Planning for Conservation Priorities Across Community Values:
An Evaluation of the Conservation Priority Setting Methodology as Developed by
Perlman and Western Lands and Communities

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Abstract

In 2005, Dan Perlman, Associate Professor of Biology at Brandeis University, began piloting a values-driven approach to conservation priority setting and planning in partnership with Western Lands and Communities, a joint venture of the Lincoln Institute of Land Policy and the Sonoran Institute. As a conservation biologist, Perlman recognized a need for planning that accounted for data limitations and allowed practitioners to compare and prioritize across distinct conservation values.

Between 2006 and 2009, Perlman and his colleagues at the Sonoran Institute piloted the Conservation Priority Setting Methodology (CPSM) with three Western open space preservation organizations: the Prickly Pear Land Trust in Helena, Montana; the Montezuma Land Conservancy in Cortez, Colorado; and the Morongo Basin Open Space Group in Twentynine Palms, California. This working paper summarizes that conservation priority setting approach and evaluates its success in light of these three pilot applications. In addition, a review of the current field of conservation planning is provided along with suggestions regarding CPSM's place within this larger field and its potential for future implementation.

About the Author

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Introduction: The Case for a Values-Driven Approach

Over the last 20 years, conservation efforts have adjusted to a continuously changing set of limiting factors. Prior to the early 1990s, many conservationists were committed to working towards the conservation ideal that the U.S. Endangered Species Act epitomizes—the protection of all organisms with the exception of insect pests (Perlman and Adelson 1997).

As the twentieth century came to a close, both scholars and practitioners recognized that operating under this ideal was no longer feasible or strategic. Even as more sophisticated technology and environmental measures were designed and implemented, they were outpaced by the challenges caused by growing urban populations and climate change. These escalating pressures were further compounded by the limited funding available to conservation efforts. In response, conservationists adapted. They sought and developed tools and frameworks to optimize their investment of finite resources.

This shift towards a more strategic allocation of limited resources has transformed conservation practices and especially, the field of conservation planning. By 2000, many conservationists had turned to data-driven planning techniques such as GIS site-selection algorithms to guide their work, believing that a rigorously scientific practice would yield the most precise and beneficial results (Margules and Pressey 2000). Although those methodologies were intended to make planning more systematic and defensible, biodiversity site-selection algorithms like Marxan[1] neglected to account for three of their own limitations: incomplete data, insufficient funding, and incommensurable values.[2]

In contrast with the seemingly exact results they produced, site-selection algorithms relied on data that was fundamentally incomplete. No environmental assessment could fully capture nature's complexities or provide equal levels of information for every species, plot of land, and ecosystem even in a single clearly circumscribed region. In addition, early site-selection algorithms relied almost entirely on analyzing species and ecosystems in terms of presence/absence or population size. Values like clean water and scenic views were not considered as factors in establishing conservation priorities, regardless of their importance to communities and conservation stakeholders. Without a technique to evaluate values as distinct as

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[1] Marxan is a systematic conservation planning tool developed by Ian Ball and Hugh Possingham and first introduced in 2000. Initially, Ball offered the technology as SPEXAN (Spatially Explicit Annealing), a site-selection algorithm for reserve design. Marxan is a modified version of SPEXAN for marine ecosystems, originally intended to support decision-making and planning in the Great Barrier Reef (The University of Queensland).

[2] Personal interviews with Dan Perlman conducted by Nicole Schneidman. February 1, 6, and 25 and May 10, 2013.

[3] Both the Prickly Pear Land Trust and Montezuma Land Conservancy are land trusts. The Morongo Basin Open
[2] Personal interviews with Dan Perlman conducted by Nicole Schneidman. February 1, 6, and 25 and May 10, 2013.

apples and oranges, practices focused, in part by design and in part by default, on species richness.

Conservation priority setting, in a general sense, can be employed in a variety of settings. The process can act as a guide to planning a strategic acquisition strategy for land trusts, and other open space conservation groups. It can also be used as an organizing process to solicit broad level community input into a conservation planning process carried out by conservation interests, municipalities, or other entities. It can also inform the comprehensive planning for local governments by providing a framework for land use planning and development for a particular geography.

Starting in 2005, Dan Perlman, Associate of Professor of Biology at Brandeis University, began piloting the conservation priority setting methodology (CPSM) in partnership with Western Lands and Communities, a joint venture of the Lincoln Institute of Land Policy and Sonoran Institute. CPSM was designed to improve upon biodiversity-driven conservation planning by addressing its three shortcomings. Perlman set out to create a process that would "help conservation groups more effectively put their conservation values and goals into practice in their day-to-day and long-term strategic decision-making" (Perlman 2009, 1). Unlike its algorithmic predecessors, CPSM was structured to be values-driven and data-supported rather than data-driven. It acknowledged the limitations of the available data and funding for environmental efforts and offered a process for guiding diverse interests in setting conservation priorities based on context-specific values.

Between 2006 and 2009, CPSM was piloted by three open space preservation organizations selected by the Sonoran Institute: the Prickly Pear Land Trust in Helena, Montana; the Montezuma Land Conservancy in Cortez, Colorado; and the Morongo Basin Open Space Group in Twentynine Palms, California.[3] This working paper will summarize the result of these pilot applications, evaluate CPSM in light of its pilots, and consider the methodology's place within the current field of conservation planning.

The specific goals and objectives for this working paper are to:

1. Trace the development of CPSM, particularly its sources of inspiration.

2. Review CPSM's facilitated approach to establishing conservation priorities by developing a decision-making framework.

3. Evaluate the contributions of CPSM and its refinement over the course of its three pilot studies.

4. Review the current field of conservation planning and if/how leading planning methodologies engage in values-driven planning.

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[3] Both the Prickly Pear Land Trust and Montezuma Land Conservancy are land trusts. The Morongo Basin Open Space Group is however, as its name implies, a partnership of over twenty organizations and agencies engaged with open space issues in the Morongo Basin. Throughout this working paper, these entities will be referenced as the pilots' "clients."

5. Consider CPSM's place amidst this larger field and offering suggestions for how the methodology can be improved and implemented in the future.

The length of time since the first CPSM workshop, staff changes, and the distinct approach applied with that pilot produced little available information regarding the first CPSM workshop with the Prickly Pear Land Trust, not to mention if, or how, it contributed to the development of a conservation plan. As a result, this paper's evaluation will primarily consider CPSM in terms of its second and third pilots with the Montezuma Land Conservancy and Morongo Basin Open Space Group.

Conservation Priority Setting's Sources of Inspiration

Although CPSM would ultimately be piloted by three Western land organizations in the United States, the inspiration for the methodology traces to India. In 1998, Dan Perlman, then Lecturer in Environmental Science and Public Policy at Harvard University, observed a conservation priority-setting workshop in India. The workshop utilized the latest practices in conservation planning. One of the sessions at the workshop showcased a prioritization algorithm that ranked bird species across India by assigning each species an exact score, which was calculated by summing indices of each species' geographic and taxonomic rarity.[4]

Perlman was struck by the problematic nature of this approach. He recognized that measurements based on two unrelated scales, in this case geography and taxonomy, could not simply be merged into a final score to effectively evaluate a species and its role in a landscape. Furthermore, he was concerned that the exercise did not acknowledge the limitations of the data upon which its prioritization relied. Although the workshop made use of the best available data on India's wildlife, this information, like any data gathered on natural resources through human means, was incomplete. Perlman did not take issue with the workshop's use of this data, but rather the degree to which the process ignored the data's insufficiencies. Rather than attempting to account for gaps, the priority-setting workshop treated its data as if it were comprehensive and absolute.

Perlman's experience in India reaffirmed the questions and themes he had previously examined with Glenn Adelson in *Biodiversity: Exploring Values and Priorities in Conservation*. In their text, Perlman and Adelson posed the question, "To what extent are we thinking critically, and employing clearly spelled-out criteria" in response to the "crisis" facing conservation (1997, 6)? Step-by-step, they deconstructed assumptions in biodiversity-driven planning and acknowledged the ambiguities latent in the field, even the degree to which terms such as *biodiversity*, *value,* and *ecosystem* could not be exactly defined. Instead, they demonstrated that biodiversity is "a value-laden set of concepts that is determined by the ideas, goals, biases, and interests of those employing the term" (Perlman and Adelson 1997, 10).

The crux of the challenge that Perlman and Adelson identified was the extent to which the values that influence how biodiversity is evaluated and protected are not acknowledged or examined in

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[4] Dan Perlman (see footnote 2).

conservation planning. They advocated for planning that articulated underlying values and considered if/how these values affect the analysis of organisms, ecosystems, and other biological elements. In so doing, Perlman and Adelson argued for planning that considers the broad range of forms that community values can assume:

> "it is only with the values and views of many different biologists, farmers, social scientists, politicians, business people, chemists, artists, nature healers and others that we can truly appreciate all that biodiversity is and all that biodiversity can offer to humans" (1997, 11).

Following the 1998 workshop in India, Perlman was inspired to continue exploring conservation priority setting scholarship and practices, even while preparing for the publication of *Practical Ecology for Planners, Developers, and Citizens* (2004) with Jeffrey Milder by the Lincoln Institute of Land Policy. Although *Practical Ecology* primarily served as an introduction to ecologically-driven planning approaches like green infrastructure, it was grounded in the following premise:

> "conservation planning must be construed broadly to include not only the preservation of nature in relatively pristine reserves but also the integration of conservation values into landscapes that are influenced and even dominated by humans" (Perlman and Milder 2004, 129).

In part, Perlman and Milder suggested these values could be accounted for by considering the "economic, legal, real estate, regulatory, political, and public opinions" that influence decision-making (2004, 129). However, Perlman and Milder recognized planning could not simply be "reduced to a recipe" (2004, 217). *Practical Ecology* argued that the range and complexity of conservation values demands context-specific planning and the careful evaluation of tradeoffs. According to Perlman and Milder, effective planning requires practitioners to wrestle with uncertainties and site-specific challenges while striving to balance ecological interests with other potentially "compelling" objectives (2004, 217).

Following the 2004 publication of *Practical Ecology for Planners, Developers, and Citizens*, Dan Perlman began leading a series of workshops, with the Lincoln Institute of Land Policy, that focused on the themes of the book. Recognizing an opportunity to offer similar workshops to support Western land trusts, Western Lands and Communities commissioned Perlman to offer a *Practical Ecology* workshop in 2006 for the Prickly Pear Land Trust (PPLT) in Helena, Montana.[5] Upon becoming familiar with the PPLT's mission and needs, Perlman adapted his approach so that it addressed a critical challenge facing the budding operation: how to prioritize so as to optimize the use of limited resources.[6]

In preparation for the workshop, Perlman began developing a facilitated process to guide conservationists in articulating and prioritizing their values that accounted for the three major limitations facing planning: insufficient funding, incomplete data, and incommensurable values.

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[5] Phone interview with Andy Laurenzi conducted by Nicole Schneidman. December 3, 2012.

[6] Dan Perlman (see footnote 2).

He resolved to "go out there, learn what we can, use the data we do have, and listen to what people on the ground are valuing".[7] Over the course of a few months, Perlman and Sonoran Institute staff members, Andy Laurenzi and Tim Davis, worked with the PPLT staff to prepare for the workshop. Even with the time constraints they faced, the 2006 pilot was well-received and provided Perlman with the first-hand experience necessary to hone his approach.

Following the PPLT workshop, Perlman was connected with the Sonoran Institute's Research Manager John DiBari and Program Director Marjo Curgus. Together, the three refined the PPLT workshop's process, specifically to improve its structure for facilitating public discussion and using GIS analysis to establish priorities. This improved approach became Perlman's Conservation Priority Setting. The revised methodology was first implemented in 2008 with the Montezuma Land Conservancy Land Trust (MLC) in Colorado. Minimal adjustments were made to improve the efficiency of the process before it was piloted for a third and final time by the Morongo Basin Open Space Group (MBOSG) in California in 2009.[8]

Conservation Priority Setting's Terminology and Framework

Conservation priority setting, as a general practice, is a process that recognizes the limitations of resources, the complexity of the available data, and the diverse needs and concerns that must be taken into account in conservation planning. It is a fundamentally collaborative endeavor that aims to recognize, honor, and preserve the places that are most representative of shared values.

At the heart of conservation priority setting is the development of a decision-guiding framework called a *values matrix*. A values matrix is an organizing structure that allows practitioners to articulate and defend what is most important to them. CPSM's process for constructing values matrices has two phases: articulation and calibration. In the articulation phase, practitioners identify the categories and characteristics that compose their values by gradually moving from considering the broad to the specific. Through calibration, these categories and characteristics become the basis for comparing otherwise incommensurable values as practitioners evaluate side-by-side how the elements that make up their values compare to one another.
CPSM's values matrices are based on a hierarchy composed of three levels:

- *conservation value: the overarching important value, similar to those that get expressed in a mission statement*

- *feature: important aspects of each conservation value; the dimensions that constitute a conservation value*

- *particular: the specific details, whether in terms of location or type, a feature assumes in connection with a place or region[9]*

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[7] Dan Perlman (see footnote 2).

[8] Dan Perlman (see footnote 2).

[9] Dan Perlman (see footnote 2).

The hierarchical relationship between these three terms is illustrated by the vertical organization of a values matrix in figure 1.

Figure 1: Illustration of the Hierarchical Relationship between Elements of a Values Matrix

CONSERVATION VALUE			
Feature	**Feature**	**Feature**	**Feature**
Particular	Particular	Particular	Particular
Particular	Particular	Particular	Particular
Particular	Particular	Particular	Particular

Source: Sonoran Institute

As illustrated by figure 1, conservation values are analyzed by considering the features that compose them, which are in turn broken down into particulars. Once a values matrix is finalized, conservationists can use it to analyze whether and how a potential project fulfills a conservation value by working through all three of a matrix's layers.

Conservation Value

The broadest level of the CPSM hierarchy is the conservation value. Conservation values are the concepts that inspire and focus an organization or group of stakeholders. They are "the preferences, motivations, and belief systems that human beings use in assessing the world" (Perlman and Adelson 1997, 39). They answer the question, *what is most important to an organization's mission?* Examples of conservation values include natural resources, scenic views, and open space.

In the case of organizations with well-defined purposes, conservation values can be generally identified as the driving forces in a mission statement. For example, the Montezuma Land Conservancy's mission states, "Montezuma Land Conservancy exists to permanently protect important open lands in partnership with landowners, in order to conserve agricultural, natural and scenic open space resources…" (Montezuma Land Conservancy). Here, MLC's central conservation values are "agricultural, natural, and scenic open space resources" (Montezuma Land Conservancy).

During the CPSM pilots, each client identified and examined at least three conservation values. Together, the three pilots analyzed a total of twelve distinct conservation values including natural resources, scenic, community views and treasures, and water (Figure 2).

Figure 2: The Conservation Values Examined by the CPSM Pilots

Prickly Pear Land Trust	Montezuma Land Conservancy	Morongo Basin Open Space Group

• Wildlife
• Connectivity
• Viewshed
• Water
	• Natural Resources
	  • Species
	  • Ecosystems
	• Scenic Open Space
	• Agriculture
		• Wildlife Connectivity and Habitat
		• Community Separators
		• Community Views and Treasures
		• National Park Mission
		• Marine Corps Air Ground Combat Center Mission

Source: Sonoran Institute

Feature

Features are the "important aspects of each conservation value".[10] They can be thought of as the dimensions of a value, the categories that must be considered to determine if and to what degree a project fulfills a specific value. Features answer the question, *what kinds of information does an evaluator need to know to determine if and to what extent a project represents a value?*

For example, in considering whether a potential project addressed the MLC's conservation value of agriculture, MLC's supporters, staff, and board members identified "water rights" and "agricultural soils" as key features (Montezuma Land Conservancy 2011). That is, the degree to which water rights and agricultural soils are present in a project is an indicator of if/how much that project fulfills agriculture as a conservation value.

