most outstanding and representative examples of the world’s diverse ecosystems.”¹⁸ WWF is focusing particular attention on approximately twenty six ecoregions globally. An approach similar to the Conservancy’s Site Conservation Planning is then used to establish a plan of action for each selected ecoregion. The approach integrates socioeconomic information at various stages.

First, practitioners identify a vision that sets biological priorities for the ecoregion. Implementation of this vision is influenced by socioeconomic information such as the proximity of priority areas to roads, population centers, areas of conflict or land tenure issues. Stakeholder analyses identify the range of stakeholders and stakeholder interests across an ecoregion that will influence the long-term success of conservation efforts. Analogous to TNC’s assessment of stresses and sources of stress in site conservation planning, the planning team then analyzes threats and opportunities.¹⁹ The analysis can include various approaches for estimating patterns and trends in human populations and in resource uses as well as the forces causing these projected trends. Once threats are identified, possible interventions are developed in a process like TNC’s strategy definition in site conservation planning. Finally, approaches to monitoring and evaluation assess the social in addition to biodiversity impacts of interventions.

The WWF guide offers two models for linking conservation strategies to the underlying causes of biodiversity threats and then using this framework to track conservation progress — the “pressure-state-response model” and the “driver-state-impact-response model.” The potential value of these models is their requirement that practitioners explicitly identify variables for measuring social as well as biological impacts.

Q. Human Geographic Issue Management

James Kent, Kevin Preister, and their associates take a “biosocial ecosystem” approach that considers both the human and physical ecosystems.²⁰ Through it, they delineate human geographic areas that represent relatively homogenous biosocial ecosystems in which people have a cultural, social and economic attachment to each other and to the physical environment. This internal consistency makes it possible to identify issues of importance to members of the community in order to usefully explore how these issues might be addressed.

A few principals form the foundation for this biosocial approach:

- People organize themselves on the landscape, and cultural boundaries are defined by human and natural factors (not necessarily political ones),
- The informal system with its informal networks of communication is more effective for addressing issues of concern than formal systems, and
- Locally identified issues must be dealt with first to realize tangible benefits for the community and the environment.

Initially, much of Kent and Preister’s work stemmed from assisting federal agencies in meeting the require

¹⁷ *A Guide to Socioeconomic Assessments for Ecoregion Conservation*. World Wildlife Fund. 2000. (For further information on this guide and WWF’s work contact Sheila O’Connor at sheila.oconnor@wwfus.org or Bronwen Golder at bgolder@xtra.co.nz. Copies can be obtained through TNC’s conservation planning group from Laura Valutis, lvalutis@tnc.org.)

¹⁸ Olson, D.M., et al. *The Global 200: A Representation Approach to Conserving the Earth’s Unique Ecoregions*. World Wildlife Fund. 2000. www.worldwildlife.org/global200/

¹⁹ Note that WWF uses the term “stress” to refer to the process leading to biodiversity loss or degradation and the term “pressure” to refer to the source of stress. WWF guidance further divides “pressure” into “proximate” and “ultimate” (or “root”) causes.

²⁰ Kent J.A. and K. Preister. 1999. *Methods for the development of human geographic boundaries*. James Kent Associates, June 1999; Natural Borders. 2000. www.naturalborders.com. Accessed 11/20/00. (contact James Kent at kentj@csn.net, or Kevin Preister at kevpreis@jeffnet.org); Preister, K. and J.A. Kent. 1997. Social ecology: A new pathway to watershed restoration. In J.E. Williams, M.P. Dombeck, and C.A. Woods, eds. *Watershed restoration: Principles and practices*. The American Fisheries Society, Bethesda, MD.

ments of NEPA (National Environmental Protection Act). Section 101 of NEPA states that the policy of the government is to “create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations.” They used the notion of productive harmony as a point of departure for developing their approach. They have applied this approach to a wide variety of problems involving natural resources and other issues and working with federal, state, and local government, and private organizations and businesses.

