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Learning the Lay of Their Land: Data Recording by Maine Land Trusts

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ABSTRACT

Land trusts have led the recent, rapid expansion in private land conservation in the US. As they have grown, many questions have emerged as to the value of their conservation efforts, especially in the long-term. To address this data gap, studies have evaluated easement restrictions and the characteristics of land trust protected property. I take a novel approach by investigating the data that land trusts record about their protected properties and its impact on their capacity to protect conservation values. I surveyed 55 land trusts operating in Maine about data they record in baseline documentation reports. A majority (82%) had a baseline report, and a majority (55.6%) of those applied it to both conservation easements and fee owned land. Land trusts required very different types of data to be recorded on baseline reports: no variables were required by all and only three were required by more than 75%. Land trusts also tended to require relatively coarse resolution or administrative variables more often than higher resolution, ecological variables. Land trusts that identified "wildlife habitat or important biodiversity features" as their primary priority had more standardized data requirements than other types of trusts; however, the trend of decreased recording with increased resolution remained. My findings suggest that the aggregate Maine land trust community is not well suited to conduct landscape scale analyses that require synthesis of standardized ecological data. Recording of invasive species was particularly unlikely. Collectively, land trusts in the US now protect enough property to impact entire landscapes, and their influence is growing. If Maine land trusts are representative of land trusts nationwide, as I suggest, then I recommend that recording practices mandated by the Land Trust Alliance should be reconsidered to develop reasonable data standardization requirements.

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INTRODUCTION

Land trusts are important and growing conservation actors in the US. Nationwide, between 2000 and 2005, the number of land trusts increased 34%, acres conserved by state and local land trusts doubled, and acres in conservation easement (hereafter "easement") increased 148% (Aldrich & Wyerman 2006). As of 2005, over 1,700 land trusts protected 37 million acres in the US, an area roughly the size of the state of Illinois (Aldrich & Wyerman 2006).

The term land trust confers no legal requirements on an organization, and therefore many diverse groups can label themselves a land trust. In fact, legal requirements for land trusts exist only in the form of requirements for non-profits or for the holders of conservation easements. The Land Trust Alliance[1] (LTA) provides the widely accepted definition of a land trust: "a non-profit organization that, as all or part of its mission, actively works to conserve land by undertaking or assisting in land or conservation easement acquisition, or by its stewardship of such land or easements" (LTA 2009a). Land trusts typically rely heavily on donations of time and money to support their operations. Staff size varies between land trusts and some may not have any staff at all (Brewer 2003).

Land trusts conserve land through purchase, called fee owned land, or conservation easements. A conservation easement permanently restricts some land uses, such as development or timber harvesting, while allowing a landowner to retain ownership of the property. Landowners may donate or sell land and conservation easements to a third party, usually a land trust. In these cases, a land trust holds only the right to enforce the restrictions of the conservation easement (Gustanski & Squires 2000).

Land trusts can play several important roles for land conservation. First, the most biologically productive lands were historically the first sold or granted to private individuals. They are generally characterized by relatively low elevation, high moisture content and rich soils, which make them agriculturally productive. These characteristics

[1] LTA is a national organization dedicated to strengthening land private conservation efforts throughout the US. It does so by producing educational materials and operational standards for land trusts, and it conducts censuses of the land trust community (LTA 2009).

also make them rich biodiversity habitats (Scott et al. 2001). Using conservation easements, land trusts can protect much of this land without actually having to purchase it. Additionally, many public conservation lands were not strategically acquired for biodiversity protection (Margules & Pressy 2000). Instead they were often purchased because they were remote, rugged, and economically unproductive (Pressy et al. 1996). As small organizations, land trusts can generally act more nimbly and decisively than the government, allowing them to conserve land effectively in areas facing urban and suburban sprawl. That urban and ex-urban areas grew nationally by over 400% between 1950 and 2000 highlights the importance of such swift conservation action (Brown et al. 2005). Finally, the immense amount of land already protected, monitored, and managed by land trusts is a vast source of biological data and a defense against the largest threat to terrestrial biodiversity: habitat loss (Mace et al. 2005).

Until recently little research had been done to quantitatively assess the utility of land trusts as a conservation tool. In 2004, a review of literature and data on the rapidly proliferating land trust community (Merenlender et al. 2004) found that there was little information available on the resources land trusts tend to protect, the spatial patterns of land trust protected properties, the resiliency of land trust protection in the long-term, and the efficacy of land trust management actions. One of the main reasons for the data gaps was the absence of standardized data sets that described conservation easements in terms of "location, ownership, ecological type and proximity to and/or connectivity with other protected lands" (Merenlender et al. 2004).

Since that report was published, scientific understanding of the conservation value of land trusts has increased. Rissman et al. (2007) find that easement restrictions held by The Nature Conservancy tend to reduce development and protect biodiversity, but may also allow for limited development and parcelization. Further, The Nature Conservancy has had difficulty maintaining long-term monitoring and enforcement of its properties. Many other trusts likely face this dilemma due to scarce resources (Campopiano 2006). In the San Francisco Bay area, easements offer widely varying levels of protection to properties, and fee owned and easement land tends to protect differing habitat types (Rissman & Merenlender 2008). Also, state-level data sets have become increasingly available through geographic information systems (GIS) in states such as Colorado,

California, Virginia, Oregon, Massachusetts, and Vermont. These data sets help to answer questions of ownership and location, although data on ecological type and easement restrictions is still limited. Overall, assessments of the entire land trust community, or a representative sample, are still lacking.

Published research on land trusts has tended to evaluate their utility as a conservation tool by focusing on past actions, in the form of easement restrictions (Block et al. 2004; Crehan et al. 2005; Rissman et al. 2007) monitoring success (Block et al. 2004; Kiesecker et al. 2007), and types of protected habitats (Rissman & Merenlender 2008). I believe that utility of land trusts should also be evaluated based upon their capacity or potential to protect various conservation values – types of land, different species, natural features, etc – in the long-term. That capacity is determined to a large degree by the data land trusts record on their protected properties. Such data will help land trusts identify conservation values and threats to them, as well as form the basis for future decisions about enforcement, stewardship, and restoration. More data will, in theory, enable better decision making. Little is known, however, about the information land trusts record on their protected properties and how they track it.