Particular

Particulars are the third, as well as the most precise and concrete level of Perlman's CPSM hierarchy. They are "the specific details of a feature that are connected to a place or region".[11] Particulars depict the range of forms that a potential project can assume in terms of one feature within a specific study area. If features are thought of as the dimensions of a value, particulars are like the points along a specific dimension. Every feature in a CPSM values matrix must have at least two particulars.

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[10] Dan Perlman (see footnote 2).

[11] Dan Perlman (see footnote 2).

In CPSM, particulars are defined by whether their respective features are continuous or categorical (Perlman 2008a). Continuous features are typically numeric and include things like the area of a site or distance from a park boundary. For example, in considering the continuous feature "proximity to Joshua Tree National Park," the MBOSG identified the following particulars: "contiguous to park," "less than 1 mile from the park," "1–2 miles from park," and "more than two miles from park" (Weigel and Ellis 2010). Categorical features consider features in terms of types. For example, in analyzing the feature "soil quality," MLC identified its particulars as "irrigated—prime," "poor prime," "fair non-prime," and "unsuitable" (Montezuma Land Conservancy 2011).

In CPSM, *conservation value, feature,* and *particular* are intentionally defined loosely to ensure they can be used to categorize and compare a range of subjects. As evidenced by their descriptions, these terms' primary function is to establish a hierarchy of categories, moving from the most broad (*conservation value*) to the most specific (*particular*) (Figure 3).

Figure 3: Questions to Define the Three Levels of CPSM

Conservation Value	
What is most important to an organizations' mission?	Agriculture (e.g.)

Feature	
What types of information must be considered to determine if/how a project fulfills a value?	Soil Quality (e.g.)

Particular	
What forms can a project take in terms of one feature?	Irrigated—prime; Poor prime; Fair non-prime; Unsuitable (e.g.)
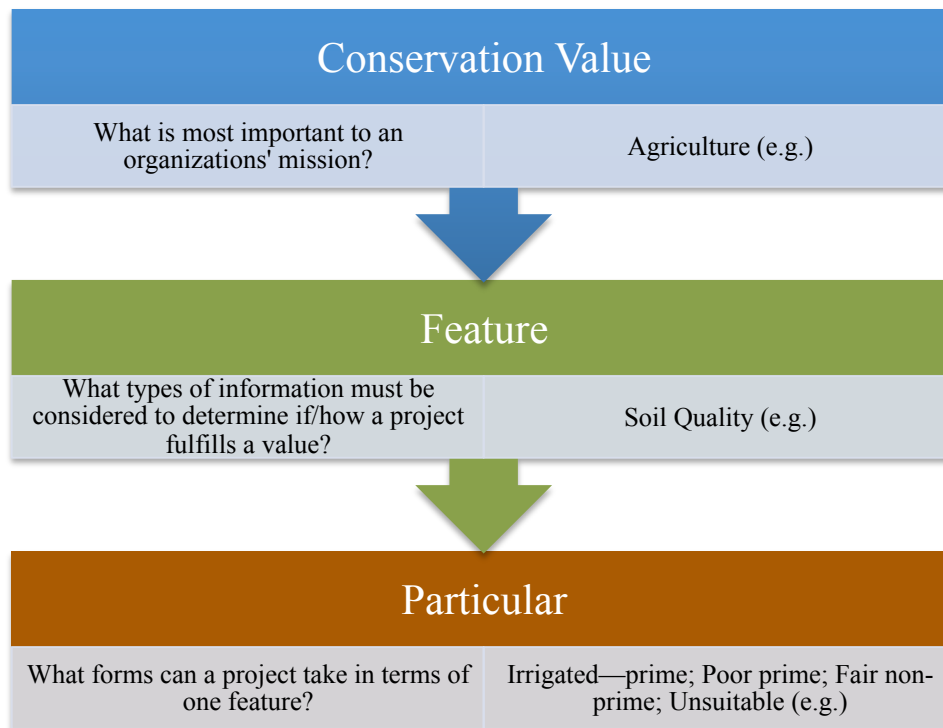
Source: Sonoran Institute

Developing a Values Matrix

By constructing a set of CPSM values matrices, practitioners identify the building blocks that compose their values. These building blocks in turn become the basis for comparing otherwise abstract values, even those as distinct as "Wildlife Habitat and Connectivity" and "the mission of the Marine Corps Air Ground Combat Center" in the case of the MBOSG (Weigel, Schafer, and Curgus 2012, 18). CPSM's process for developing values matrices requires three steps, as described and illustrated below:

1. Identify Key Items:

   a) Conservation Values:
      Review an organization's mission statement and consult its staff and board members to identify the beliefs, concerns, and/or types of resources that are the primary focus of that organization. Once values are approved, they become the top level of a values matrix.

   b) Features:
      Identify the features for each conservation value by brainstorming the dimensions or categories of information that must be considered to evaluate if/how a property or potential project fulfills that value (Figure 4).

Figure 4: An Example of the Value and Feature Levels of a Value Matrix

Scenic Open Space				
Public Access to View	How much of the viewshed from a public access point depends on a conservation easement?	Adjacency to protected open space	Quality of View (potential or existing)	Contribution to the diversity of views protected, or rarity of view

(Montezuma Land Conservancy 2011, 84)

c) Particulars:
Identify the particulars for each feature by brainstorming the forms, continuous or categorical, that a feature can assume in the study area (Figure 5).

Figure 5: The Brainstormed Particulars of a Feature of a Values Matrix

Public Access to View
Viewed from a federally designated scenic byway –OR- a state highway – OR- a national park road
Inside park property (full public access to scenic view)
Viewed from a county road, -OR- a publicly accessible trail –OR- BLM/FS/State road

Not listed in any order; (Montezuma Land Conservancy 2011, 84)

2. Prioritize and Calibrate within Conservation Values:

    a) Rank order particulars:
        Within a feature, arrange particulars in order of worth, with the most important particular placed in the cell immediately below a feature's title (Figure 6).

Figure 6: Ranked Particulars of a Feature of a Values Matrix

Public Access to View
Viewed from: a federally designated scenic byway –OR- a state highway –OR- a national park road
Viewed from: a county road –OR- a publicly accessible –OR- a BLM/FS/State road
Inside park property (full public access to scenic view)

(Montezuma Land Conservancy 2011, 84)

    b) Grade particulars:
        Along the left side of the matrix, add a column listing the following grades from high to low: A+, A, B, C, Neutral, and F. These grades are used to indicate the worth of a particular within a feature.

        An A+ is the equivalent of a "trump card," a characteristic that is so desirable that if a potential project or property has it, it is immediately designated as a high priority project that demands action. Dan Perlman describes an A+ as being assigned to those few features that if present, "merit dropping everything and starting to talk with people no matter what else is going on".[12]

        A grade of "A" indicates very significant importance to meeting an organization's conservation goals. A "B" is still quite important, but worth only approximately half as much as an "A." Similarly, a "C" designates a positive particular is worth only about half as much as a "B" and a quarter as much as an "A." A "Neutral" grade signifies that a particular is neither a positive or negative characteristic, but simply

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[12] Dan Perlman (see footnote 2).

one that practitioners should be aware of. And, finally, an "F" represents a negative characteristic that's presence significantly damages the viability or quality of a project.

Particulars are rearranged to ensure they are assigned to the appropriate grade's row within a matrix (Figure 7). It is not necessary for every feature to have a particular for every grade on a matrix. A+ should be used sparingly, with no more than one or two per matrix (unless there are in fact several extraordinary particulars). Some features may also not have a particular for A, B, and C; and multiple particulars assigned to the same grade, indicating equal levels of importance.

Figure 7: Graded Particulars of One Feature of a Values Matrix

Grades	Public Access to View
A+	
A	Viewed from a federally designated scenic byway –OR- a state highway – OR- a national park road
B	Viewed from: a county road, -OR- a publicly accessible trail –OR- a BLM/FS/State road
C	Inside park property (full public access to scenic view)
Neutral	
F	

(Montezuma Land Conservancy 2011, 84)

c) Prioritize and calibrate grades between features:
With each feature's particulars prioritized and graded, *calibration* begins. Calibrating involves establishing rough equivalencies across features such that an "A" particular under one feature is roughly equal in worth to the "A" particulars of a matrix's other features.

In considering how particulars relate to one another, it is also necessary for practitioners to reflect on how their features compare to each other. Discussion may reveal that one feature is more important than another in fulfilling a conservation

value. To reflect varying levels of worth amongst a matrix's features, it may be necessary for entire columns of particulars to be shifted up or down to ensure they are appropriately graded and calibrated (Figure 8).

Figure 8: Particulars of a Values Matrix Calibrated across Three Features

Scenic Open Space			
Features	*Public Access* to View	**How much of the viewshed from public access depends on CE?**	**Adjacency**
A+			
A	Viewed from a federally designated scenic byway –OR- a state highway –OR- a national park road	100% of view	Wilderness areas, national park, BLM-WSA, BLM-RNA, established CE with scenic purpose
B	Viewed from: a county road, -OR- a publicly accessible trail –OR- a BLM/FS/State road	$\geq$ 50% of view	Public land multiple use –OR- both BLM and national forest –OR- potential CEs
C	Inside property (public access)	$\leq$ 25% of view	
Neutral			Development or lands with mining or oil & gas production
F			Utility corridor

(Montezuma Land Conservancy 2011, 84)

3. Calibrate among Conservation Values:
Once the values matrices are individually calibrated by feature, the group of matrices can be compared across conservation values. With this final step of matrix development, CPSM achieves one of its three central goals by enabling the evaluation of otherwise incommensurable values. As in the case with calibration at the feature level, the goal of this step is to arrive at a point where the "A" particular of one conservation value's matrix is roughly equivalent to an "A" particular of another value. It may be necessary to add grade levels to the matrices (e.g. "D" and "E") to reflect that one value's particulars are more important than others.

These three steps to developing and calibrating values matrices in CPSM do not proceed in a strictly linear fashion. Rather, CPSM is designed to be an iterative process. Within each of CPSM's three steps, real-life scenarios are considered to force practitioners to discard assumptions and defend their priorities until consensus is reached.

Developing and calibrating values matrices is the central activity of CPSM. However, as a methodology, CPSM extends beyond simply designing values matrices. It offers a facilitated process for guiding practitioners through the many complexities of planning, from reflecting on what a client intends to accomplish by creating a conservation plan to identifying a focused set of priorities based on a balance of GIS analysis and community input.

Site Selection

As a facilitated process, CPSM begins with a conservation organization's staff and outside CPSM facilitators jointly considering whether the methodology is an appropriate fit for that entity's planning needs. Over the course of the three CPSM pilots, a better understanding of the appropriate audience for the methodology was developed.[13] By the close of the MBOSG workshop, it was clear that clients considering using CPSM should meet the following criteria:

- **Moderate GIS Capacity:**
  - Access to current GIS software such as Esri's ArcGIS
  - At least one trained staff member who is able to compile and manipulate data-sets from a range of sources and complete moderate to complex overlay analysis

- **Dedicated Lead Staff:**
  A full-time staff member who is familiar with conservation planning and can devote between 10 and 20 percent of his or her time for 12 to 18 months to oversee CPSM.

- **Clear Mission Statement:**
  An up-to-date mission statement that clearly identifies an organization's or group of stakeholders' areas of focus and conservation values.

- **Strong Local Network:**
  An established rapport with a range of local stakeholders is essential if this process is intended to guide a large-scale community engagement effort on conservation planning. A client should have the relationships and capacity to ensure a wide range of representative stakeholder groups from the study area is engaged with the planning.[14]

- **Familiarity with Relevant Conservation Plans:**
  Basic understanding of the intent and structure of the conservation plans of organizations with similar missions or operating in the same region. It is essential that any client considering conservation planning appreciates the investment the process will require and what it will ultimately produce. Clients may also need to be fully aware of development plans, comprehensive plans or other land use planning policies and efforts by local governments which may impact conservation planning in their region. In addition, clients

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[13] Dan Perlman (see footnote 2).

[14] Dan Perlman (see footnote 2).

at the outset of planning should consider the kinds of activities, such as fundraising, that will be required to implement any type of conservation strategy (or to even undergo the process of developing the conservation priorities through CPSM).

As with any type of planning, a potential client must carefully consider options, needs, and resources before determining if CPSM is a suitable match.

Outside Facilitation

CPSM was designed as a facilitated process and specifically one that is intended to be conducted by an outside expert. All three of the CPSM pilot applications in the Intermountain West were led by at least one outside facilitator who was intimately familiar with the methodology.[15] In contrast to local participants whose familiarity with a landscape may dispose them to potential bias, outside facilitators have the advantage of assumed neutrality. This neutrality allows them to more easily guide the challenging, and at times, emotional discussions that values analysis and calibration require.

Outside facilitators can also further legitimize planning. The degree to which facilitators can lend planning efforts additional credibility corresponds to if/how they demonstrate their role as "conservation communicators," outsiders with a genuine interest in a landscape who are willing to listen and "reflect back" a community's concerns and beliefs.[16] In the case of the CPSM pilots, many of the participants interviewed for this evaluation[17] noted they were more excited about the process when they were informed of their facilitators' professional backgrounds. Even five years after CPSM's pilots, 10 percent of interviewed participants acknowledged they approached the planning with greater respect and enthusiasm because of outside involvement.[18]

Workshop Preparations and Scoping

Once a client commits to using CPSM to guide its conservation planning and outside facilitators are in place, CPSM proceeds with a three to six month preparation phase. During this phase, preparations include three concurrent activities:

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[15] Dan Perlman was present for all three pilot workshops. The PPLT workshop was led by Perlman alone. The MLC workshop was led by four facilitators and the MBOSG was led by five.

[16] Phone interview with Ole Amundsen conducted by Nicole Schneidman. January 8, 2013.

[17] For a description of the evaluation's methodology and interview process, please see the section in this paper titled Evaluation of Conservation Priority Setting Methodology. A copy of the interview guide used for the evaluation is included in Appendix D.

[18] This is especially noteworthy considering that with both MLC and MBOSG, staff and board members recognized the potential for outsider involvement to be received poorly by local community members protective of their interests and suspicious of those who were not familiar with the complexities of their communities. The success of the CPSM' pilots in terms of the enthusiastic reception outside facilitators encountered is in large part a credit to the individual facilitators, the preparations they undertook to become familiar with the study areas, and especially, their eagerness to listen to local community members.

- **Community Outreach:**
  The client generates interest in the upcoming two-day CPSM workshop to ensure a diverse range of representative stakeholder groups attends the workshop.

- **Information Exchange and Facilitated Internal Reflection**:
  Guided by outside facilitators, the client's staff review their mission and role in relation to their landscape and community and give facilitators access to internal strategy and program information. Staff should strive to become familiar with CPSM 's terminology and major steps as a structure for their reflection.

- **Outside Facilitators' Scoping Trip**:
  Outside facilitators use a week-long scoping trip to become familiar with the clients and their study area, local conservation interests and concerns, and the region's ecological, historical, cultural, and socioeconomic background.[19]

Community Outreach

In preparation for a CPSM workshop, it is essential that the client(s) engage in community outreach to generate local buy-in for their planning and especially, the CPSM public workshop and ongoing priority setting process that follows the workshop.[20] By regularly promoting an upcoming CPSM workshop through meeting announcements, flyers, newsletter, email, radio ads, etc., a client significantly improves the likelihood that a workshop will be well attended and include participants who represent the range of issues and perspectives at play in their community.

Since a major part of the methodology relies on consensus building, CPSM is most effective when a client already has a strong network of relationships to draw upon. CPSM strengthens these existing relationships and allows a client to build a base of supporters for their planning even before a conservation plan is finalized.