Two key processes form the core of Kent and Preister’s approach. The first is “The Discovery Process.” This process develops a description of the community from the perspective of the people who live there. They have identified seven “cultural descriptors” for portraying the social reality of a community and people’s social and economic routines, beliefs, communication networks, and important issues. These cultural descriptors include publics (e.g., farmers, ranchers, youth, business owners), informal networks, work routines, support services, recreation activities, and geographic features. Data for these cultural descriptors are collected using secondary data and informally interviewing and interacting with members of the community. They have developed a series of questions and key information needs for each cultural descriptor.

Results of the Discovery Process can be used to produce human geographic maps. These maps show boundaries between cultural areas. Different scales of such areas are designated as neighborhood, human, social, cultural, or global resource units. Each resource unit is nested completely within the unit at the next higher scale, much as is done with ecological systems. Individuals operate and make decisions within those boundaries.

Human geographic maps and their underlying data can be used to develop appropriate social boundaries for natural resource activities, because they illustrate areas where people are likely to work together on shared issues. They also allow decisions to be based on how people identify with and use the land and resources.

Human geographic maps, along with The Discovery Process, provide a rationale for expanding natural resources management activities to address such issues as community health and well being.

The second key process is “Issue Management,” a process used to identify issues in a community and to set priorities for action. Three different levels of issues exist: emerging, existing, and disruptive. Emerging issues, those just becoming apparent, are the easiest to deal with and provide opportunities to make real progress on solving problems. Existing issues may prove to be more challenging and require more time and effort -- particularly if they have become intractable or deeply embedded in the community. Disruptive issues are those which have grown beyond a community’s ability to address them and are being dealt with at higher levels or outside of the community. Examples of disruptive issues might include pollution of a local lake or logging practices. Such issues can be divisive. Solving problems at the emerging issue stage increases community resilience and the ability to address additional concerns.

Issue management is an ongoing process, and organizations working with communities must be able to monitor progress and adapt to changes. The process is similar to that used in “adaptive management” of ecosystems, and was developed, in part, for use by federal agencies implementing ecosystem management.

The processes designed by Kent and Preister were used to better understand the community in the Applegate Valley in Oregon and make recommendations for community involvement in forest management and for diversifying the economy and improving the community consistent with ecosystem management.²¹ The 1970’s saw great social and economic change in the valley as outsiders moved in, land was broken into smaller parcels, agricultural operations became more costly, and the economic base changed. By examining existing records and talking widely with residents, Preister and colleagues were able to identify key publics in the Valley and to distinguish five “neighborhoods,” each with its own sociocultural characteristics and unique emerging issues. From this analysis came nine action sets of

²¹ Preister, K. 1994. *Words into action: A community assessment of the Applegate Valley*. The Rogue Institute for Ecology and the Environment. May 1994.

community-based options for new economic opportunities. It provided a starting point for further activity as well as a baseline to monitor future social and economic change and the impacts of specific actions.

R. Social Dynamics of Watershed Planning

Chris Lant and colleagues at the University of Southern Illinois are building a spatial decision support system (SDSS) that will examine the impacts of policy options on land use in the Cache River area of southern Illinois. The USDA Water and Watersheds Program is funding this work. The Nature Conservancy's Ecosystem Research Program funded the team's preliminary work on policy impacts on agricultural decision making.

The researchers are building a spatially referenced modeling system in an effort to evaluate cause and effect. The system will predict how changes in political or economic factors, such as government-funded conservation programs or prices for certain crops or farm inputs, affect changes in land use. Two approaches are being used to make predictions. One is based on survey responses of producers to questions about how they would react to various policy proposals. The other is based on maximizing profit given the distribution of soil type and various environmental constraints.

For any given proposed policy option, the model will calculate and prepare a predicted land use map. Data from the map can then be fed into models that estimate impacts on various parameters, for example, a hydrologic model that predicts water quality or sediment rates. Another possibility would be ecological models that predict other parameters of conservation concern, such as biological integrity. Ultimately this approach could be used to project and compare the outcomes of competing policy options for accomplishing specific conservation goals.