In this study, I investigate what land trusts operating in Maine know (i.e., record) about their protected properties, primarily by analyzing the data land trusts require to be recorded in baseline documentation reports (hereafter "baseline reports"). I first discuss Maine as an appropriate case study, describe current recording requirements, then summarize the results of the survey I developed and administered to land trusts operating in Maine. I conclude with a discussion of the implications on the ability of land trusts to protect both on-property and landscape level conservation values.

MAINE AS A CASE STUDY

Maine is an appropriate case study for three reasons. First, its land trusts are national leaders in conservation. As of 2005, Maine had the second most privately conserved acres (1,717,657 acres), the second highest percent of its land privately conserved (8.7%), the second largest increase in privately protected land between 2000 and 2005 (1,156%), and it ranked first in land trusts per capita (6.48×10^{-5}) (Aldrich &

Wyerman 2006; Roche et al. 2008). As of 2008, the 93 land trusts operating in Maine protected about 1.97 million acres, or 9.67% of the state, and are active in all its regions (MSPO 2008). Following a national trend, easements are growing much faster than fee owned land in Maine, and there is wide diversity among the missions, scopes, and ages of Maine land trusts (Aldrich & Wyerman 2006; Roche et al. 2008). The state has had a land trusts network for over 14 years, which provides land trusts with a forum for collective discussion and problem solving, potentially including recording practices (MLTN 2006). As national leaders in many indicators of conservation and with a well organized network, it is probable that Maine land trusts also lead in data recording and tracking.

Second, the unique combination of land trusts, demographics, and natural resources in Maine make the state a feasible microcosm for the nation as a whole. Land trusts throughout the US have a wide array of conservation priorities, and Maine offers an abundance of diverse characteristics for land trusts to prioritize. Northern Maine constitutes the largest contiguous forested area in the US east of the Mississippi (Acheson 2008), the state contains 6,000 lakes and ponds, 5,300 miles of coastline, over 4,600 islands, 15 distinct biophysical regions, and a plethora of family farms and historic buildings (MEGIS 2006; MSPO 2006). Within these habitats live 49 species of threatened and endangered fish and wildlife, listed on US or State endangered species lists (DIFW 2007a). Additionally, the Maine population of 1.27 million is concentrated in the coastal south, leaving over half the state totally or nearly unoccupied (MDC 2005). As a result, the challenges faced by Maine land trusts may be similar to those faced in both rural, suburban, and urban areas, as well as densely or sparsely populated states.

Lastly, to pursue their conservation and stewardship goals, Maine land trusts face many of the same challenges as those in other states. Land trusts nationwide rely heavily on fundraising from private individuals, and this will likely become harder to obtain during an economic recession. Using scarce funding for data recording, tracking, and stewardship decreases the amount available to conserve more land (Tenenbaum 2000). This tradeoff may become increasingly unappealing as real estate values decline. In Maine, the challenge is heightened by a rapid decrease in land controlled by timber companies, as logging becomes unprofitable, which has fueled an equally rapid increase in land owned by real estate trusts intent on development (Brookings 2006). Finally,

many Maine land trusts, like others around the nation, are working toward accreditation, a process intended to improve land trust operations and provide tangible proof of their commitment to responsible conservation. Meeting the requirements is costly, in both time and money, especially for the many small land trusts with few or no staff. As a testament to this challenge, the mean number of hours spent just preparing the application – after the land trust has already worked to make sure it has met all the requirements – is 400 hours (LTAC 2009). Also, since the accreditation process opened in 2008, only one Maine land trust has been accredited and two others have applied; all three are statewide trusts with relatively large budgets.

LAND TRUST HISTORY

Land trusts have existed in the US for over a century, and have most often formed in response to rapid population growth or development of land (Gustanski & Squires 2000). Founded in 1891 and still operating, the Trustees of Public Reservations in Massachusetts lays claim to the oldest land trust in the US (Gustanski & Squires 2000). The first land trust in Maine, the Hancock County Trustees of Public Reservations (now defunct), was founded shortly after in 1901. It operated on Mount Desert Island and was formed in response to the loss of public spaces due to development (Brewer 2003).

Since the founding of the Trustees of Reservations, the combination of World War I, the Great Depression, World War II and successful government conservation kept interest in private land conservation low. Roughly 50 land trusts existed by 1950, mostly confined to New England. By the mid 1960s, however, the expanding environmental movement led to rapid growth in new land trusts (Brewer 2003). Then totaling 132, land trusts had primarily spread throughout the North East and Mid-Atlantic states (Gustanski & Squires 2000). The 1980's witnessed explosive growth of land trusts, fueled by a loss of faith in the ability of state and federal governments to adequately protect land, coupled with an increase in communication among land trusts that helped foster a national land trust community (Brewer 2003). Growth in both in both land trusts and conservation easements appears exponential, with the fastest growth occurring most recently. Between

2000 and 2005, the number of state and local land trusts increased 32% and their acreage of conservation easements increased 148% (Aldrich & Wyerman 2006).

HISTORY OF CONSERVATION EASEMENT LAW

For hundreds of years, English common law – the basis of the US legal system – has recognized that land ownership confers upon the landowner a bundle of rights, and that he or she may separate and convey each of those rights to others if they so choose. A conservation easement separates and conveys certain property rights to a land trust, so it has a long standing legal basis.

The idea of a conservation easement as a charitable, tax-deductible contribution, however, has only existed since the 1970s. The Tax Reform Act of 1976 and the Tax Reduction and Simplification Act of 1977 legalized tax-deductions for conservation easements until 1980, a strategy to encourage land owners to increase private conservation. In 1980, Congress permanently legalized the tax-deductions through the Tax Treatment Extension Act, incorporating easements into the Internal Revenue Code. In 1997, the Tax Payer Relief Act provided a further incentive, by decreasing the estate tax on landowners that donate easements (TNC 2009). The Pension Protection Act of 2006 increased the tax deduction generated by easement donation (LTA 2009a).