Information Exchange and Facilitated Internal Reflection

For at least six months prior to a CPSM workshop, outside facilitators are in contact with a client's staff to exchange (1) information regarding CPSM's general process and past success; (2) the client's mission, service area, history, and conservation values; and (3) environmental, social and historical factors that have or will likely influence conservation activities in the region.

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[19] Dan Perlman (see footnote 2).

[20] Dan Perlman (see footnote 2).

Information that facilitators review prior to a CPSM workshop includes:

- Client's mission statement, strategic plan, history, etc.
- Information on conservation and land-use issues and controversies in the region.
- Information on key conservation and land-use organizations and individuals in the region.
- Any maps of the client's study area.
- GIS layers for the study area that can be used during workshop for illustrative purposes such as roads, property ownership, prominent species, etc.

Information that is shared with a client by facilitators in advance of a CPSM workshop includes:

The basic agenda of a CPSM workshop, along with a clear description of what is entailed in preparing for and running such a workshop.

- Biographies of any participating outside facilitators.
- Sample values matrices with explanations regarding their development and calibration.

An example of a finalized conservation plan produced using CPSM by a previous client.

For the client, this reflection and orientation doesn't require an extensive time commitment. Prior to a CPSM workshop, a client's GIS expert will need to dedicate one to two weeks to compiling basic GIS layers such as roads and land ownership as well as a handful of example layers that can be used during the workshop to illustrate values-driven overlay analysis. In addition, a senior staff member, likely the individual tasked with overseeing CPSM, should plan to commit at least a week to a week-and-a-half to become familiar with CPSM's major steps and orient outside facilitators.[21]

Outside Facilitators' Scoping Trip

In the months leading up to a CPSM workshop, outside facilitators use conversations with a client's staff, original research, and GIS analysis to become familiar with that client's service area. These preparations culminate with a five to seven-day scoping trip. As CPSM was refined, these scoping trips were lengthened to allow facilitators further time to tour a landscape, meet with client's staff, and interview community members.[22]

During his scoping trips for the CPSM pilots, Dan Perlman captured photos that ultimately made his opening presentations for the MLC and MBOSG workshops particularly effective. As an outside expert whose attitude and images communicated clear enthusiasm, Perlman not only quickly won the trust of both workshops' participants, but also enabled them to view their surroundings with fresh eyes. Perlman presented original photography that illustrated the special and scenic nature of the region and forced participants to examine elements of their surroundings out of their normal context. In the case of the MBOSG, participants were particularly struck by a

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[21] Dan Perlman (see footnote 2).

[22] Dan Perlman (see footnote 2).

beautiful image of a parcel of untouched Joshua trees. When placed within its larger context through a 360-degree photograph, Perlman revealed this parcel was surprisingly next door to a local Home Depot.[23][24]

Scoping trips also allow outside facilitators to lead a workshop primer approximately two weeks to a month prior to the CPSM workshop. This primer is an intensive session with a small group of committed community members, such as the client's staff, board members, and representatives from partner organizations. Ideally, this group should represent, on a smaller scale, the range of interests that will ultimately participate in the CPSM workshop.

A workshop primer serves two purposes. It acts as a listening session during which facilitators can gain a more in-depth understanding of local values and concerns. Equally important, it offers an opportunity to introduce soon-to-be workshop participants to CPSM's terms and approach. If time permits, the first steps of CPSM's three-step process for creating a values matrix can begin during a workshop primer. A client's conservation values can be discussed to verify that they are the appropriate topics for concentrating the subsequent planning. Once a client's conservation values are confirmed, brainstorming can begin to identify those values' features. By completing these first steps during a workshop primer, it is more likely that a client's CPSM workshop will successfully close with well-calibrated values matrices in place.

Facilitated Workshop

The central activity of CPSM's facilitated process is a workshop during which outside facilitators guide a public discussion to analyze and articulate a client's conservation values and use them to set organizational priorities. The majority of the workshop is dedicated to working through CPSM's three-step process for creating values matrices. Here is an outline of a two day workshop that involves members of the public:

Day 1: Setting the Stage and Values Articulation

"Setting the Stage" Opening Remarks

Following introductions, a CPSM workshop begins with an outside facilitator using the first hour to offer a "Setting the Stage: Geography and Values" presentation (see Appendix A). This presentation provides an overview of client's service area and key conservation challenges and opportunities. These opening remarks set the tone for the remainder of the workshop and are critical for an outside facilitator to establish his or her role as conservation communicator. Sixty percent of participants interviewed from the MLC and MBOSG identified this opening presentation as the best example of what outsider facilitators achieved through CPSM.

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[23] This use of photography as both a means of celebrating a local landscape and guiding practitioners in viewing their landscape in a new light epitomizes the role of conservation communicator that outsider facilitators can assume in Conservation Priority Setting. Their role is not one of expert lecturer, but rather that of informed listener who assists communities in articulating their priorities and "reflecting back" the values and ideas that participants may have trouble recognizing because their lives are immersed in them every day.

[24] Personal interview with Marlana Brown conducted by Nicole Schneidman. January 16, 2013.

Following the "Setting the Stage" presentation, a CPSM workshop continues with a facilitator introducing the concepts and terms behind CPSM. CPSM is described as a process of moving from "broad to fine [in identifying] what is important" followed by moving "in reverse, from fine to broad" to analyze and prioritize what has been identified as important (Morongo Basin Conservation Priority Setting Agenda 2009, 2). Any progress made during the workshop primer is reviewed and the conservation values generated are presented.

Small Group Breakout Sessions

Following the opening overview, participants divide into small groups with at least as many small groups as conservation values under consideration. Each small group is paired with an outside facilitator who assists the group in brainstorming what kind of information they would need to know (size, species present, etc.) to evaluate if a conservation project fulfills a specific conservation value. This discussion leads to identifying the features that will be listed across the horizontal axis of the values matrix. During this phase, potential features are written on post-its and displayed on a wall.

The resulting collection of post-its is reviewed by the entire group of participants and voted on to select the features that will be included in the values matrices. Features that receive the greatest number of votes become the subject of continued small group discussion as those features' particulars are brainstormed.

Once all of the elements of the values matrices are defined, the workshop shifts to ranking and calibration, starting with the finest level of the hierarchy, particulars. Participants work in small groups to rank particulars according to their level of priority. Ranking is achieved through a series of pair-wise comparisons (e.g., "In comparing particular X and particular Y, is one significantly more valuable than the other or are they roughly equivalent in value? How does particular Z compare in value with particulars X and Y?") Once ordered, particulars are graded.

The process of defining particulars, then ranking and calibrating them, can take several hours. Throughout this time the groups adjust their features and particulars quite significantly, sometimes combining them, or turning a feature into a particular (or vice versa).

Day Two: Calibrating to Compare Apples and Oranges

The second day of a CPSM workshop completes the calibration of a client's values matrices. Once small groups are satisfied with the grading of their particulars, they calibrate across features and test their matrices using a real-life scenario in which two similar project sites that engage with the same conservation values are evaluated (Morongo Basin Open Space Group Conservation Priority Setting Workshop Agenda 2009). Following this exercise, participants are guided in calibrating across values as a large group. Before they are finalized, calibrated matrices are again tested using a real-life scenario, this time by comparing two dissimilar sites, each with multiple conservation values at play.

After the matrices have been fully calibrated and tested, the workshop draws to a close with a final presentation on how GIS can use the drafted matrices' "decision rules" to set conservation

priorities (Morongo Basin Open Space Group Conservation Priority Setting Workshop Agenda 2009, 4). This introduction to GIS acknowledges what the technology can and can't accomplish particularly in light of data gaps, and demonstrates how rough targets can be used to set priorities through GIS.[25] Following this GIS 101 session, a short amount of time is spent discussing next steps, completing evaluations, and wrapping up the workshop.

The intention of the two-day workshop is for participants to leave with a new level of understanding regarding consensus-driven planning, a basic knowledge of GIS analysis and its limitations, and a renewed sense of commitment to engaging with local partners. Clients should close the workshop with strengthened relationships, a set of decision-making matrices, and an "approach for tackling incredibly complex situations" by "being able to look across a landscape" and identify where their work should focus.[26] In Dan Perlman's words, a CPSM workshop gives people the "confidence" to undertake the overwhelming and daunting task of setting priorities, "a process for how to think about it, and the skills to articulate what they feel is important"[27].

Post-Workshop Planning: Matrix Refinement, GIS Analysis, and Priority Setting

At the time of its pilot implementations, no guidebooks or models had been developed for CPSM. Outside of agendas and slide presentations created for the specific workshops, there was no content available that explained the process or documented if/how it was intended to proceed following a workshop. In addition, due to capacity constraints, the clients received limited support from the outside facilitators following the workshop. Both MLC and MBOSG largely relied on their own devices and the knowledge gained through the workshop to revise their matrices, undertake GIS analysis and create final conservation plans.[28]
CPSM, however, was designed with specific steps in mind to guide clients in progressing from roughly drafted matrices developed during a workshop to well-defined values matrices and GIS maps, which would ultimately lead to a set of actionable conservation priorities. These steps may have been communicated to some degree to the pilot clients, but not to the extent that they were successfully able to independently implement them. With that in mind, this section provides both a description of CPSM's envisioned process for completing a conservation plan after a two-day workshop as well as details regarding the approaches MLC and MBOSG improvised to produce their conservation plans.

Refining the Matrices

Before a client can undertake GIS analysis, the drafted values matrices must be carefully reviewed and fine-tuned. The process for these revisions should include at least one more public session attended by the client's staff, board, and as many of the workshop's participants who are

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[25] Phone interview with John DiBari conducted by Nicole Schneidman. December 4, 2012.

[26] Dan Perlman (see footnote 2).

[27] Dan Perlman (see footnote 2).

[28] In MLC's case, greater follow-up support was provided, specifically in terms of John DiBari lending his expertise to guide the organization in their GIS work. More limited support was provided to MBOSG, in part due to the presence of a full-time Sonoran Institute staff member, Stephanie Weigel, on the ground in the Morongo Basin.

available. This session can also be open to those who were unable to attend the workshop, but are interested in becoming involved, in which case an additional orientation should be considered for newcomers.

To refine their values matrices, a client can revisit CPSM's three-step process. Distinct attention must be paid to verifying that the matrices have been calibrated across features and values. In addition, a client can identify and present to their stakeholders the GIS data-layers that are available to represent their matrices' particulars. This information and the data gaps it identifies may prompt discussion and revision. However, a careful balance must be struck as particulars should not be removed from values matrices simply because they lack a corresponding GIS data-set; to do so would skew the matrices and how accurately they represent a community's priorities.[29]

Performing GIS Analysis

Once values matrices are finalized, they become the basis for GIS analysis. Particulars are mapped as much as available data allows with the understanding that not all will be able to be incorporated in GIS analysis. For particulars that lack corresponding data-sets, clients can perform assessments to create original data-sets for their service area or when appropriate, combine available information. However, a client should feel comfortable with the knowledge that every particular will be accounted for through CPSM, even if it isn't mapped.

After data-sets are identified, the grades assigned to particulars are translated into GIS-compatible numbers using the following scale: A+=100; A=4; B=2; C=1; Neutral=0; and F= minus 100.[30] This process maintains the rough equivalencies established by values matrices, with A+ and F standing out as extremes to ensure sites that receive those grades are individually assessed. Once the GIS data layers incorporate these numeric values, a set of maps can be developed that assigns scores using a parcel or equal-area grid-based approach, both for individual values and a composite score across values.

Setting Priorities

A client can finish setting conservation priorities by taking one or both of what Dan Perlman refers to as the *tactical approach* and *strategic approach* to prioritization:

The Tactical Approach:

CPSM's tactical approach to prioritization considers parcels or grid cells individually. A client begins by estimating how many projects or acres it has the capacity to focus on for a defined duration, e.g. a fiscal year. The client then reviews approximately three times as many top-scoring parcels or grid cells before selecting targets. For example, if a client was planning on

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[29] Dan Perlman (see footnote 2).

[30] Dan Perlman (see footnote 2).

working on 10 projects, the highest scoring 30 parcels or cells would be the first analyzed in great detail as potential priorities.[31]

Once a parcel or cell is identified as a possible priority, it is carefully analyzed. Each potential site is considered through a field visit and working through all of the client's finalized values matrices. To account for particulars that could not be mapped, local experts should be consulted so that their judgment can compensate for the limitations of GIS analysis. By considering each top-scoring opportunity in detail and comparing them using the values matrices, the client can then develop a set of target priorities to guide their work. The tactical approach attempts to answer the question, *which specific parcels best match the client's values?*

Strategic Approach:

CPSM's strategic approach to setting priorities creates regions within a service area that a client can subsequently focus its efforts on. The strategic approach also uses the composite scores assigned at the parcel or grid level as a starting point. However, rather than honing in on top-scoring parcels, staff review the distribution of parcel or grid-based scores across their service area's composite map to identify regions with concentrations of high-scoring cells or parcels.

After high-potential areas are roughly identified, these sections are compared to one another using the values matrices. Again, local expertise should be drawn upon while conducting these comparisons to account for GIS data-set limitations. Ultimately, a set of regions should be selected that represent the breadth of a client's conservation values. These regions in turn become the client's focus areas. The strategic approach attempts to answer the question, *which portions of the service area best match the client's values?[32]*

A key advantage of CPSM's strategic approach is its emphasis on considering adjacency when establishing priorities among conservation projects. With the tactical process, there is a risk that priorities include a set of disconnected parcels that are distributed across a service area. If priorities are isolated, they will likely fail to optimize the results of a client's investments. By developing focus areas using CPSM's strategic approach, a client can craft a more flexible strategy that focuses on broader swaths within its service area and ensures future investments are coordinated.

Clients will typically use both the strategic and tactical approaches in their planning. Both CPSM approaches are designed to end with production of the following:

- A set of fully functional values matrices capable of guiding a client in making difficult decisions that are consistent with its values and mission.

- GIS maps of a service area that roughly illustrate how conservation values' particulars are distributed across a landscape.

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[31] Dan Perlman (see footnote 2).

[32] Dan Perlman (see footnote 2).

- A list of target properties and/or focus areas that represent high-priority opportunities to which the client can direct its resources to optimize its impact.

Montezuma Land Conservancy and Morongo Basin Open Space Group's Follow-Up Processes to Conservation Priority Setting

Following their CPSM workshops, MLC and MBOSG relied upon organizational knowledge and the support of local partners to complete their planning and produce conservation plans. Elements of the CPSM vision are evident in their approaches, but their processes are largely the product of their staff's tenacity and creativity.

<u>Montezuma Land Conservancy's Internal Approach to Prioritization:</u>

The Follow-Up Process:

Following the 2008 CPSM workshop, MLC dedicated significant time and resources for 14 months to drafting and finalizing a conservation plan that was published in 2011.[33] The remainder of their planning was an internal process during which MLC's small team engaged chosen experts and partners when needed. Outside of the workshop, limited public feedback was gathered.

Immediately after the workshop, MLC's team completed the calibration of their values matrices across features and values so that they were consistent with their mission's equal focus on three central values. At the time of the MLC workshop, CPSM's system for converting letter grades into numeric figures had not been developed. Instead, the outside facilitators had instructed MLC to establish priorities by considering "packages," the combination of grades across values that one parcel could potentially receive.[34] MLC analyzed the permutations of packages that were possible using their values matrices and how each compared to each other. Packages were in turn assigned grades similar to those used for particulars with an "A" indicating a high-priority package (Montezuma Land Conservancy 2011).

However, once MLC's board and staff used graded packages to evaluate their service area, they found the approach did not provide the level of focus and clarity needed to successfully establish priorities. GIS analysis based on these graded packages resulted in 80 percent of MLC's service area being designated high priority. The board and staff also tried totaling scores across matrices, but did not find the results useful.[35] MLC refined their priority-setting to design a system that could immediately be employed to triage potential projects even while continuing the longer-term work of creating a comprehensive plan that documented its planning process, outcomes, and a forward-looking strategy.

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[33] Phone and personal interviews with Juniper Katz conducted by Nicole Schneidman February 13 and March 7, 2013.

[34] Dan Perlman (see footnote 2).

[35] Juniper Katz (see footnote 33).

To begin putting their priorities into action, MLC developed a process to evaluate projects under consideration by its Projects Committee. MLC found even their finalized values matrices did not fully account for several important factors that the staff felt were critical to their planning's success. These "secondary values" included issues such as degree of urgency, degree of threat, and the potential of the project to catalyze additional conservation opportunities (Montezuma Land Conservancy 2011, 41). MLC incorporated these secondary values into its project evaluation by developing a Project Score Sheet (see Appendix B), which in turn became the system by which MLC began immediately implementing its priorities.

MLC's Project Score Sheet is the primary vehicle through which its CPSM matrices continue to be used by the organization. When reviewing a project, a MLC staff member begins with a site visit and carefully works through the organization's set of values matrices to grade a potential project.[36] The results of the values matrices' scoring is listed on the Project Score Sheet, including the final grade a project received for each value and each of the value's priority features. In addition, the score sheet offers opportunities to consider a project in terms of its urgency, additional opportunities it enables, and complementary efforts that could affect the project.

 With a process for triaging projects in place, MLC pursued the drafting of a comprehensive conservation plan. In response to their values matrices resulting in analysis that identified the majority of the organization's service area as high priority, MLC chose to hone their focus by developing a sub-set of six narrower conservation priorities (Montezuma Land Conservancy 2011). Using a technique they were introduced to at the Land Trust Alliance's Rally, MLC mapped its six refined priorities and applied the local expertise and knowledge of staff and partners to develop six geographic focus areas, which they call "program areas"[37]; Montezuma Land Conservancy 2011, 54–57). These areas fully represent the range of the organization's refined values and are informed by intensive research on its service area's geography, cultural and regional identity, and significant conservation factors. The six program areas now guide MLC's mission and specifically, their efforts toward the overarching organizational goal of protecting 48,000 acres in its service area by 2020 (Montezuma Land Conservancy 2011).

MLC's staff compiled all of this information including detailed documentation of their process, full-colored GIS maps, values matrices, and descriptions of their program areas into a conservation plan. Twelve copies were printed and an online version was made available for download on the MLC website. MLC chose to do little to publicize the plan's outcomes, in part because of its implications for private landowners in the area and also out of recognition that the plan was a "living document" that required regular updating.[38] An article was published regarding the planning in MLC's newsletter and hard copies were distributed to board members. Since its finalization, MLC's conservation plan has not been revised and serves largely as internal reference for staff members. Rather than promoting their entire plan, MLC's team is developing marketing materials for their program areas to educate and engage community members regarding the land trust and its focus.

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[36] Juniper Katz (see footnote 33).

[37] Juniper Katz (see footnote 33).

[38] Juniper Katz (see footnote 33).

Results:

Since MLC initiated its conservation planning with CPSM, it has doubled the number of acres it has protected in its service area from between 16,000 and 17,000 acres in 2008 to approximately 34,000 acres in 2013.[39] Not all of this expansion is purely due to the planning process; Juniper Katz, MLC's current Executive Director, attributes the success to a combination of factors including MLC's becoming more comfortable with complex land deals with multiple funding sources.

After finalizing its conservation plan, MLC has employed a balanced approach to pursue its priorities that blends opportunity and strategy to their maximum effect. Using its conservation plan, MLC conducts outreach to pursue its program areas. This strategic outreach is married with MLC's new level of responsiveness for evaluating opportunities as they arise. MLC's Projects Committee carefully evaluates any potential project to ensure it meets established criteria consistent with the organization's values before pursuing it.

MLC's focus since finalizing its planning has also been heavily influenced by funding opportunities. The organization's strategic approach has allowed its staff to focus attention on projects that are consistent with their mission and have potential funding attached.[40] MLC has also found that the planning process combined with its management of complex deal-making, accreditation, and growing success has led to improved fundraising. Together, Juniper Katz explained, these factors have resulted in MLC receiving greater respect and attention from funders and partners, particularly remarkable considering its staff size of only three full-time employees. Much of this success, must be attributed to MLC's fostering a robust network working relationships, rather than purely focusing on the direction established by its values matrices.

The Morongo Basin Open Space Group's Publicly-Driven Approach to Prioritization

The Follow-Up Process:

Unlike MLC, MBOSG had the benefit of a full-time Sonoran Institute staff member and planner, Stephanie Weigel, to lead its follow up process to the CPSM workshop. Weigel's familiarity with the region (she was stationed there prior to the workshop) and her expertise resulted in MBOSG's using a rigorously transparent approach to develop a final conservation plan.

Unlike the first two pilot sites where planning preparations were limited to the logistics of organizing a two-day workshop, MBOSG had already begun engaging in intensive community outreach before choosing to pilot CPSM. This community engagement included presentations at local events, club meetings, and the organization's regular bimonthly meetings. Stephanie Weigel conducted this outreach campaign during which she posed two significant questions to community members: "What do residents treasure about life in the Morongo Basin?" and "What

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[39] Juniper Katz (see footnote 33).

[40] Juniper Katz (see footnote 33).

do community members value?" (Weigel, Schafer, and Curgus 2012, 6) Using maps of the Morongo Basin region, Weigel invited community members to indicate where and what they treasured with results such as Joshua Tree National Park, "my backyard," and Big Morongo Canyon Preserve. In addition, Weigel's process captured treasures that could not be mapped including "dark night skies and stars, "views and vistas from and to mountains and hills," and "clear and open ridgelines" (Weigel, Schafer, and Curgus 2012, 6). This community outreach engaged about 300 residents from across the Morongo Basin and established MBOSG's planning as a publicly-driven process.[41]

Following its 2009 CPSM workshop, MBOSG drew upon the expertise of local partners and community members to produce a conservation plan that was ultimately published in the fall of 2012. That follow-up process required a longer period than had been estimated—in total, close to three years. Throughout, MBOSG maintained its dedication to community-driven, transparent planning.

Immediately after the CPSM workshop, MBOSG's board members and stakeholders put great care into refining their values matrices. This revisiting was facilitated through working-group meetings; at least half of MBOSG's values matrices required two follow-up sessions.[42] Updates to all of the matrices were publicly presented at the MBOSG's bi-monthly meetings with opportunities for feedback.

In addition, Stephanie Weigel began working with Sean Murphy, a GIS expert at Joshua Tree National Park, to compile the data-sets required to translate MBOSG's values matrices into GIS analysis. The two found moving from the matrices' letter grades to numeric figures particularly challenging. In addition, a number of the matrices' particulars identified through public discussion did not have corresponding data-sets. To address this, Weigel and Murphy used field assessments and when appropriate, combined existing data-sets. For example, to ensure that the community's emphasis on "beautiful rocks along the highway" could be incorporated into the mapping, Weigel surveyed the highways in the Morongo Basin region, using a camera to document where that particular occurred.[43]

Ultimately, full-color GIS maps were created for each of MBOSG's five conservation values in addition to a composite map. Based on distributions in the maps' parcels' scoring, natural breaks were used to categorize parcels as high, moderate, or lower priority for each value. This information from across conservation values was combined to create the composite map. Two percent of the MBOSG's service area's parcels were categorized as composite high-priority, meaning they ranked as high priority for two out of MBOSG's five conservation values. Composite moderate-high priority parcels were defined as those that ranked high for at least one

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[41] At the same time as MBOSG was completing its community treasures outreach, the South Coast Wildlands (now know as the Science and Collaboration for Connected Wildlands), a nonprofit focused on promoting "functional habitat connectivity across diverse wildland networks," published a wildlife linkage design report for the Morongo Basin region (Science and Collaboration for Connected Wildlands). This study would prove an important building block in MBOSG's planning and a base layer in its ultimate GIS analysis.

[42] Personal interview with Stephanie Weigel conducted by Nicole Schneidman January 16, 2013.

[43] Phone interviews with Stephanie Weigel conducted by Nicole Schneidman November 27 and December 11, 2012.

of the conservation values, or at least moderate for three of the conservation values. About a third of the land in MBOSG's analysis area was categorized as moderate-high priority parcels (Weigel, Schafer, and Curgus 2012).

This process of developing and analyzing a composite map was designed to identify the win-win parcels from amongst MBOSG's study area. Special emphasis was placed in considering connectivity, opportunities to protect large contiguous habitat, and whether the protection level of a parcel could be improved. This composite map was informed by local expertise and the results of the community treasuring process to identify multiple benefit conservation areas, focus areas that met more than one of MBOSG's conservation goals. In total, seven multiple benefit conservation areas were identified across MBOSG's service area (Weigel, Schafer, and Curgus 2012).

Due in part to the time required for MBOSG to compile their results and the process' level of public involvement, MBOSG encountered several challenges before its plan could be finalized. Changes in elected public officials engaged in the process delayed the publication of the MBOSG's conservation plan as newcomers expressed concerns or dissatisfaction with the planning's results.

Since the conservation plan's publication in the fall of 2012, printed copies of the plan have been widely distributed amongst the MBOSG's partner organizations, stakeholders, and community members. In addition, even prior to the publication of the plan itself, the GIS analysis the plan relied on was made available online. Due to funding constraints, the website that originally made that information public became outdated. However, supporters of the MBOSG secured a grant in 2013 that will again make the GIS analysis and resulting maps publicly available online.[44]

Results:

Since the MBOSG's conservation plan was only recently finalized and published, it has not had the same opportunity as MLC to effect change and has already faced its own set of challenges. Unlike PPLT and MLC, MBOSG is not a land trust, but an open space group composed of over 20 organizations and agencies engaged in open space and conservation issues in the Morongo Basin. Its mission is to enable discussion and coordination amongst conservation stakeholders in the Morongo Basin "to plan for the region's long-term development and conservation and provide for the economic and well being of local communities" (Morongo Basin Open Space Group). As a forum for dialogue and a research organization, the MBOSG lacks the structure and funding necessary to implement its conservation plan.[45] Moreover, in the midst of finalizing its conservation plan, the MBOSG's regular public meetings came to an end.

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[44] Personal interview with Laraine Turk conducted by Nicole Schneidman January 18, 2013.

[45] Several of the participants interviewed from MBOSG suggested that a significant limitation of this organizing structure is its lack of the capacity for implementation. They suggested that to complement the conservation planning, an action plan must also be developed that will ensure the momentum created by the planning process is not lost and that funding is available to begin putting the plan into action.

These setbacks should not overshadow what the conservation plan has accomplished in its short existence. The plan has allowed local organizations, notably the Mojave Desert Land Trust, to secure additional funding for focused conservation programs in the region. In addition, it has yielded innovative partnerships between the Marine Corps Air Ground Combat Center and conservation partners such as the Mojave Desert Land Trust, including a matching grant program through the Department of Defense's Readiness and Environmental Protection Initiative (REPI) towards the purchase of a long sought after parcel, Quail Mountain.[46]

The strength of the relationships developed through its community engagement and its dedication to transparency have resulted in supporters of the MBOSG continuing to promote the organization's efforts. These supporters now regularly use the MBOSG's finalized conservation plan as a reference, whether to consider the placement of a proposed solar project or engage others in the beauties of their surrounding landscape.[47]

Evaluation of Conservation Priority Setting

Methodology

In conducting the evaluation of the pilot applications of CPSM, site visits were scheduled with the clients of the second and third CPSM pilots.[48] During these trips, interviews were conducted with as many of the original workshop and planning participants as were willing and available to offer feedback. In total, eight interviews were conducted related to the MLC 2008 workshop (26 percent of total participants) and ten interviews were completed with participants from the MBOSG 2009 workshop (approximately 30 percent of total participants). Of the eighteen participants interviewed, only one was not closely affiliated with a conservation organization at the time of the pilot workshops.[49]

Each interview covered at least 48 standard questions; staff members who were more deeply involved in planning answered additional questions. A sample of the standard interview questions follows:

- Was CPSM a valuable process for your community? Why?

- What was your reaction to the vocabulary (value, feature, particular) introduced?

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[46] Marlana Brown (see footnote 24).

[47] Personal interview with Pat Flanagan conducted by Nicole Schneidman January 18, 2013.

[48] Originally, a third site visit was planned for PPLT. However, due to the distinct nature of that process and difficulty following up with the original workshop's participants, that research trip was cancelled.

[49] Due to the length of time that passed between the CPSM workshops and this evaluation, the participants who were willing to be interviewed were overwhelmingly individuals who were invested in conservation in the pilot's service areas at the time of the workshops and have remain engaged in a local conservation effort. Although all of the workshops' participants for whom contact information was available for were contacted, only one individual who is not closely affiliated with a conservation organization responded to repeated requests for an interview.

- What parts of the workshop did you have difficulty with? Was there any information covered that you felt was too technical?

- Following the workshop, did you feel more invested in the planning process? Did you feel as if you were better able to defend conservation decisions in the region?

- Have you reviewed the finalized conservation plan? What impact has it had thus far?

- Would you recommend CPSM for guiding other organizations in developing a conservation plan? Why?

- What improvements do you think are necessary before CPSM is applied again?[50]

As this sample suggests, the majority of the questions posed to interviewees prompted narrative answers. Any answers that could be quantified have been incorporated into the text or listed in Appendix E. The information collected through these interviews has been combined with additional conversations with Sonoran Institute staff members and Dan Perlman, a review of available documentation from the workshops and clients' follow up planning approaches, and comparative research regarding the larger field of conservation planning to inform the following analysis of CPSM.

CPSM was designed to help conservation organizations navigate the challenges that inadequate funding, insufficient data, and incommensurable values pose to fulfilling their mission. It was intended to be a publicly transparent process, one capable of engaging community members from a range of interests in open discussion and careful analysis. Perlman set out to develop a values-driven and data-supported process that was spatially explicit and could be easily translated into GIS, but avoided the oversimplification and exaggerated exactness of the weighting process he had observed in India in 1998. Finally, CPSM was designed to be flexible enough that it could easily be applied across geographic scales. In light of these intentions, the success of CPSM and its areas for improvement are identified and evaluated below.

Comparing Apples, Oranges, and Incommensurable Values

During the three years in which CPSM was piloted, the methodology was significantly improved, evolving from Dan Perlman's vision for assisting conservation organizations in analyzing their underlying values to a polished process for facilitating public discussion. The elements of the workshop that Dan Perlman, Marjo Curgus, and John DiBari invested special attention in clarifying are evident and among the most successful components of the methodology.

The original workshop that Dan Perlman held in 2006 with PPLT offered a distinct process from the ones conducted with MLC and MBOSG. Rather than using values matrices and their three-

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[50] For a full list of the interview questions, see Appendix D.

tiered hierarchy, the first pilot focused on developing "decision rules" and "scoring sheets"[51] that assigned scores of 1 to 4 to prioritize characteristics within a value (Perlman 2007, 3). Due to the limited information available related to PPLT, it is difficult to ascertain the results of this initial approach. However, it is clear that the revised structure provided by the workshop's focus on values matrices proved exceptionally constructive for MLC and MBOSG.

The best example of CPSM's success in analyzing incommensurable values is the progress it empowered MLC to make. Prior to the CPSM workshop, MLC was struggling with what seemed an insurmountable roadblock. The organization was having difficulty establishing a project evaluation process that accounted for all three of its central conservation values. Immediately following the CPSM workshop, MLC expressed confidence in having a decision-making framework that was capable of evaluating projects across its values (Perlman 2008b). Although the ultimate conservation plan that MLC produced is largely the result of its staff's ingenuity and dedication, CPSM undoubtedly provided the organization with an approach to overcome a significant hurdle.