In 1981, the National Conference of Commissioners on Uniform State Laws adopted the Uniform Conservation Easement Act (UCEA). This has served as a model for states to adopt, and nearly all have currently enacted it into law in some form. The key provisions of UCEA are that it (1) allows land owners to attach obligations and/or restrictions on their property in perpetuity, and it (2) defines conservation easements as non-possessory interests in real land, meaning that the holder of the easement does not own the land, but rather has the right to enforce the restrictions and affirmative duties of the easement on current and future landowners. Maine passed its version of UCEA in 1985, then amended it in 2007 (Gustanski and Squires 2000). One unique provision is that it requires all easement holders to monitor each easement once every three years; however, it does not specify how. Land owners primarily donate easements to land trusts, although they may also donate to a local, state, or the federal government.

CURRENT LAND TRUST RECORDING REQUIREMENTS

There are no legal requirements for land trusts to record data on their protected properties. Instead, LTA has developed standards for data recording that are broadly accepted as the requirements that land trusts strive to attain. These requirements are among 42 indicator practices enumerated in *Land Trust Standards and Practices (S&P).* The Land Trust Accreditation Committee (LTAC), an independent program of LTA, uses *S&P* to accredit land trusts. Although only 53 (3.2%) land trusts nationwide have received accreditation since LTAC launched the program in 2008, many more are likely working towards accreditation and/or have already met many of the requirements (LTAC 2009). LTAC offers the only accreditation in the nation, accreditation reflects positively on the land trust and the land trust community as a whole, and the requirements are intended to improve land trust performance. *S&P* was written in 1989 and was last updated in 2004, so one can expect that land trusts have had sufficient time to read, interpret, and begin working towards meeting its requirements.

The five requirements in *S&P* most relevant to this study involve site inspection, data recording and monitoring. For all properties, land trusts must perform a site inspection which serves, among other purposes, "to identify the important conservation values on the property and to reveal any potential threats to those values" (Aangeenbrug et al. 2004). The data recording requirements are different for easements and fee owned land. For each easement, a land trust must complete a baseline report in which it records the "conservation values protected by the easement" and the "relevant conditions of the property as necessary to monitor and enforce the easement" (Aangeenbrug et al. 2004). Land trusts may have standardized data that they require for all easements, regardless of easement restrictions. Land trusts do not have to complete a baseline report for fee owned land, rather, they must "inventor[y] the natural and cultural features of the property" (Aangeenbrug et al. 2004). In terms of monitoring, *S&P* requires that land trusts annually monitor their easements "in a manner appropriate to the size and restrictions of each property, and to keep documentation (such as reports, updated photographs and maps) of each monitoring activity" (Aangeenbrug et al. 2004). On fee owned land, trusts must regularly mark the boundaries and search for "potential management problems (such as

trespass, misuse or overuse, vandalism or safety hazards) and takes action to rectify such problems" (Aangeenbrug et al. 2004).

As of 2009, the Internal Revenue Service does require all non-profits holding conservation easements to report information on them in their tax return; however, the information is not easement specific. It asks for aggregated data, such as which of five broad categories are the land trust's easements designed to protect; on how many total acres and properties the land trusts hold easements; in which states the land trust hold easements; and how many staff or volunteer hours were devoted to monitoring easements (IRS 2008).

METHODS

I conducted an extensive literature review to assess the published research about land trust recording practices, the history and current state of land trust conservation, data collection efforts for conservation land throughout the US, the relationships between public support for conservation and public awareness, and the relationship between data collection and management of protected properties. I then designed a survey to ask what information land trusts record about their protected properties and administered it to the 93 land trusts currently operating in Maine (Appendix A). Fifty-five land trusts (59%) responded to the survey.

Survey Development

I developed the survey using questions previously raised in the peer-reviewed literature, by conducting phone interviews with eight Maine land trusts with varying sizes, locations, and missions; and by examining examples of land trust baseline reports. I called 20 land trusts, selected to represent the full diversity of Maine land trusts, for an interview. I received feedback from 8 (Appendix B). The survey instrument was revised following a draft sent to four land trusts. I administered the final survey using the on-line survey tool SurveyMonkey. The Maine Land Trust Network provided me with a list of

100 land trusts, seven of which replied they were either not a land trust, did not operate in Maine, or were no longer in existence, reducing the total number to 93.

Survey Content

The survey contents fell into three major categories: questions for (1) all land trusts, (2) land trusts with a baseline report, and (3) land trusts without a baseline report. Questions for all land trusts included contact information, priorities, use of a baseline report, monitoring, records on land cover, land use, working farms and working forests; and organizational opinion. For those with a baseline report, questions included application of report based on property type, data land trusts require to be recorded in report, and updates to baseline reports. For those trusts without a baseline report, questions included reason for lack of a report and plans to develop a report.

Land trusts with a baseline report identified which of 30 variables they always, sometimes, or never require to be recorded on their baseline report (Appendix A: part VI). These variables were included because they concern ecological characteristics of a property and could thus help gauge which conservation values land trust might best protect.

Data Analysis

In this report, I collectively refer to land trusts that operate statewide, nationwide, and/or internationally as “state-national” in scope. I assigned this grouping because it makes a clear distinction between locally and greater-than-locally operating land trusts. For a survey of land trusts operating in Maine, statewide, nationwide, and international land trusts could all potentially protect land throughout the state.

To analyze land trust primary priorities, I included only those land trusts which chose one primary priority, as instructed by the survey. Thirteen land trusts chose multiple primary priorities and three did not answer the prioritization question. These 16 land trusts are excluded from all analysis regarding priorities.

Comparison of Respondents and Non-Respondents

Using data gathered in a previous study by Roche et al. (2008), I compared the general priorities of respondents and non-respondents. Their study analyzed the on-line mission statements of land trusts operating in Maine. It registered a keyword as a priority if the keyword appeared in their mission statement. A mission statement was identified as any statement preceded by either the words or a sentence with the words "goals" or "mission" or a sentence that clearly outlined the operational focus of the land trust. Six respondents and ten non-respondents did not have on-line mission statements. The analysis therefore included 49 (87.3%) respondents and 27 (73.0%) non-respondents.