During the interviews for this evaluation, participants of both workshops consistently identified the small group work through which incommensurable values were analyzed as the most effective part of the CPSM workshop and even larger planning process (Figure 9). Pat Flanagan, a participant of the 2009 MBOSG workshop, emphasized that she was impressed by the depth of the conversations the values matrices inspired and especially, how far she was pushed to discard assumptions and defend her stances (2013).

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[51] The "scoring sheets" that PPLT developed employed a distinct process from that which MLC ultimately developed to guide their Projects Committee. MLC received no direction from the CPSM facilitators in creating a Score Sheet and the resulting product is entirely their own.

Figure 9: Graph Charting Interviewee Responses to "What did you find to be the most effective element of CPSM?"
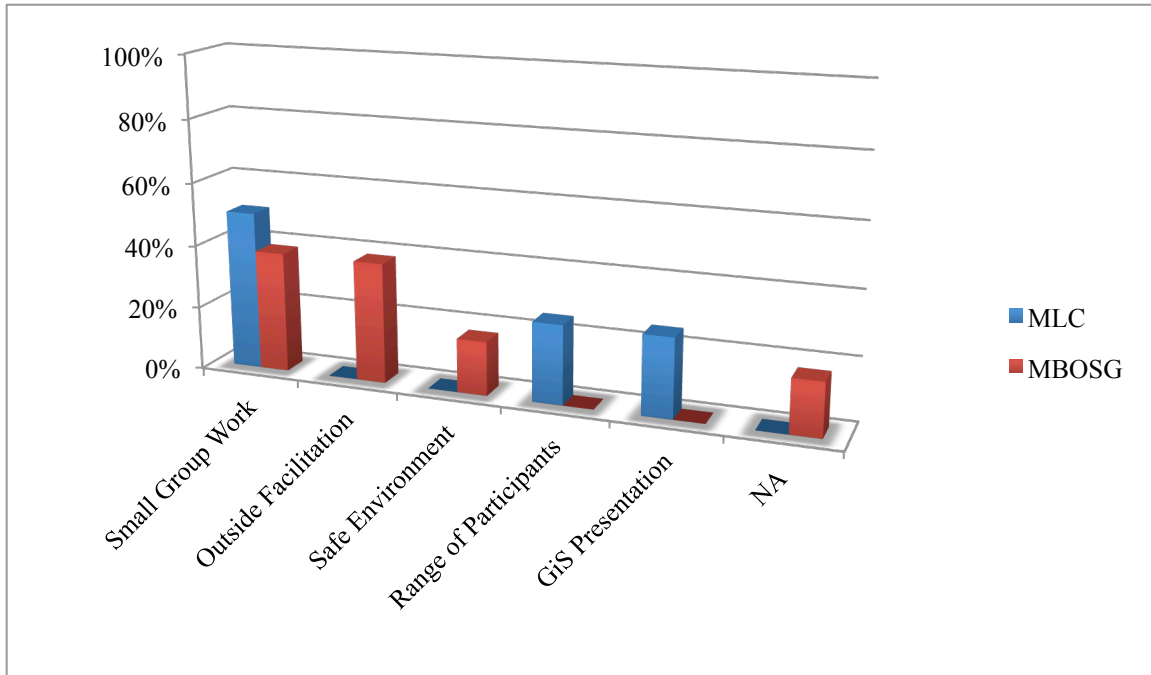
Source: Sonoran Institute

Respondents were encouraged to identify a single element.

Other participants reflected that the values matrices made it possible for them to understand prioritization and cross-values analysis, exercises which they felt otherwise might have proved abstract and confusing. Although 57 percent acknowledged they initially struggled with differentiating the layers of the matrix (value, feature, and particular),[52] participants felt strongly that once they had completed CPSM's three-step process, they were completely comfortable with the concepts a values matrix helped to organize and would have been able to repeat the process independently to compare new conservation values.

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[52] Laraine Turk, one of the MBOSG interviewees, offered the suggestion that CPSM terms could be better explained using metaphors such as the layers of an ice cream sundae (personal interview with Laraine Turk January 18, 2013.). When this suggestion was brought up in subsequent interviews, other participants agreed that kind of comparative exercise might have allowed them to feel comfortable with CPSM vocabulary more quickly.

Figure 10: Graph Illustrating Interviewee Responses to "Having participated in the CPSM workshop, do you feel that the client could in the future develop and calibrate values matrices without additional outside support?"
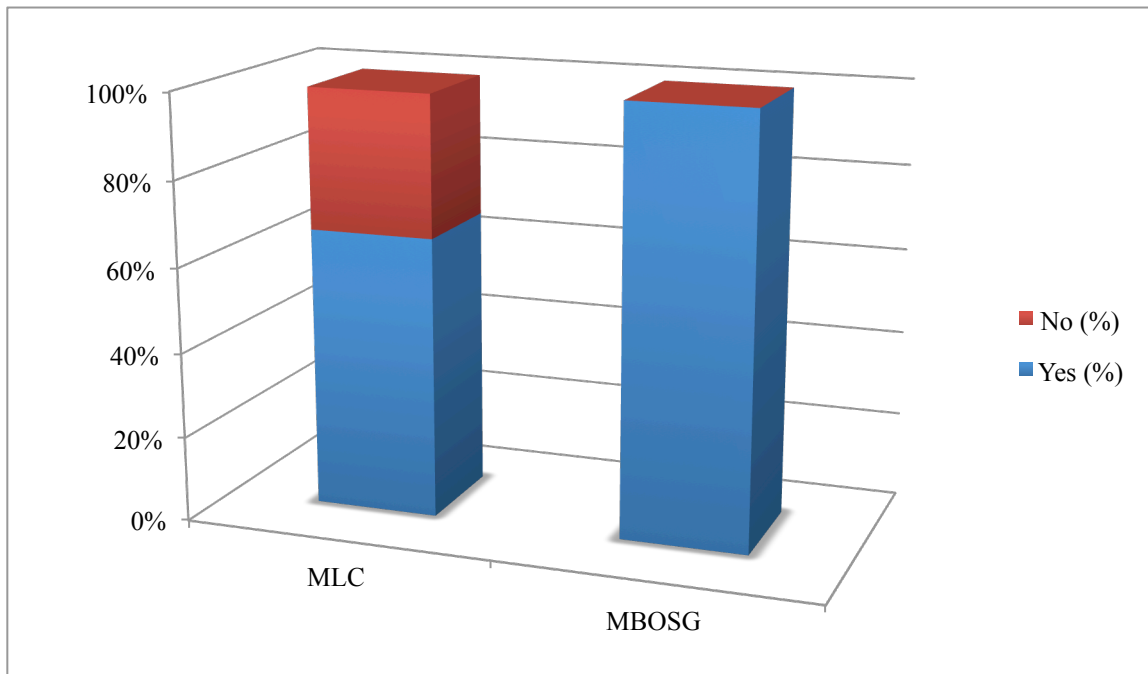
Source: Sonoran Institute

These results suggest CPSM's most significant accomplishment is its success in offering a transparent process for comparing otherwise incommensurable values. The participants that took part in MLC and MBOSG's workshops represented a broad range of community members including Federal, state, and county officials, ranchers, developers, and conservation activists. These stakeholders arrived at the workshop with dramatically different assumptions, areas of expertise, and goals. The fact that CPSM was not only accessible to this range of participants, but that every participant who was interviewed for this evaluation agreed they would recommend CPSM to other organizations embarking on conservation planning is an indicator of the methodology's value and potential.

Accounting for Insufficient Data

In addition to developing the values matrix as the organizing structure of the workshop, Perlman, Curgus, and DiBari's refinements to CPSM focused on calibration. All three facilitators recognized that a ranking scheme that forced practitioners to evaluate across features and values was critical to CPSM's usefulness. However, they were wary of the assumptions that accompanied the employment of numeric scores and in particular, weighting practices that used exact percentages as in the case of the 1998 Indian workshop. They were determined to develop a prioritization system that forced practitioners to recognize they were dealing with rough approximations, even before GIS analysis begins. The result is the letter-based grading system CPSM utilizes. In Dan Perlman's words, the letter approach forces a "gut check" so that participations are less tempted to think the process is an exact science (2013).

With MLC, this grading system was used to develop and prioritize packages (e.g., 2 "A's" and 2 "B's" represents one package; 1 "A" and 4 "B's" another), which were in turn prioritized as high, moderate, or low. However, prior to the MBOSG workshop, Perlman, Curgus, and DiBari chose to adjust this package approach, largely due to the number of possible permutations such packages could assume. In an effort to make cross-value prioritization easier, a conversion scale was introduced and participants were informed at the start of calibration that "rough" numbers existed behind the grades they were assigning.[53]

In this manner, CPSM succeeded in accounting for the limitations that accompany incomplete data in two ways. First, the MBOSG workshop began and ended by emphasizing the inherent limitations of available conservation data. Special emphasis was placed during the GIS 101 presentation on the fact that any type of GIS analysis is the product of the quality of the data it employs and cannot be treated as authoritative. Second, participants were routinely reminded during the CPSM workshops that the entire process was one of establishing "rough equivalencies" and thus was an exercise in relative weighting, not precision.[54]

As previously described, the envisioned follow-up process to a CPSM workshop was designed to include two additional measures to account for insufficient data:

1. Finalized values matrices with all their particulars listed were to remain an integral part of project evaluation to ensure particulars that could not be mapped would be accounted for during the analysis of a specific project.

2. Before GIS maps were finalized, a public review process would act as a "gut check" so that resulting priorities were as much the result of community input and local expertise as GIS analysis.

Due to capacity limitations, these measures were implemented during the pilots to the extent to which the clients recognized the need for them.

If evaluated purely in terms of the structure and content of its workshops, CPSM appears to have largely succeeded in accounting for the limitations of incomplete data. Participants understood that the comparisons of values their matrices enabled were "rough" approximations. One small area for improvement within the scope of the workshops is the placement of the GIS 101 presentation. In the case of the MBOSG, the placement of the GIS 101 presentation at the end of the two-day workshop meant many of the participants felt they were not fully able to concentrate or benefit from its information. One interviewee admitted she did not realize that maps were going to be developed based on the workshop's values matrices. Moving forward, it would be helpful to reinforce during the workshops how the rough values matrices relate to the longer process of creating a conservation plan and especially, highlighting more than once how data limitations will come into play with GIS analysis.

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[53] Dan Perlman (see footnote 2).

[54] Dan Perlman (see footnote 2).

Outside of the workshops, CPSM requires additional refinement to improve its process for accounting for limited data, especially in the guidance it provides to clients for using values matrices to create final conservation plans. Both MLC and MBOSG staff acknowledged they experienced great difficulty in translating their graded values matrices into GIS-compatible data for two reasons: difficulty in identifying appropriate data sets, and complications arising from translating CPSM's letter grades into GIS analysis.

Identifying Appropriate Data Sets

Both MLC and MBOSG struggled to compile data that they felt adequately represented their finalized values matrices. They each spent at least seven months and significant resources to find and develop data-sets for as many of their matrices' particulars as possible.

Perlman's vision for clients' use of their full set of values matrices for ongoing project evaluation might partially ameliorate this issue. This is a question of whether clients would feel that Perlman's suggested review of all of their matrices' particulars before approving a potential project sufficiently accounts for particulars that could not be mapped in GIS. [55] However, the degree to which both pilot clients struggled with this point suggests it merits further attention. Moving forward, clients may benefit from receiving a rough timeline for CPSM with recommendations for the following: (1) an estimate of the amount of the time that should be spent locating and/or developing appropriate data-sets for GIS analysis; (2) likely sources of information for pertinent GIS layers; (3) an estimate for the minimum number of particulars that should be represented to ensure GIS maps are appropriate for use; and (4) guidelines for GIS workarounds, especially if/how local input can be represented in maps.

During his interview, Sean Murphy, GIS Specialist at Joshua Tree National Park, suggested another option — performing a more thorough inventory of available data sets for a study area prior to a CPSM workshop.[56] That inventory would be shared in advance of a workshop with facilitators. Facilitators could in turn intersperse GIS gut-checks at appropriate moments during the workshop to better ground the expectations of participants. This isn't to suggest that a particular would be eliminated from a values matrix based on data availability. Rather, this additional step could allow participants to consider appropriate alternatives or gain a better understanding of what GIS maps will illustrate and how they should be supplemented.

Translating CPSM's Letter Grades into GIS Analysis

Interviews with MLC and MBOSG staff and board members also revealed how challenging they found translating the grades of their values matrices into GIS-compatible numbers. While MLC ultimately did not find a satisfying process that could establish a sufficiently narrow set of priorities, MBOSG created a process that is remarkably similar to that envisioned by John DiBari

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[55] The question here is if regularly using the full set of values matrices to evaluate projects publicly or in a group-setting is a reasonable expectation. In the case of MLC, staff members chose to move to a scorecard evaluation process that heavily drew upon the matrices because they found the matrices rather unwieldy and difficult for board members and volunteers to follow, especially when being used by their Projects Committee.

[56] Personal interview with Sean Murphy conducted by Nicole Schneidman January 17, 2013.

and Dan Perlman. The fact that facilitators and clients arrived separately at the process whereby A+=100, A=4, B=2, C=1, Neutral=0, and F= minus100 is a positive indicator of its intuitive nature.

With that in mind, this difficulty could be overcome with a written guide for any organization using CPSM in addition to more intensive follow-up by facilitators to address planning questions or difficulties. Ideally, this extended follow up would be coupled with further standardization in the hope that improving CPSM's efficiency could counterweigh the additional costs that more intensive follow-up process will likely require. Any conservation planning requires a financial investment, and the majority of the challenges that clients using CPSM encountered were due to limited funding and the resulting constraints on facilitators. Perhaps a workbook or online primer shared with organizations prior to workshops could better prepare them for CPSM and thereby, optimize the use of facilitator's time and make them more available for follow-up support.

In addition, training new facilitators who are geographically closer to partners may reduce costs and increase the amount of time facilitators can dedicate to a client. Following the MLC workshop, Perlman and Curgus briefly explored applying a "train the trainers" approach to prepare a cohort of new facilitators.[57] This type of training, focusing largely on the staff of clients, could be particularly effective as a technique to build more capacity for partner organizations. It merits further exploration while recognizing the realities of already hard-pressed organizations' staff and potential conflicts that facilitators connected with a region may have.

Optimizing the Investment Funding

Of the three major planning factors CPSM was designed to address, inadequate funding is the one which requires the greatest attention moving forward. As seen with its pilots, CPSM addresses the problem of insufficient funding in so far as it guides stakeholders to set priorities that are consistent with their mission and make the most of scarce financial resources. While any type of prioritization can improve the likelihood that an organization invests its resources strategically, additional steps should be integrated within CPSM to more fully consider cost effectiveness.

All too often, organizations are tempted to pursue their highest priority projects without fully considering cost. This can lead to an organization directing the majority of its limited resources on one or two high-priority projects, rather than pursuing a combination of somewhat lower-priority projects that will likely be more effective in the long-term, both in terms of cost and fulfilling conservation values. Refinement in this area may offer an opportunity for CPSM[58] to partner with approaches such as Optimization Modeling that The Conservation Fund (TCF) is exploring with the University of Delaware and Cornell University.

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[57] Dan Perlman (see footnote 2).

[58] Cost was intentionally not incorporated into the pilot's values matrices as it is not a conservation value. Dan Perlman felt the consideration of cost was important, but that it should follow the drafting of priorities based on a client's conservation values.

A Scalable Process for Landscape-Scale Conservation Planning

CPSM's three pilots provide a very limited sample size by which to evaluate the methodology, especially in terms of whether it can be easily scaled across geographic levels. However, the information available suggests that CPSM's values matrix is the element of the methodology that would be most suitable for scaling up or down. It is likely that CPSM's flexible organizing structure is capable of accommodating a range of geographic sizes and conservation values beyond those connected with open space.

CPSM appears to be especially well-suited to the complexities of regional planning. Nine of the ten interviewees who participated in the MBOSG workshop felt CPSM was especially effective for regional planning. At a regional level, coordination and public participation are critical to the success of conservation planning, but difficult to facilitate (Lerner, Cochran, and Michalak 2006). In this sense, CPSM may offer an important contribution to the field of regional planning. The most significant limiting factor for broader applications of CPSM's values matrices lies not in its structure, but the degree to which it relies on a multi-day workshop to facilitate consensus building. At larger geographic scales, coordinating a two-day workshop would likely not be feasible or adequate for establishing consensus, especially considering that Perlman's three-step process is time-intensive and both MLC and MBOSG required additional time to complete calibration.

This highlights a dilemma regarding the structure of the CPSM workshop. Although a two-day workshop may not be sufficient to work through CPSM's three-step process, it is unlikely that simply lengthening the workshop itself could alone resolve this issue. About fifteen percent of participants interviewed as part of this evaluation commented on the difficulties of attending a full-day workshop, especially two weekdays in a row. In addition to the challenge of making a two-day commitment, participants noted that they were "spent" after two full days of intensive discussion and analysis.

Developing an alternative method for broader consensus-building is the first area of improvement that must be addressed before CPSM is applied at a regional level. Regional planning begins with a "strategic vision"; to be successful, it requires the development of an "implementation plan to move from vision to action", the monitoring of outcomes, and "adaptation" in response to ongoing evaluation (Chambers et al. 2010, 7). In this sense, CPSM must be revisited to ensure it is capable of supporting a regional planning process from beginning to end. It is particularly lacking in terms of offering a model that a regional partner could follow to continue to coordinate stakeholders once priorities are established. Although MBOSG's pioneering work offers an important example that subsequent regional partners can emulate, more extensive guidelines and structure is necessary before CPSM is capable of singlehandedly guiding a regional effort in developing a comprehensive conservation plan and putting into place the structure and evaluation practices to support its successful implementation.

The Larger Universe of Conservation Planning

Over the last 20 years, the field of conservation planning has been redefined to accommodate technological advances and the escalating pressures facing practitioners. At the close of the twentieth century, conservationists recognized that the scale of the challenges posed by growing urban populations and climate change necessitated a transition. Programs to protect natural resources and spaces could no longer afford to be opportunistic. They required strategic frameworks to ensure organizations and communities were getting the greatest "bang for their buck". During the 1990s and early 2000s, a new generation of conservation planning approaches emerged to address this need. Today, those processes have developed into a robust field that includes Perlman's conservation priority setting methodology.

Conservation planning dates back to the mid-nineteenth century. The earliest planning was driven by a desire to give urban populations access to the benefits of natural soundings and iconic landscapes. Until as late as the 1950s, conservation plans relied on the expert opinion of a few, primarily ecologists familiar with the needs and resources of a specific region (Noss). In 1969, the publication of Ian McHarg's *Design with Nature* and its introduction of overlay analysis marked a significant shift as planning became a fundamentally spatial, data-driven exercise.

By 2000, conservation biologists such as C.R. Margules, R.L. Pressey, and Hugh Possingham were advocating for systematic conservation planning that relied on site-selection algorithms including Marxan[59]. They argued that a GIS-based approach to designing reserve systems maximized the protection of biodiversity and prevented the undue non-scientific influences of social, economic, and political factors. Acknowledging the challenges of limited funding, a range of environmental threats, and divergent views on how to manage conservation efforts, Margules and Pressey emphasized that planning should be guided by explicit, quantitative biodiversity targets to make it more defensible and transparent (2000).

Conservation planning methodologies such as The Nature Conservancy's Conservation by Design, The Conservation Fund's Green Infrastructure Program, The Trust for Public Land's Greenprinting, and eventually, the Conservation Priority Setting Methodology developed by Perlman and Western Lands and Communities in this context. These approaches bridged a critical gap between the academic findings of conservation biology and the realities of fieldwork facing practitioners. As these processes have evolved, they have adapted to changing expectations for planning, especially regarding public transparency and how communities are engaged in identifying and protecting their conservation values in the context of social values regarding nature.

The Nature Conservancy's Conservation by Design

The Nature Conservancy (TNC) was one of the first conservation organizations to embrace the potential offered by GIS and systematic planning to maximize the effectiveness of their biodiversity-driven work. In 1996, TNC adapted its 5-S system, originally developed for its

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[59] See footnote 1.

bioreserve initiative, to take an organization-wide adaptive management strategy: Conservation by Design. Conservation by Design uses a "collaborative, science-based approach and a common set of analytical methods to identify the biodiversity that needs to be conserved, to decide where and how to conserve it and to measure [TNC's] effectiveness" (Baumgartner et al. 2006, 5). Its process consists of a four-step cycle: (1) setting goals and priorities; (2) developing strategies; (3) taking action; and (4) measuring results. Through the focus provided by Conservation Design, in 1996 TNC assumed the goal of conserving at least 10 percent of every major habitat type on earth by 2015. Over a decade later, Conservation by Design remains a central tenant for TNC's work in the 30 plus countries in which it operates.

In comparison to other major planning methodologies, Conservation by Design is unique in the degree to which it is grounded by environmental assessments that consider the state of biodiversity worldwide. Through global habitat assessments, TNC identifies the ecoregions, threats, and strategic opportunities that warrant conservation action. These outcomes in turn direct studies that establish conservation priorities at the ecoregional level, which are the basis for TNC's action sites (The Nature Conservancy 2003).

At the site level, TNC uses its 5-S (Systems, Stresses, Sources, Strategies, and Successes) framework as a flexible guide for conservation planning. For each site, an interdisciplinary team assesses and ranks conservation targets, stresses, and sources of stress; develops strategies to address threats and protect the viability of the site; and tracks and measures the impact of their efforts. This process rests on establishing at most eight conservation targets for each site that represent its biodiversity, account for ecoregional priorities, and address critical threats. Each target is evaluated according to its size, condition, and role within the landscape and categorized by its viability as "Very Good," "Good," "Fair," or "Poor", which correspond to a four-point scale (The Nature Conservancy 2003).

Once targets are identified, the threats facing them are ranked to focus on the most pressing to a site's long-term viability (The Nature Conservancy 2003). High-priority stresses become the basis for TNC's action planning and strategies for addressing them are brainstormed and prioritized according to benefits offered; likelihood of success; cost; and potential for catalyzing broader positive effects. These strategies are carefully monitored by tracking every site's biodiversity health, threat status and abatement, and conservation capacity (The Nature Conservancy 2003).

TNC's overall planning framework is currently being updated and will be transitioning. Moving forward, organizational priorities will be set using the Global Challenges-Global Solutions Framework. In addition, TNC will be shifting its strategy design and implementation approach from Conservation Action Planning to Conservation Business Planning. These changes are in part intended to incorporate a broader range of interests in TNC's planning and to consider goals related to ecosystem services, human well-being, and others that extend beyond traditional biodiversity objectives (Groves 2012). This move is also accompanied by TNC's increased focus on landscape planning endeavors through its "whole systems" approach (Ward et al. 2011).

The Conservation Fund's Green Infrastructure Program

Although the concepts behind it date to Olmsted's vision for greenways, green infrastructure as a term was introduced in a 1994 report to the Florida governor that advocated for planning wherein ecological systems were given equal import to the built infrastructure. After states such as Florida and Maryland began efforts to protect interconnected systems of natural resources, in 1999 the President's Council on Sustainable Development identified green infrastructure as one of five critical approaches to comprehensive sustainable community development (Benedict and McMahon 2001). In their 2006 *Green Infrastructure: Linking Landscapes and Communities*, Benedict and McMahon define green infrastructure as

> "a strategically planned and managed network of wilderness, parks, greenways, conservation easements, and working land with conservation value that supports native species, maintains natural ecological processes, sustains air and water resources, and contributes to the health and quality of life for America's communities and people" (2006, 3).

In contrast to Conservation by Design, the Conservation Fund's Green Infrastructure Program (GIP) balances environmental and economic factors by developing planning frameworks that work in concert with land development, growth management, and built infrastructure. Green infrastructure networks are composed of three basic building blocks: core areas, hubs, and corridors. Core areas are the "nuclei of the network," spaces that provide adequate room and resources to sustain even the most sensitive of local species (Amundsen and Chapman 2009). Hubs surround these core areas, the largest contiguous sections of conservation land in a network, and corridors are the links in the system, the connecting passages that allow for wildlife movement, pollination, and when appropriate, recreational opportunities.

Since green infrastructure's emergence in the mid-1990s, The Conservation Fund (TCF) has been a leader in its development and implementation. Under TCF's auspices, GIP is a year-long planning process "designed to obtain community input, create goals, design policies, identify land protection and enhancement priorities, and develop funding mechanisms to create a lasting legacy for a region" (Amundsen and Chapman 2009, 6). TCF divides its approach into three phases: (1) leadership forums and public input sessions; (2) designing the network, and (3) implementation plan.

The first phase begins with the organization of a local leadership forum, a group of key stakeholders tasked with establishing the plan's goals and approving the proposed network prior to implementation. In addition, before any designing begins, public input sessions are held on themes that are critical to the study area. With the Central Indiana Land Trust's Greening the Crossroads conservation plan, four public sessions were held, each attended by between 22 and 40 participants (Amundsen and Chapman 2009).

This input phase grounds the design of a green infrastructure network. Following the public sessions, a TCF team works with local experts to study the landscape, break it into large components, and identify within those components key wildlife as focal species. These species' requirements for health and safety set a standard to ensure the network provides adequate

protection to sustain local ecosystems. A Technical Advisory Team of regional, state, and local experts oversees this process, from approving TCF's methodology to developing a GIS model for the focal species' habitat requirements that will become the basis for the plan's core areas (Amundsen and Chapman 2009).

TCF's green infrastructure GIS models are built using the most up-to-date Esri desktop software and can be used "out of the box" with Esri's raster spatial analysis extension installed. TCF has custom landscape-based green infrastructure network design and functional connectivity/corridor design toolboxes that allow the models to be dynamically re-run as new data becomes available.

TCF's process is not complete without a network implementation plan, a framework that matches the network's needs with available resources, including planning tools, programs, and funding sources. This plan also creates a monitoring system by which local partners and networks can gauge their progress based in part on the goals identified by the leadership forum and public input sessions. It assigns roles and responsibilities among stakeholders and plans for regular, at minimum annual, gatherings of the leadership forum to ensure the plan is on track.

TCF continues to set the standard for green infrastructure planning across the country due to both its project work as well as courses in GIP led by the Conservation Leadership Network. It is the only organization to have led green infrastructure planning in four of the United States' largest metro areas: Chicago, Nashville, Houston, and Los Angeles. Its networks have protected over seven million acres across the country, including land in all 50 states (The Conservation Fund a). TCF's planning has also assumed a variety of forms from the largest green infrastructure network that spans 13 states to a pioneering approach to flood management through land acquisition (The Conservation Fund b). As indicated by the recent America Planning Association Report called *Green Infrastructure: A Landscape Approach*, the method is becoming widespread in its application. Given the host of challenges facing conservation, GIP's balanced approach to biodiversity and economic development and emphasis on protecting interconnected natural networks make it a critical player in the field of conservation planning.

The Trust for Public Land's Greenprinting

Starting in 2002, The Trust for Public Land's (TPL) commitment to conserving land for people to enjoy as parks and protecting livable places led to a new offering for meeting communities' open space and conservation goals (Hart 2013). Ten years later, TPL's Greenprinting is a leader in the field of conservation planning with over 45 complete Greenprints that have generated $85 million in new conservation funding and protected over 153,000 acres (The Trust for Public Land 2012).

As in the case of TCF's GIP, TPL offers Greenprinting as a fee-based,[60] year-long process. Greenprinting is designed to "help communities and regions make informed decisions about how

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[60] Prior to beginning a Greenprint, TPL's team uses a careful scoping process to gather critical preliminary information that allows them to ascertain whether Greenprinting would be an appropriate fit for a would-be partner. As part of this process, TPL explores with a partner what a Greenprint costs and if/how the process could be funded. Generally, Greenprints require between $100,000 and $300,000. However, TPL has never turned a potential partner

to grow while preserving community character, opportunities for recreation, clean water, environmental benefits, and quality of life" (The Trust for Public Land 2012, 1). Unlike the biodiversity-driven approaches of Conservation by Design and GIP, Greenprinting develops conservation plans that reflect the values and regional and local priorities of partner communities. Greenprints assist communities in articulating their own visions for making strategic, cost-effective investments that represent their values (Garfield Legacy Project 2012). They guide voluntary land conservation with willing landowners through intensive community engagement, computer modeling and GIS mapping, and action planning.

For each of the 45 Greenprints that TPL has produced in partnership with land trusts, local governments, and communities across the country, TPL has individualized its planning process (Hart 2013). That said, TPL's planning consistently incorporates four phases: (1) community outreach; (2) identify community goals; (3) map priorities for each goal; and (4) determine realistic steps for implementation. These phases can be further broken down into the following seven steps: (1) current conditions analysis; (2) goal setting and public engagement; (3) model design and data collection; (4) model presentation and final refinement; (5) action planning; (6) final products; and (7) support program design (Hart 2013).

In comparison to alternative methodologies, Greenprinting is particularly rigorous in engaging communities in planning. For each Greenprint, extensive outreach is used to identify local conservation goals and define project objectives. At minimum, this includes the organizing of a steering committee of local stakeholders, conducting personal interviews with a range of residents, hosting community forums, and forming a technical advisory team, a group of local and state experts who oversee the plan's mapping.[61] A series of public listening sessions are typically used not only to set the plan's goals, but also prioritize them. This input is combined with careful research on environmental, social, economic, educational, cultural, and recreational factors prior to GIS analysis (The Trust for Public Land 2011). For each Greenprint, TPL then works with a Technical Advisory Team to identify GIS data and apply a criteria analysis approach to creating an interactive GIS model. Within the model, conservation goals and criteria are ranked and weighted to reflect local input to create a set of full-color maps.

Like TCF's GIP, Greenprinting establishes an action plan to guide implementation. TPL recognizes that a Greenprint is only valuable to the extent that it is actively used to "facilitate an acceleration of both the pace and quality of land conservation" (The Trust for Public Land 2011). In the case of the Sebago Lake Region Greenprint's action plan, five steps were identified for implementation: (1) strengthen roles and partnerships to implement the Greenprint; (2) use the Greenprint goals and maps to further land conservation; (3) promote conservation of natural resources and recreation to support the economy and tourism; (4) provide resources to assist municipalities and inform land use decisions to protect small town character; and (5) discuss and determine appropriate methods for financing open space protection projects in mapped priority areas (The Trust for Public Land 2011). To facilitate the success of these steps, the TPL team

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away and is willing to work closely with an organization to develop funding sources. (personal communications with Kelley Hart).

[61] Personal interview with Kelley Hart conducted by Nicole Schneidman March 8, 2013.

assists their local partners in creating marketing materials and establishing rigorous evaluation practices.

Over the last 10 years, TPL has refined Greenprinting to make use of the latest planning and technological advances. TPL has gone to great lengths to "truly capture the perspective of the person on the street" by canvassing well-used public spaces from farmer's markets to ice skating rinks to local basketball games.[62] In addition, TPL makes use of the most up-to-date ESRI software, using Esri's ModelBuilder to develop transparent, easy to understand, replicable models.

TPL develops decision-support tools through custom online, interactive mapping sites that allow community members to update the Greenprint over time. Nearly all of the online mapping sites that TPL custom develops are password protected for land conservation practitioners who were partners or stakeholders in the Greenprint project. These sites are carefully designed to assist real estate practitioners in identifying new conservation opportunity lands or in responding to requests for conservation action by others. These sites include query functionality that incorporates the project selection criteria identified by the practitioners so that they can run searches to hone in on parcels that meet their missions, funding parameters or urgency factors. Besides parcel query tools, the online mapping sites include parcel reports and custom mapmaking tools.