Using four of the survey questions, I also compared respondents with a random sample of thirteen of the 38 non-respondents (Appendix C). I called non-respondents directly to ask them the four questions (hereafter "abbreviated survey"). I asked whether the land trust considered itself state-national or local in scope and had a written prioritization strategy, baseline report, and/or a written monitoring strategy. I chose these four questions because they are basic characteristics that can differentiate data recording and organizational operations.

To compare both keywords and the abbreviated survey results according to respondent type (respondent or non-respondent), I used cross tabulation analysis and a Pearson chi-square test of independence. For some cross tabulations, the expected values were less than five. In these cases, I did not apply the Yates correction for continuity, as recommended by Yates (1934) to prevent overestimation of statistical significance for small (<5) expected frequencies. I did so because research has indicated that the correction is too conservative (Haviland 2007).

Data Required by Land Trusts in Baseline Reports

Using the responses concerning which variables land trusts required to be recorded in their baseline reports, I calculated the number of land trusts that always or at least sometimes required a variable. "Always" included only land trusts that required a given variable to be recorded every time it uses the baseline report. "At least sometimes" included trusts that always or sometimes required the given variable to be recorded. I also

grouped the 30 variables into 13 categories by common theme (Table 4). For each category, I calculated the mean percentage of its variables that land trusts always required to be recorded. Additionally, I compared both primary priorities and operational scope of respondents with the frequency that they recorded thirteen indicator variables. The indicator variables are intended to be representative of thirteen variable categories. Twelve of the indicator variables included are the most commonly recorded in each of their respective categories. The thirteenth, water quality, was included because I considered it more ecologically relevant than feet or miles of shoreline, which was the most often recorded variable in the water category. To compare them, I used cross tabulation analysis and a Pearson chi-square test of independence.

Baseline Scores

Using the survey responses, I calculated baseline scores for each land trust. Baseline scores equal the sum of all variables that the land trust recorded, weighted by frequency of recording. For a given variable, Always = 1, Sometimes = 0.5, and No = 0. Respondents without a baseline report received a baseline score of 0. I then analyzed whether higher baseline scores were found more often in land trusts that (1) used an electronic spreadsheet to record all data on baseline reports, (2) considered biodiversity a primary priority, (3) had a written prioritization strategy for land or easement acquisition, and (4) had varying annual budgets.

To test for differences between the binary characteristics (spreadsheet, biodiversity, and strategy) and the baseline scores, I used the non-parametric two sample Mann-Whitney U Test. To test for differences between the multi-category characteristic of budget, I used the non-parametric Kruskal-Wallis one-way analysis of variance. To discern positive or negative trends, I divided the baseline scores into five groups and calculated the percentage of each group that had a certain binary characteristic. R^2 values are provided for each characteristic. The first group included land trusts without baseline reports. The next four groups were the four quartiles of all baseline scores for land trusts that had baseline reports.

Protected Property and Data Recording

I calculated the total number of properties on which respondents could have completed a baseline report. I first calculated the potential number for each of the 55 land trusts and then summed all 55 values. For each land trust, the potential number of properties was represented by the equation P = E(X) + F(Y). P was total potential properties with a completed baseline report, E was number of easements held, and F was number of fee owned properties held. X equaled one if the land trust applied its baseline report to both fee owned and easement properties or just to easements; zero if it applied it only to fee owned properties. Y equaled one if the land trust applied its baseline report to both fee owned and easement properties or just to fee owned; zero if it applied it only to easement owned properties.

I do not include any analysis of the relationship between acres and data recording, because sizes of total property holding are vastly different for both respondents and non-respondents. For example, one respondent accounted for 74% of all land in the survey, and one non-respondent accounted for 38.5% of all privately-protected land in Maine.

Opinions

Lastly, I calculated the percentage of respondents that agreed, disagreed, or felt neutral about four opinion questions (Appendix A: part XVII). Answers ranged from 1 to 7. I categorized answers of 1-3 as “Agree/Necessary/Better,” 4 as “Neutral/Same,” and 5-7 as “Disagree/Unnecessary/Worse.”

RESULTS

I present the results in five categories: (1) respondent characteristics, (2) data recording, (3) data tracking, (4) opinions, and (5) baseline scores. The ultimate focus of my research is to assess the Maine land trust community as a whole, in terms of the data it records on its protected properties and how it does so. I first provide a description of

the respondents, to understand how they relate to the entire Maine land trust community. I then present the data that respondents record on protected properties, both in baseline reports and through other means, and present the strategies land trusts use to update data in baseline reports. I dissect baseline recording and updating data according to respondent priorities and operational scope, to discern if any important differences exist within the land trust community. To gain insight into the motivations behind current recording practices, I present data on respondent opinion and on the relationship between baseline scores and land trust characteristics. These also help construct hypotheses for the future of data recording efforts.

The sample size changes throughout the survey. To indicate this percentages are often written as (X%, N=Z), where Z equals the sample size from which that percentage was taken.

Respondent Characteristics

Of the 55 responding land trusts, 46 (83.6%) identified themselves as operating locally, 5 (9.1%) as statewide, 3 (5.5%) as nationwide, and 1 (1.8%) as internationally. Collectively, respondents protected 371,251 acres, of which the majority (84.1%) was in fee ownership and a minority (15.9%) was in easement, and they protected 1,256 parcels, of which just of over half (52.9%) were in easement and the rest (47.1%) were in fee ownership.

I analyzed the distribution of protected acreage, parcels, and budgets among respondents according to their scope of operation (Table 1). State-national land trusts protected the majority (86.3%) of the acreage but a minority (22.6%) of the parcels. The median number of easement and fee owned properties was roughly equal for local and state-national land trusts, but the size of both the median property and budget was smaller for local land trusts. Local land trusts also had a smaller range of property sizes and budgets. The median number of properties for both state-national and local land trusts was higher for easements than fee owned land.

Table 1. Ranges and median values for the number of protected properties, acreages, and budgets of local and state-national land trusts. Respondents could select a budget from within a range, for example $25,001-$50,000 or $75,001-$100,000.

	Median (Range)	
	Local	State-National
Properties (Number)		
Easement	12 (0 - 46)	15 (1 - 45)
Fee	9 (0 - 50)	8.5 (1 - 80)
Area (Acres)		
Easement	352 (0 - 2,500)	1,568 (250 - 23,000)
Fee	388 (0 - 4,300)	1,405 (267 - 275,000)
Budget ($1000 US)	75-100 (<25 - 400-600)	400 (25-50 - >2,000)

Respondents identified which type of nine types of land was their primary priority to protect (Table 2). The most common primary priority (38.5%, N=39) was "wildlife habitat or important biodiversity features" (hereafter "biodiversity"), although it actually ranked second for local land trusts, below "open space, unspecified." Four priorities were not identified as a primary priority by any respondent. Land trusts nationwide also listed open space and biodiversity as their top two priorities (LTA 2009b).

Table 2. Numbers and percentages of respondents with various primary priorities. Only land trusts that indicated only one primary priority, as required by the survey, were included. All, N=39; Local, N=33, State-National, N=6.

Priority	Local		State-National		All	
	N	%	N	%	N	%
Wildlife habitat or important biodiversity features	12	36.4	3	50.0	15	38.5
Open Space, unspecified	13	39.4	-	-	13	33.3
Recreation lands, including trails	4	12.1	2	33.3	6	15.4
Water resources, including wetlands	2	6.1	-	-	2	5.1
Working forest lands	1	3.0	1	16.7	2	5.1
Historical or cultural resources	-	-	-	-	-	-
Scenic lands	-	-	-	-	-	-
Urban parks, gardens, or open spaces	-	-	-	-	-	-
Working farms or ranchlands	-	-	-	-	-	-

Using data from Roche et al. (2008), I analyzed the keywords included in the on-line mission statements of respondents and non-respondents (Table 3). No keyword was included in a majority of mission statements, although four were included in over a third. Additionally, the frequencies of the majority of keywords in on-line mission statements of survey respondents were similar to the non-responding land trusts: there was not a significant association between the respondent type and the presence of any keyword.

Lastly, from the abbreviated survey, I found that there was not a significant difference between the respondent type and (1) the relative percentages of land trusts with state-national and local scopes of operation, nor the existence of (2) a written prioritization strategy, (3) a baseline report, or (4) a written monitoring strategy.

Table 3. Percentages of respondents and non-respondents that have certain keywords in their on-line mission statements. Keyword data from Roche et al. (2008). Six respondents and 10 non-respondents did not have an on-line mission statement and were omitted from data of Roche et al. (2008). Respondents, N=49; Non-Respondents, N=27.

Keyword	Respondents		Non-Respondents		Significance Test	
	N	%	N	%	Pearson Chi-Square (DF)	P
Public Access	24	49.0	11	40.7	1.3870 (1)	0.239
Land	18	36.7	13	48.1	0.0570 (1)	0.811
Biodiversity	18	36.7	10	37.0	0.3390 (1)	0.56
Historic/Cultural^	17	34.7	11	40.7	0.0150 (1)	0.904
Natural Resources	15	30.6	5	18.5	2.4610 (1)	0.117
Education	15	30.6	13	48.1	1.0000 (1)	0.317
Scenic	14	28.6	11	40.7	0.2040 (1)	0.651
Water	11	22.4	7	25.9	0.0160 (1)	0.898
Farmland	11	22.4	7	25.9	0.0160 (1)	0.898
Watershed^	8	16.3	3	11.1	0.4870 (1)	0.485
Freshwater^	7	14.3	6	22.2	0.5490 (1)	0.459
Forests	6	12.2	4	14.8	0.0002 (1)	0.988
Working Forests^^	5	10.2	2	7.4	0.4270 (1)	0.513
Shoreland, islands^	4	8.2	5	18.5	0.9760 (1)	0.323
Wetlands^^	3	6.1	2	7.4	0.0001 (1)	0.992
Scientific^^	3	6.1	1	3.7	0.4030 (1)	0.526
Mountains^^	1	2.0	0	0.0	0.6800 (1)	0.410

^one cell in cross tabulation analysis had an expected count <5; ^^ two cells in cross tabulation analysis had an expected count <5

Data Recording

A majority (82%) of the 55 respondents had a baseline report. Of those (N=44), 55.6% applied it to both easement and fee owned properties, 40% to easements only, and 4% to fee owned land only. As a result of this variability and because of the different number of parcels held by each respondent, I estimated that 72% of all parcels could have received a baseline report. Baseline application is skewed towards easements. Baseline reports could have been applied to 94.3% of easement properties but to only 48% of fee owned properties. Of the respondents with baseline reports (N=44), a majority completed a report on all (61.4%) and on at least half (79.5%) of their protected properties acquired from January to December 2007.

Respondents with a Baseline Report

The 44 respondents with a baseline report identified whether they always, sometimes, or never required each of 30 variables to be recorded on their baseline reports (Table 4). The percentage of land trusts that always required a variable to be recorded ranged from 0% to 88.6%, with a median of 39.8%. Of the 30 variables, none were always required to be recorded by all land trusts with baseline reports, and only three were required by ≥75%: land use, land cover, and acres of land cover. Lists of species that exist on a property were required by respondents to varying degrees: rare or endangered species, 72.7%; primary woody plants, 50%; invasive species, 27.3%; flowers and herbs, 13.6%; and plant or animal diseases, 2.3%. Of the seven possible maps of on-property species distributions, only three were required by >40% of respondents and the remaining four were required by less than 15% of respondents. Of the three possible population sizes a respondent could have recorded, none were required by >25% of respondents.