In addition, TPL has integrated a keypad voting system that links into the Greenprint GIS model so that participants in stakeholder meetings can identify the conservation goals important to them in real time, and with the click of a few buttons, the maps reflect those preferences immediately. The online mapping websites' analytics are monitored by the TPL team in addition to yearly evaluations that TPL conducts for all of its Greenprints to remain abreast of their partners' progress and improve the effectiveness of their approach.[63]

The Land Trust Alliance's Strategic Conservation Planning

In the early 2000s, the Land Trust Alliance (LTA) undertook an organizational strategic planning process to respond to the urgent challenge of the yearly loss of two million acres of agricultural and natural lands to development (Land Trust Alliance 2004). Recognizing the demand to "protect our most cherished landscapes before they will be lost forever" (Land Trust Alliance 2004, 1), LTA established four mission-critical goals, including encouraging strategic conservation. LTA's resulting vision for a "training program on strategic conservation including a portfolio of approaches to conservation planning" (Land Trust Alliance 2004, 3) has become Strategic Conservation Planning.

The challenge for LTA was that the land trust movement is very diverse, in terms of capacity of land trusts (all volunteer vs. paid staff), the size of the land trust service areas (a single town vs. multi-state), and most importantly the diversity of land trust missions. Many of the conservation

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[62] Kelley Hart (see footnote 61).

[63] Kelley Hart (see footnote 61).

planning methods, such as TNC's 5S method or National Audubon's Important Bird Areas were very focused on a particular mission or goal, such as biodiversity conservation. LTA needed to create a guide for the conservation community that was comprehensive and inclusive in terms of mission. Strategic Conservation Planning is an umbrella term that implies a flexible planning process, which includes an orientation to a number of different conservation planning methods, such as Greenprint, TCF's GIP, and others. Strategic conservation planning is the overarching process within which an organization can select a number of different prioritization methods that are appropriate for their needs and capacity.

LTA became further interested in developing a guide to Strategic Conservation Planning based on the results of its National Land Trust Census in 2005. According to the 2005 National Land Trust Census, the organizations that report having a strategic conservation plan conserved more than twice the total amount of acres, more than three times the number of conservation easements and nearly three times the number of fee parcels (Amundsen 2011). The benefits that accompany conservation planning, regardless of an entity's size, capacity, mission or scope, are undeniable. Interestingly the results from the 2005 census have been reaffirmed as the census of 2010 concluded that organizations with conservation plans preserved on average over twice the total number of acres of land of those without (Chang 2011).

As part of its commitment to fostering strategic conservation, in 2011 the Land Trust Alliance published *Strategic Conservation Planning* by Ole Amundsen, a the guide to orient land trusts of any capacity to current planning practices and assist them in "identifying, prioritizing, pursuing and protecting the land that will most effectively and efficiently achieve the land trust's mission" (2011, 13). *Strategic Conservation Planning* is organized to highlight the key components of effective planning: (1) getting started; (2) understanding your community; (3) setting priorities; and (4) implement your plan. Together, these steps are estimated to require 12 to 18 months and a financial investment ranging from a thousand dollars to tens of thousands of dollars.

Strategic Conservation Planning provides easy-to-manage guidelines to ensure readers are prepared for planning. It illustrates variations in the forms planning can assume, particularly in terms of degree of public involvement, GIS and other technology that can be involved, and even the types information that should be considered in crafting a plan, including "inspirational information" that considers the values and priorities that local cultural, historic, and recreational resources may reveal regarding a landscape (Amundsen 2011).

In terms of prioritization, *Strategic Conservation Planning* provides a two-step process that captures the overarching structure used by every major methodology to translate conservation priorities into GIS maps with defined areas for concentrated action: the development of project selection criteria and the identification of focus areas. Project selection criteria are the connection between a land trust's mission and its planning activities. They enable a trust to consider a potential project from many angles, including considering "the quality of resources values to be conserved, the viability of the project being completed, the threat to conservation values in the short and long term, and the capacity of the land trust to manage the property or defend the easement in perpetuity" (Amundsen 2011, 174). *Strategic Conservation Planning* categorizes these criteria according to their format as qualitative or intuitive criteria, threshold or screen-based criteria, quantitative criteria, or scoring systems using weighting. Each type of criteria is

analyzed in terms of its respective advantages and disadvantages and the audience that might find its format most useful (Amundsen 2011, 176–177).

Regardless of the form project selection criteria take, *Strategic Conservation Planning* provides guidelines for using them to identify land trust's focus areas, high-priority regions within service areas. These practices range from a "magic markers and minds" non-GIS approach to sophisticated GIS-based suitability analysis—such as Greenprinting or ecological planning based methods like TCF's GIP. The resulting maps with defined focus areas become the basis for the text's final section on Implementation, which provides land trusts with action planning steps to ensure organizations of any size use strategic partnerships, careful outreach, and regular monitoring to maximize on the return of their investments.

LTA's *Strategic Conservation Planning* marked a critical development in the field of conversation planning. Rather than offering a competing methodology, *Strategic Conservation Planning* took a significant step in making planning accessible to a broader audience and especially, organizations of a range of capacities. Since Strategic Conservation Planning is a flexible process it is applicable beyond the land trust community, including municipalities, counties, and other NGOs such as watershed associations. With the emergence and ascendance of collaborative large landscape-scale conservation initiatives and frameworks, Strategic Conservation Planning provides those practitioners with insight into the land trust community and how to build landscape vision that reflects a wide variety of missions of partners. The LTA has continued to build upon this foundational work to improve the effectiveness and efficiency of the land trust movement. The most recent National Land Trust Census offers hopeful indications of the effect of LTA's strategic conservation planning endeavors. Compared to previous census measurements, land trusts across the United States in 2010 had protected more land, engaged more people in "on-the-ground conservation," and become more strategic, sustainable, and accountable with their investments and standards of practice (Chang 2011, 4).

The Conservation Fund's Optimization Modeling

As a field, conservation planning was inspired by a need to ensure practitioners get the greatest "bang for their buck." With any of the leading planning methodologies, a motivating intent is to maximize the returns of organizational investments in the face of pressing conservation threats and limited resources. However, planning methodologies differ in the degree to which they directly engage with the realities of one limited resource: funding. The Conservation Fund (TCF) in collaboration with the University of Delaware and Cornell University is breaking ground in directly addressing this with Optimization Modeling.

Project selection criteria were a key innovation of conservation planning in the early 2000s and succeeded in establishing a more transparent process for organizations to evaluate potential conservation projects. However, concerns have arisen regarding how these criteria can ensure funding is used to its maximum effect. This issue has spurred optimization, a branch of economics and operations research studies that is enabling conservationists to conserve more with current budgets or gain the same benefits at a lower cost (Amundsen, Messer, and Allen 2010). Optimization builds on rank based processes for project selection including the Lincoln Institute of Land Policy's *A Methodology for Valuing Town Conservation Land* that considers

conservation value, market value, and replacement value (Brown and Fausold 1998). Optimization achieves this by considering the total benefits of a collection of potential projects as opposed to the isolated value of each project.

TCF has developed a computer model that performs this type of analysis, translating raw data regarding project options into an easy-to-use spreadsheet with cost-effectiveness comparisons. In its early implementation, TCF's Optimization Modeling has yielded significant results. The Baltimore County Agricultural Land Preservation Program's use of the model has led to the saving of 22 percent more farmland than would have otherwise occurred in three years, resulting in the protection of an additional 680 acres of high-quality agricultural land with a savings of approximately $5.4 million (The Conservation Fund c).

Optimization modeling can be very intensive since it often requires large data sets and accurate land value information. For many land trusts and other organizations with modest staff or capacity, another approach is Cost-Effectiveness Analysis, a method that is most appropriate for evaluating a small pool of potential acquisitions because it involves a couple of simple mathematical calculations. If the land trust uses a quantitative parcel selection process, this tool can be easily incorporated into the evaluation system (Amundsen 2011).

Both Optimization Modeling and Cost-Effectiveness Analysis are likely part of the next evolution of conservation prioritization and planning. As demonstrated by the formation of the Institute for Computational Sustainability at Cornell University and the Natural Capital Project, a partnership between Stanford University, the University of Minnesota, The Nature Conservancy, and World Wildlife Fund, a new field of using computer science and economic modeling to address complex social issues is quickly emerging. However, additional work is necessary to ensure that these cost considerations are integrated into larger planning methodologies and overcome organizational cultural obstacles of implementing a new approach to conservation decision making.

The Conservation Priority Setting Methodology (CPSM) within the Field of Conservation Planning

As a field, conservation planning has made significant advancements over the last two decades in an effort to counteract the escalating threats facing conservation. Although each was designed with the needs of a target audience in mind, the methodologies that currently lead the practice share much in common, especially in terms of overarching structure and the trends that have influenced their refinement.

Each of the comprehensive planning methodologies discussed here consist of four shared phases that the Land Trust Alliance's Strategic Conservation Planning accurately identifies as (1) getting started; (2) understanding your community; (3) setting priorities; and (4) implement your plan (Amundsen 2011). Unquestionably, an element of these approaches' success stems from their shared commitment to not only drafting conservation plans, but rigorously engaging local partners and community members in implementation and tracking the effectiveness of their work.

In addition to sharing this structure, the leading methodologies' evolutions reflect common trends in planning. Across the board, methodologies are increasing efforts to balance their use of the latest scientific research and technology with their consideration of the values and priorities of local communities. Perhaps most dramatically signaled by TNC's reexamination of Conservation Action Planning, the planning community has acknowledged that public engagement and support is necessary for conservation strategies to be successful and sustainable. This in turn has led to a broader range of opportunities for community members to become involved in planning, whether participating in a one-time phone interview or serving on a technical advisory team.

This shift towards increased public transparency and involvement has also required many of the planning approaches to consider the challenge central to CPSM—prioritizing the incommensurable. To address this, each methodology has developed its own ranking and weighting system. They differ in complexity, the level of accuracy they claim, and the degree to which they publicize their respective recipes for computing priorities. However, each of the practitioners behind these methodologies acknowledge that the results of their weighting or ranking processes are as yet unable to exactly represent public priorities, particularly in light of challenges related to insufficient data and the abstract nature of certain public values.

Within this field, CPSM's role is not yet clearly defined. Unlike the leading planning methodologies, CPSM does not offer a comprehensive planning process and in terms of implementation, relies largely on the diligence and ingenuity of partner organizations. When compared with the level of guidance provided by alternative approaches, this lack of direction impacts the likelihood that clients can and will succeed in achieving their goals without additional investment of time and resources.

In addition, due to its more narrow focus on values prioritization, the CPSM model does not allow practitioners to consider factors critical to the success of a conservation plan beyond conservation values. Since it relies on implementing organizations to independently develop actionable strategies, CPSM does not, as yet, offer a framework that would allow practitioners to consider planning issues, such as funding options as in the case of Optimization Modeling and Conservation by Design or connectivity to the degree offered by TCF's GIP.

Considering the current field of planning, CPSM might be more appropriately offered as a decision-supporting tool rather than a comprehensive planning methodology. Unlike GIPs or Greenprinting, which have been implemented dozens of times across the country over the last 10 years, CPSM has only been used as part of three planning processes. This limited sample size means that the approach has not had the same opportunity for refinement that other processes have benefitted from. It would likely require similar investment and study before it could offer a comparable level of guidance to that of a fully developed methodology. However, as a decision-support tool, CPSM can already offer several contributions that could be effective in complementing other planning practices.

CPSM strikes a balance between the analytically intensive planning services offered by TCF and TPL and the self-guided approach of *Strategic Conservation Planning.* Conservation planning requires a significant investment of time and resources for any organization or community to be

successful. The $100,000 to $300,000 that a Greenprint costs is not affordable for many organizations.[64] And, while *Strategic Conservation Planning* has succeed in providing a thorough guide for land trusts to familiarize themselves with the best practices in the field, there are benefits to having a set of outside experts engage with a study area and a community's values. In this regard, CPSM may offer a middle ground, especially if adjustments are made to ensure it is not cost-prohibitive to organizations with limited funding and staff resources.

The intensive, but brief involvement of the outside "conservation communicators" means that in CPSM, the majority of the work required to compose a conservation plan and GIS maps becomes the responsibility of local practitioners. While the disadvantages to this approach have been acknowledged, it also poses a set of opportunities. To the degree that an organization or group of stakeholders is able to succeed in finalizing, implementing, tracking, and updating a conservation plan, it is entirely their own product and success. In this sense, the narrow scope of CPSM may enable organizations to build greater local capacity and stronger relationships by taking the lead in generating the buy-in required for a locally-driven process to succeed.

In addition, in contrast to weighting practices epitomized by the 1998 workshop Dan Perlman attended in India, CPSM broke ground in intentionally avoiding the use of exact percentages in weighting. The grading system that CPSM has pioneered offers an alternative that merits additional exploration. Perlman's grading forces practitioners to acknowledge the limitations of prioritization as an inexact, comparative exercise. It avoids the temptation that can accompany weighting for stakeholders assuming that the results of a community's public-priority setting can be readily translated into highly accurate numeric figures.[65] Before CPSM's grading can be considered for further application, however, it requires refinement. Although significant progress was made in the span of the three original applications of CPSM, it is clear from the feedback of the staff of the MLC and MBOSG that a greater of level of support should be provided to ensure practitioners can easily use their graded values matrices as the basis for GIS analysis.

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[64] It is difficult to determine the total cost of implementing CPSM. The cost of organizing CPSM's two-day public workshop is estimated at $70,000. However, in the case of the MBOSG, Stephanie Weigel noted that the combined costs of the public workshop, community outreach, and follow-up mapping process may have matched the cost of the Greenprinting process.

[65] It is important to note that weighting practices that employ percentages, such as that used by Greenprinting, can and do account for inadequate data. In the case of Greenprinting, special explanation is provided to ensure practitioners appreciate that planning is not an exact science, but rather a process that makes use of the best information available to guide decision-making (personal communication with Kelley Hart). This employment of percentages may have its own advantages as compared to the rough system devised for CPSM, especially in terms of its efficiency.

Conclusion

Fifteen years since Dan Perlman attended the priority-setting workshop that inspired CPSM, the three limiting factors that drove his methodology's development remain central concerns for the field of conservation planning. Especially in light of the new challenges accompanying climate change and rapid urban expansion, the questions posed by incommensurable values, incomplete data, and insufficient funding require attention more than ever. In response to these factors, community-driven processes that account for a range of conservation values have become more influential in conservation planning.

Within the current field of conservation planning, CPSM as yet does not offer a comparable approach to more refined and widely applied methodologies such as TPL's Greenprinting or TCF's GIP. However, its process nonetheless merits continued exploration in light of its success as a transparent public engagement tool that acknowledges the realities of data limitations for planning. In its three pilot applications, CPSM demonstrated its potential as an easy-to-follow process that is broadly accessible and successful in achieving consensus at the local and regional level. In addition, CPSM made an important contribution to the larger field of planning in its drawing public attention to the need for planning that balances local expertise with the latest technical tools to account for the incomplete nature of available data.

These successes are tempered by portions of the methodology that require refinement before CPSM can be implemented again. In particular, guidelines that fully document CPSM's workshop and priority-setting process and offer clients examples by which to gauge their work must be developed. Further attention should also be invested in ensuring clients have the structure and feedback necessary to translate their values matrices into not only conservation plans, but successful implementation strategies and evaluation practices.

Considering the current field of conservation planning, CPSM may be more appropriately packaged moving forward as a decision-support tool rather than a planning methodology. Although many planning processes have developed their own mechanisms to account for the issues connected with incommensurable values and incomplete data, CPSM's straightforward approach to values analysis and calibration may be of interest as an add-on for alternative methodologies. Especially in the case of other approaches that are seeking options to become more community-driven or cognizant of data limitations, CPSM could offer an appealing opportunity. Further research is required to ascertain whether interest exists in CPSM being marketed in this fashion.