For most variables, many more respondents at least sometimes required a variable to be recorded on their baseline reports rather than always (Table 4). Of the 30 variables, 4 were at least sometimes required by all land trusts with a baseline report: land use, land cover, acres of land cover, and a map of land cover. Further, 16 variables were at least sometimes required by ≥75% of land trusts and 22 variables by ≥50%.

Table 4. Percentage of all respondents with baseline reports (N=44) that always and at least sometimes required variables to be recorded on their baseline report. Variables are grouped according to similar topic and listed in order of the average "Always" response for their group.

Category	Variable	Recorded (% Total)		Category Average (Always %)
		At Least Sometimes	Always	
Land Cover	Land Cover, primary	100.0	75.0	**67.4**
	Acres of Land Cover	100.0	75.0	
	Map	100.0	52.3	
Land Use	Land Use	100.0	88.6	**64.8**
	Map	90.9	40.9	
Aerial Photo	Aerial Photo	88.6	63.6	**63.6**
GIS	Digitized Property Boundary	75.0	54.5	**50.0**
	Digitized Features, Other	72.7	45.5	
Rare or Endangered Species	List of Species Present	86.4	72.7	**48.5**
	Map	75.0	47.7	
	Population Size(s)	56.8	25.0	
Ownership	Owners of Neighboring Parcels	79.5	45.5	**44.3**
	Previous Property Owner	88.6	43.2	
Soil	Soil Type	86.4	38.6	**38.6**
Important Species*	List of Species Present	84.1	52.3	**34.1**
	Population Size(s)	43.2	15.9	
Water	Shoreline, Feet or Miles	84.1	70.5	**29.5**
	Water Quality	45.5	13.6	
	Water Level	25.0	4.5	
Forests	List of Primary Woody Plant Species Present	84.1	50.0	**26.6**
	Forest Age, Approximate	60.5	16.3	
	Map	75.0	13.6	
Invasive Species	List of Species Present	63.6	27.3	**12.9**
	Map	39.5	7.0	
	Population Size(s)	40.9	4.5	
Flowers and Herbs	Flowers and Herbs, primary	65.9	13.6	**9.1**
	Map	53.5	4.7	
Diseases	List of Diseases Present	25.0	2.3	**0.8**
	Map	11.4	0.0	
	List of Diseased Species Present	6.8	0.0	

**The definition of an "important species" was left open for interpretation by each land trust.*

I grouped the 30 variables into thirteen categories and ranked them according to the average number of land trusts that always required all the variables to be recorded (Table 4). The categories of land cover, land use, aerial photo, and GIS all averaged ≥50%. Five categories included both a species list and a map of the species' on-property distribution. Three categories included both a species list and a measurement of the species' on-property population size. Two categories included all three variables - a species list, map, and population size. Within a category, species lists were recorded more often than all maps and/or population sizes. Maps were also recorded more often than all population sizes (Table 4).

A subset of 13 indicator variables required to be recorded in baseline reports were compared between those that identified biodiversity as their primary priority and all others (Table 5). These variables were recorded by a higher percentage of respondents that identified biodiversity protection as their primary priority than all other respondents combined. Half (7) were significant and four were highly significant ($p<0.01$).

Table 5. Percentages of respondents that always required 13 indicators variables to be recorded on their baseline reports, according to biodiversity as the primary priority (N=15) or any other priority as the primary (N=23). 16 respondents either did not identify a primary priority or identified multiple primary priorities and were excluded. See Methods for explanation of indicator variables.

Variable	Primary Priority				Significance Test		
	Biodiversity		All Others		Pearson Chi-Square (DF)	P	
	N	%	N	%			
Land Use+	15	100.0	11	47.8	11.44 (1)	0.001	**
Rare or Endangered Species List	14	93.3	10	43.5	9.7 (1)	0.002	**
Land Cover, primary	13	86.7	8	34.8	9.89 (1)	0.002	**
Aerial Photo	12	80.0	8	34.8	7.45 (1)	0.006	**
Digitized Property Boundary	10	66.7	7	30.4	4.28 (1)	0.028	*
Ownership of Neighboring Parcels	9	60.0	7	30.4	3.26 (1)	0.071	
Primary Wood Plant Species List	9	60.0	5	21.7	5.71 (1)	0.017	*
Important Species List	8	53.3	6	26.1	2.9 (1)	0.089	
Soil Type+	8	53.3	4	17.4	5.42 (1)	0.020	*
Water Quality++	4	26.7	2	8.7	2.21 (1)	0.138	
Invasive Species List++	3	20.0	4	17.4	0.41 (1)	0.839	
Primary Flowers and Herbs List++	2	13.3	1	4.3	1 (1)	0.315	
Diseases List++	1	6.7	0	0	1.58 (1)	0.210	

(*) p<0.05; (**)p<0.01; (+) one cell in cross-tabulation analysis had expected an expected count <5; (++) both cells in cross-tabulation analysis had an expected count <5

Nevertheless, variation within the biodiversity group remained high, ranging from 100% for land use to 6.7% for disease, with a median of 60%.

The same indicator variables were compared between those that identified as state-national and local in operational scope (Table 6). State-national respondents required 10 of the 13 variables to be recorded more often than local respondents. Only two were significantly higher. Again, variation within both groups remained high. For state-national respondents, responses ranged from 77.8% for land cover to 11.1% for disease, with a median of 44.4%. For local respondents, responses ranged from 77.1% for rare or endangered species to 0% for disease, with a median of 40%.

Table 6. Percentages of respondents that always required 13 indicator variables to be recorded on their baseline reports, according to state-national (N=9) or local operational scope (N=35). See Methods for explanation of indicator variables.