Although CPSM was designed as a facilitated process, the success of its values matrix design may merit further exploration to consider if it can be adapted as an open access tool. While any open access version of CPSM's three-step approach to creating values matrices would not rival the depth of the facilitated process, an open access values matrix tool may allow conservation organizations unable to commit to the investment of a CPSM workshop or full planning process to take their first steps in values-driven planning and priority setting.

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———. c. Optimization Modeling. http://www.conservationfund.org/our-conservation-strategy/major-programs/strategic-conservation/optimization-modeling/

Appendix A: Example Agenda from a Conservation Priority Setting Workshop

DAY ONE:

9:00   Introductions

9:20   Setting the Stage: Geography and Values

Facilitator will provide an introductory overview of the local landscape and challenges of working in conservation.

10:20 BREAK

10:30 Overview of Conservation Priority Setting Workshop Goals

Facilitator will provide an overview of the goals of the workshop including an introduction to the process, terminology, and expectations. He will use examples from a previous Conservation Priority Workshops to illustrate an example of how to create conservation priority decision-making guidelines.

Overview

We want to move from broad to fine in terms of identifying what is important, then from fine to broad in terms of evaluating these entities. We want to go from the major goals (protect buffers and separators, connectivity, community values, and water quality and quantity, etc.) to being able to decide whether to spend funds to acquire specific properties. We need to go from very broad to very specific for the guidelines.

11:00 Clarifying Conservation Values: *What is Important?*

Facilitator will briefly review the Conservation Values for the client as expressed in the organization mission statement and expressed planning goals. As a way   to clarify what these values mean to participants, facilitators will lead small groups   through a short exercise to begin the process of defining features.

SCENARIO: What do you want to know about a conservation parcel?

A land owner has approached the client about a piece of property that potentially has conservation values on it. You have been asked to help review the request and evaluate whether the land has any conservation potential for one of the OSG's Conservation Values. What questions do you have for the landowner about the parcel that might help you to evaluate its potential conservation value?

11: 30 Defining Features: *How do you know it is important?*

Facilitator will report back the results of the pre-workshop primer. This meeting was held to begin to define what the mission statement means to stakeholders and to begin to define the Features of the group's primary values. Features are the more specific descriptors that define important aspects of each Conservation Value. Features define important aspects of each Conservation Value. For example, for a parcel near a desert wash, soil permeability and groundcover would be especially important in determining its overall conservation value.

12:15 LUNCH

1:15 Review and Complete Features Identification

If not yet complete with Features, groups will wrap up their work. When completed, facilitators will report back the final list of Features for each Conservation Value clarifying meaning and intention.

2:00 Identifying Particulars: *What specifically describes a Feature?*

Particulars are the specific details of a Feature that are attached to a place. They describe the parcel in detail.

Scenario: What Particulars describe a Feature?

A landowner has approached you with an outstanding conservation acquisition opportunity. You can hardly wait to tell the other members of the client about it. When you reach them, what are you going to tell them about this slam dunk purchase? How would you describe it to them? What are a few of the particulars that make this parcel so great?

3:00 BREAK

3:15 Rank Ordering Particulars

Now that you have identified the Particulars of each Feature, it is time to determine which Particulars are of a higher priority than others. For example, is Particular X of a higher or lower importance than Particular Y under Feature #1?

3:30: Grading of Particulars

*You have just completed rank ordering the Particulars within each Feature. Next you will assign "grades" to the Particulars to indicate the importance of each Particular within a Feature. A grade of **A** indicates that the Particular is extremely important in meeting your group's goals, a **B** grade implies it is very important, **Neutral** means that if it is present that is good, but it is not enough alone to merit conservation action. In some cases, a Particular may actually have negative weighting that would possibly cause exclusion if present, in which case it is an **F**. More*

than one Particular in a Feature can share the same grade (e.g., there can be two Bs or four Neutrals).

4:00 Wrap up and End of Day

DAY TWO:

9:00   Review of Day One

9:30   Complete Prioritizing Features *within* a Conservation Value: Calibrating Grades Between Features

You have completed grading the Particulars within each Feature. Now it is time to further refine our priorities. In this exercise you will calibrate across Features and determine if the A's in Feature 1 are roughly equal to the A's in Feature 2 and so on.

10:30 BREAK

10:45 Testing the Conservation Value Decision Making Guidelines: *Choosing Between Similar Sites*

You have completed calibration of the criteria within your conservation value, so let's give it a test run! Facilitators will describe a scenario where the client must prioritize one similar conservation project over another.

11:15 Creating Priority Packages within Conservation Values

Great conservation parcels will likely contain a combination of important Particulars from several Features. Packages are combinations of graded Particulars that when present together help to identify priority conservation projects. What combinations of elements would make for great conservation projects in the client's service area?

12:00 LUNCH

1:00   Prioritizing between Conservation Values: *Choosing Between Dissimilar Sites*

While it might be easy to choose one buffer parcel over another buffer parcel, what do you do when you have to choose between a significant Desert Tortoise parcel and a valuable watershed infiltration parcel? Comparing apples with oranges is not as simple. This exercise will help to define the decision guidelines for these types of conservation challenges.

3:00   Utilizing GIS to Apply Decision Rules

A GIS expert will provide a brief introduction to Geographic Information Systems (GIS) and how it can help with this type of conservation planning and priority-setting. He will demonstrate how

once conservation priorities are clarified through decision making rules, GIS can be used to help identify and map parcels with conservation potential.

3:45   Next Steps, Evaluation of Workshop, and Wrap-up

4:00   END

Appendix B: The Montezuma Land Conservancy's Project Score Sheet

Conservation Value: Natural Resources — Species

Presence of wide ranging mammal habitat _____

Adjacency _____

Habitat Connectivity _____

Potential habitat for federally listed or state tracked plant, or plant community, or wildlife species of concern as determined by CDOW _____

OVERALL SCORE _____

Conservation Value: Natural Resources — Ecosystems

Intact/Non fragmented (developmental fragmentation) _____

Dominant vegetation/habitat type _____

Secondary vegetation/habitat type _____

Water features _____

Size of Relatively Natural Habitat _____

Percent cover of exotic plant species on property _____

OVERALL SCORE _____

Conservation Value: Scenic

Public Access to View _____

How much of the viewshed from public access point depends on the CE? _____

Adjacency _____

Quality of View (potential or existing) _____

Type of View _____

Contributes to Diversity of Views Protected, Rarity of View _____

OVERALL SCORE _____

Conservation Value: Agriculture

Precipitation/ Water _____

Dominant Soils _____

Size in Acres _____

Adjacency _____

Percent cover of exotic plant species on property _____

Development Pressure _____

OVERALL SCORE _____

Other Factors

Urgency

Opportunity

Other complementary conservation efforts

Appendix C: List of Interviewees

Albers, D'Anne. Personal interview conducted by Nicole Schneidman. Twentynine Palms,
    January 17, 2013.

Amundsen, Ole. Phone interview conducted by Nicole Schneidman. Phoenix, January 8, 2013.

Brown, Marlana. Personal interview conducted by Nicole Schneidman. Twentynine Palms,
    January 16, 2013.

Buickerood, Jimbo. Personal interview conducted by Nicole Schneidman. Durango,
    March 7, 2013.

Compton, Andrea. Personal interview conducted by Nicole Schneidman. Joshua Tree,
    January 18, 2013.

Curgus, Marjo. Phone interview conducted by Nicole Schneidman. Phone, December 21, 2012.

DiBari, John. Phone interview conducted by Nicole Schneidman. December 4, 2012.

Elder, Scot. Phone interview conducted by Nicole Schneidman, March 15, 2013.

Fernandez, Dan. Personal interview conducted by Nicole Schneidman. Cortez, March 6, 2013.

Flanagan, Pat. Personal interview conducted by Nicole Schneidman. Twentynine Palms,
    January 18, 2013.

Hart, Kelley. Personal interview conducted by Nicole Schneidman. Denver, March 8, 2013.

Honeycutt, Linda. Personal interview conducted by Nicole Schneidman. March 6, 2013.

Jones, Becky. Phone interview conducted by Nicole Schneidman. January 29, 2013.

Katz, Juniper. Phone and personal interviews conducted by Nicole Schneidman. Cortez,
    February 13 and March 7, 2013.

Kloster, Chris. Personal interview conducted by Nicole Schneidman. Cortez, March 6, 2013.

Laurenzi, Andy. Phone interview conducted by Nicole Schneidman. December 3, 2012.

Messaros, Karin. Personal interview conducted by Nicole Schneidman. Joshua Tree,
    January 17, 2013.

Murphy, Sean. Personal interview conducted by Nicole Schneidman. Joshua Tree,
    January 17, 2013.

Perlman, Dan. Personal interviews conducted by Nicole Schneidman. February 1, 6, and 25;
    and May 10, 2013.

Sauer, Curt. 2013. Phone interview conducted by Nicole Schneidman. January 29, 2013.

Turk, Laraine. Personal interview conducted by Nicole Schneidman. Twentynine Palms,
    January 18, 2013.

Weigel, Stephanie. Phone interviews conducted by Nicole Schneidman. Twentynine Palms, November 27, December 11, 2012.

Weigel, Stephanie. Personal interview conducted by Nicole Schneidman. Twentynine Palms. January 16, 2013.

Williams, Nina. Phone interview conducted by Nicole Schneidman. February 11, 2013.

Appendix D: Conservation Priority Setting Workshop Participant Interview Guide

GENERAL PARTICPANT IMPRESSIONS:

1. To get started before we dive too deeply into the details of the Conservation Priority Setting process, it would be great if you could share any general impressions that you still have regarding the process. For example, was the CPSM process valuable? Why?
2. Did the process impact how conservation work is being conducted in [client's service area]? How?

PARTICIPANT INVOLVEMENT:

3. How did you get involved with the Conservation Priority Setting work with the [client]?
4. When you learned of the intent to develop a strategic conservation plan, what was your opinion of its potential and suitability for [client]? What did you think it was going to accomplish?

PRE-WORKSHOP PREPARATIONS:

5. Prior to the CPSM workshop, [client] conducted community outreach including presentations at local organizations and gatherings to identify what the local community treasured in its service area. Did you attend or participate in any of these gatherings?

WORKSHOP:

6. How did you learn of the [client] Conservation Priority Setting workshop?
7. What were your expectations regarding the workshop?
8. Did you participate in the pre-workshop meeting to review the [client's] mission statement and conservation values?
    (IF YES):
    How did you find that first meeting?
    What was your reaction to the vocabulary (value, feature, particular) that was introduced? Were the terms easy to understand and apply?
9. The workshop was conducted over two days and focused primarily on developing the conservation value matrices based on [client's] conservation values. Did you attend the full workshop?
    (IF NO): What portions of the workshop did you attend?
10. What can you recall most vividly from the workshop? (Dan Perlman presentation on the area, building matrices, calibrating matrices, John GIS presentation, etc.)
11. What did you feel was most effective about the workshop?
12. What was your reaction to the outside facilitator (Dan Perlman)?
13. What did you find particularly effective about his approach? How could he have improved?
14. What parts of the workshop did you have difficulty with? Was there any information covered that you felt was too technical?
15. Do you recall which conservation value matrix group you were part of? Which one?

16. Did you find the vocabulary and process of identifying features and particulars intuitive and easy to complete?
17. At what point in the workshop, did you feel you were comfortable with its vocabulary?
18. What most surprised you about the process of identifying features and particulars? What did you find most challenging?
19. How did you find the process of calibrating features and particulars? Did that prompt your group to rethink the ranking of features and particulars?
20. Were you satisfied with the matrix and scoring your group arrived at by the end of the workshop?
21. Did you find the GIS presentation useful? Do you feel like participants left the workshop with an understanding of how their work would translate into a conservation plan and maps?
22. What did you perceive as the "next steps" following the workshop? What did you understand as the expected final product(s)?
23. Did you find yourself wanting extra time?
    (IF YES): What part of the process would you have liked more time for?
24. In the future, would you suggest that the workshop be shortened or lengthened?
25. What do you think reasonable expectations for the workshop should be if conducted in the future?

POST-WORKSHOP:

26. Following the workshop, did you feel more invested in the [client's] strategic planning process?
27. Did you feel like you were more able to understand and defend future conservation decisions made in the service area?
28. What was your impression of how other participants felt?
29. Following the workshop, how were you involved in the process of finalizing the value matrices and creating the strategic conservation plan?
30. Looking back, what do you think was most successful about the post-workshop follow up work?
31. What kind of information or steps do you think could have improved that follow up process?

EVALUATION:

32. How would you rate the quality of the services/experience provided via Conservation Priority Setting? Fair, Average, Good, Excellent
33. How would you rate the knowledgeableness of the staff involved? Fair, Average, Good, Excellent
34. How have you seen the impact of the workshop and subsequent strategic conservation planning? Did anything surprise you regarding the results?
35. Do you have a sense of if/how the values matrices and composite maps have been used? Have you used the information? (Would you think it accurate to state "the CPSM tools have been utilized")
36. Have you reviewed the final Strategic Conservation Plan?
37. In your mind, if/what impact has it had thus far?

38. To your knowledge, has the CPSM process led or influenced government action?
39. Allowed [client] to leverage or secure funding?
40. Do you believe the Conservation Priority Setting process built capacity for [client]?
41. Help foster lasting relationships?
42. Improve upon an existing conservation program?
43. Part of the intent of the Conservation Priority Setting methodology is to apply a values-driven and data-supported approach to conservation decision making as opposed to purely data-driven. Did you see evidence of that distinction? How? What results did it have?
44. If [client] needed to revisit the matrices and composite maps, do you feel a facilitator would be necessary or could the process be repeated independently?

FUTURE IMPLEMENTATION:

45. Would you recommend the Conservation Priority Setting methodology for guiding other organizations in developing a strategic conservation plan? Why?
46. Who do you think would be the best audience for the process in the future?
47. What improvements do you think would be necessary before the process was applied again?
48. Do you think improving the efficiency of the process is necessary? Why?
49. Do you think an outside facilitator(s) is necessary for the process to be successful?

Appendix E: Conservation Priority Setting Evaluation Participant Interview Results

Question	MLC (N=8)		MBOSG (N=10)		Total (N=18)	
	Yes (%)	No (%)	Yes (%)	No (%)	Yes (%)	No (%)
Was the CPSM process valuable?	86%	14%	100%	0%	94%	6%
Did the process impact how conservation work is being conducted the region?	80%	20%	71%	29%	75%	25%
Did you find the vocabulary and process of identifying features and particulars intuitive?	80%	20%	38%	62%	57%	43%
Were you satisfied with the matrix and scoring your group arrived at the end of the workshop?	50%	50%	80%	20%	66%	33%
Did you find the GIS presentation useful?	50%	50%	20%	80%	33%	66%
Following the workshop, did you feel more invested in the planning process?	60%	40%	62%	38%	61%	39%
Following the workshop, did you feel like you were better able to understand and/or defend conservation decision-making in the region?	66%	33%	87%	13%	78%	22%
Do you have a sense of how the results of the conservation plan have been used?	66%	33%	50%	50%	57%	43%
Have you reviewed the final conservation plan?	50%	50%	62%	38%	57%	43%
To your knowledge, has CPSM led to or influenced government action?	20%	80%	43%	57%	33%	66%

To your knowledge, has CPSM led to additional funding being secured for conservation work?	75%	25%	50%	50%	61%	39%
Did CPSM build capacity for (MLC/MBOSG)?	40%	60%	66%	33%	54%	46%
Did you see evidence of CPSM being a values-driven and data-supported process rather than purely data-driven?	80%	20%	100%	0%	91%	9%
Would you recommend CPSM for guiding other organizations in developing a conservation plan?	100%	0%	100%	0%	100%	0%