Variable	Primary Priority				Significance Test		
	State-National		Local		Pearson Chi-Square		
	N	%	N	%	(DF)	P	
Land Cover, primary+	7	77.8	26	74.3	0.01 (1)	0.829	
Ownership of Neighboring Parcels++	6	66.7	14	40	2.05 (1)	0.152	
Digitized Property Boundary++	5	55.6	19	54.3	0.01 (1)	0.946	
Land Use++	5	55.6	13	37.1	6.63 (1)	0.250	
Primary Wood Plant Species List++	5	55.6	17	48.6	0.14 (1)	0.709	
Rare or Endangered Species List+	5	55.6	27	77.1	1.68 (1)	0.195	
Aerial Photo+	4	44.4	24	68.6	1.80 (1)	0.180	
Important Species List++	4	44.4	19	54.3	0.28 (1)	0.598	
Soil Type+	4	44.4	13	37.1	0.16 (1)	0.688	
Invasive Species List+	3	33.3	9	25.7	0.21 (1)	0.647	
Primary Flowers and Herbs List ++	2	22.2	4	11.4	0.71 (1)	0.400	
Water Quality++	2	22.2	1	2.9	4.23 (1)	0.040	*
Diseases List++	1	11.1	0	0	3.98 (1)	0.046	*

(*) p<0.05; (**) p<0.0l; (+) one cell in cross-tabulation analysis had expected an expected count <5; (++) both cells in cross-tabulation analysis had an expected count <5

All Respondents

All respondents, including those without baseline reports, were asked on what percentage of all of their protected properties they had recorded various types of data (Figure 1). Despite being the two most commonly recorded items on baseline reports, less than half of all respondents (N=52) have recorded land use (48.1%) or land cover (40.4%) on all of their protected properties. To record land cover, just over a quarter (28.8%) of all respondents used a specific classification system. Four types of systems were used by respondents: Maine Natural Areas Program Natural Communities Classification Key, GIS land cover classification, a system developed by an outside contractor, and a system developed internally by a land trust. The most common was the Maine Natural Areas Natural Program's Natural Community Classification Key, used by one-third of those with a classification system. Also, the majority of respondents recorded data on 0% of their properties and/or answered data unavailable to all three questions about working forest properties and to two of three working farm properties (Figure 1).

Data Tracking

Respondents with a Baseline Report

Less than half (42.2%, N=45) of respondents with a baseline report have a master electronic spreadsheet (or equivalent tracking mechanism) that contains information from all baseline reports, providing an overview of all protected properties.

Land trusts were also asked if they periodically update their baseline reports by recollecting data on some or all of the variables in the original report. Over half (63.6%, N=44) of the respondents with baseline reports had a strategy to update their baseline reports; however, the majority (78.6%) of these were unwritten. Further, most (55.5%, N=27) of the strategies suggested an update to the baselines only when significant changes to the property occur. This held true for the majority of unwritten strategies (63.6%, N=22) but only a minority (20%, N=5) of written strategies. Of the six land trusts with written strategies, updates were required annually by three and every ten years by one; one did not specify a time period. Of the 22 land trusts with unwritten strategies,

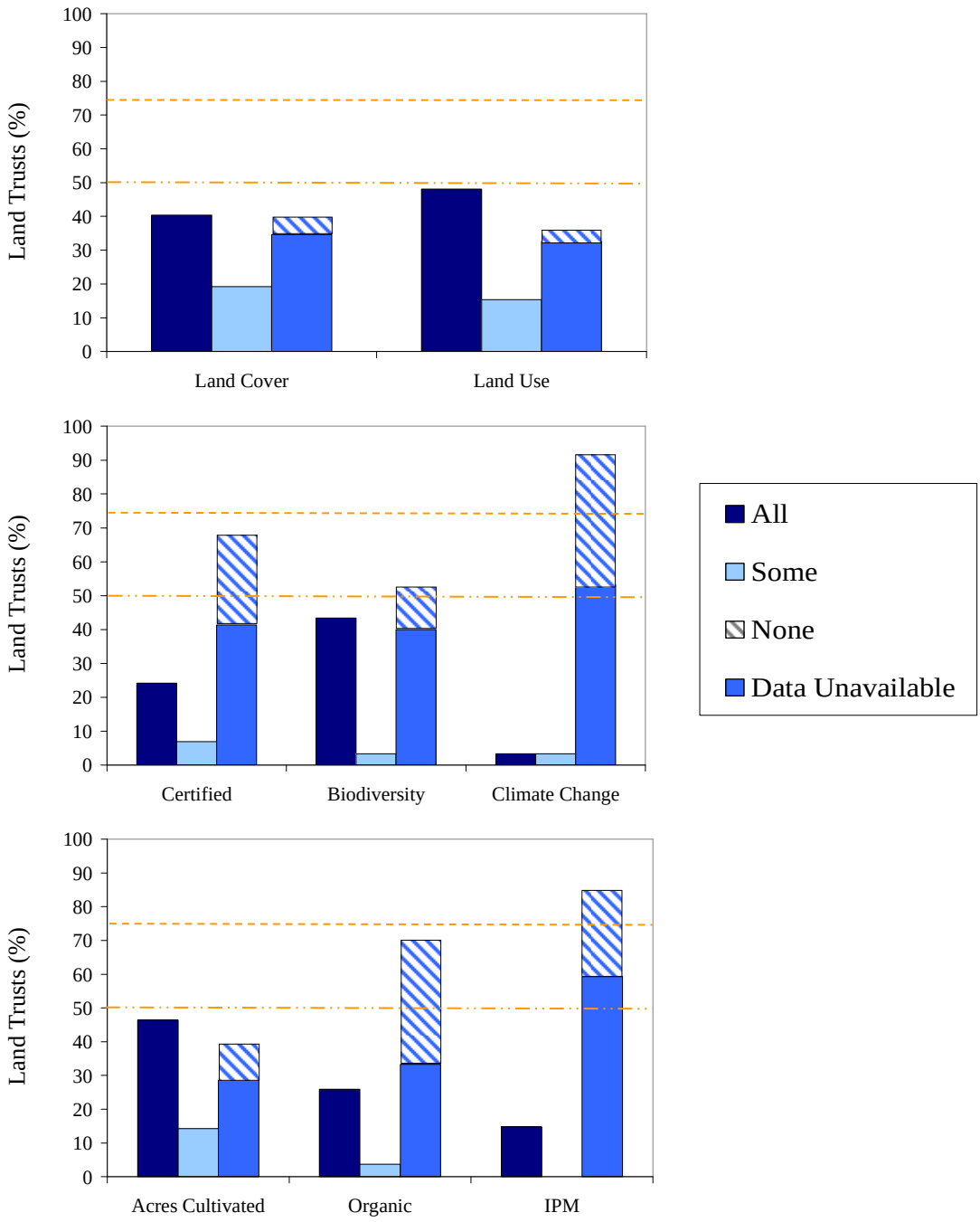

Figure 1. Percentages of respondents that have recorded a variable on a percentage of their protected properties. Respondents were asked (1) on what percentage of all their protected properties they had recorded land use and land cover; (2) on what percentage of their working forest properties they had recorded (a) if the management plan address impacts of climate change, (b) if the management plan managed for biodiversity, and (c) if logging is certified to any standard; and (3) on what percentage of their working farm properties they had recorded (a) if the farm used an integrated pest management system, (b) if the farm was certified organic, and (c) how many acres are under cultivation.

updates were required annually by three, every two years by two, every five years by two, and every ten years by one.

All Respondents

Most respondents (71.2%, N=52) have a written strategy regarding the periodic monitoring, inspection, and enforcement of their protected properties. Nearly all of those strategies (94.4%, N=36) require annual monitoring. Also, the majority (84.3%, N=51) of all respondents monitored at least half of their protected properties between January and December 2007, and slightly over half (58.8%) monitored all over the same time period.

Opinions

Approximately two thirds of all respondents felt that they needed to improve their recording system (which would include using a baseline report) and that biodiversity criteria are necessary to include in a baseline report to meet their organization's mission (Table 7). More respondents, but not a majority, felt that updating their baseline reports was necessary (46%) than not.

Table 7. Land trust opinions, on a scale of 1 to 7, to three questions about recording practices. Need to Improve, N=51. Biodiversity Criteria and Updating Baseline, N=50.

Question	Response (% of Total)					
	Needs Improvement, Necessary (1-3)		Neutral (4)		Does Not Need Improvement, Unnecessary (5-7)	
	N	%	N	%	N	%
Need to Improve Recording System[a]	32	62.7	4	7.8	15	29.4
Biodiversity Criteria in Baseline is Necessary[b]	30	60	5	10	15	30
Updating Baseline Reports is Necessary[c]	23	46	11	22	16	32

([a]) Do you believe that your organization's recording system for property characteristics can and should be improved? An improvement would include the use of a baseline report if your organization does not currently use one
([b]) For your organization to meet its mission, how necessary is a baseline report which includes biodiversity criteria?
([c]) For your organization to meet its mission, how necessary is updating the baseline report by recollecting some or all of the information in the original baseline?

Most respondents that both that lacked a baseline report (88.9%, N=9) and that only applied it to easements (58.8%, N=15) felt that they needed to improve their recording system. Over half of the respondents with unwritten (61.9%, N=21) and no (62.5%, N=16) strategies to update their baseline reports felt that they needed to improve their recording system. Three of the nine land trusts that do not have a baseline report did not have one because they were in the process of expanding and three more cited a lack of funding. Five of the nine plan to develop a baseline report within the next five years.

Respondents identified a diversity of their most pressing challenges. Of the 48 respondents, the most common challenges were lack of funding (68.8%) and lack of volunteer or staff manpower (27.1%), followed by monitoring and stewardship (16.7%), data management/developing management plans (5.3%), accreditation (4.2%) and development of land (4.2%).

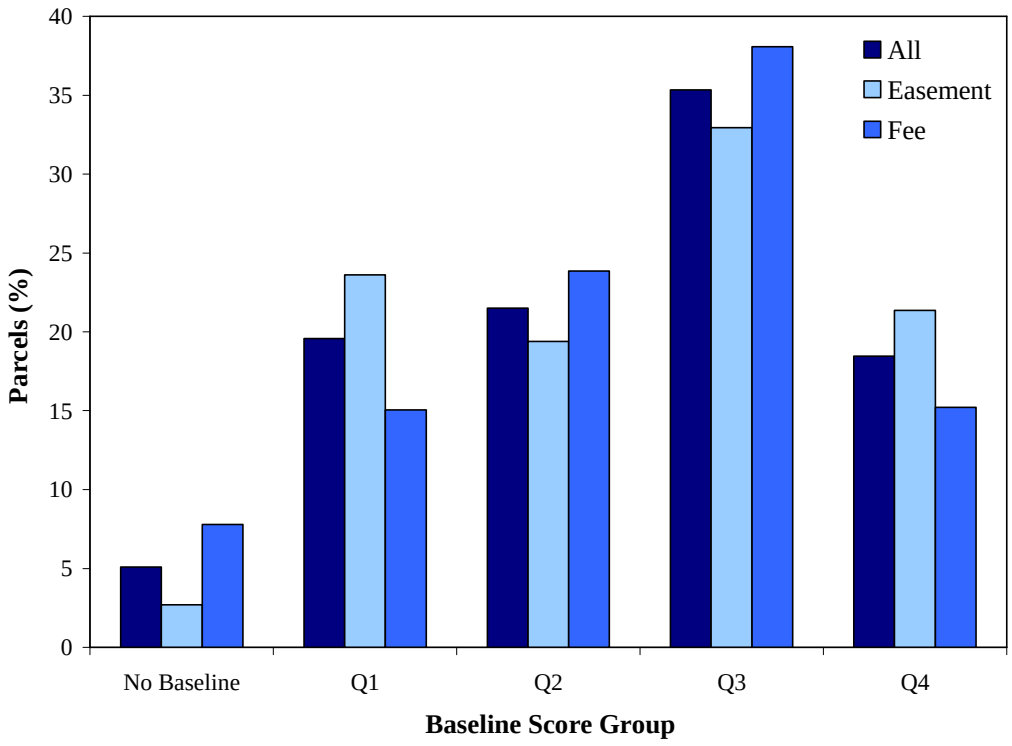

Figure 2. Percentage of total parcels protected by respondents in each of the five baseline score groups. No Baseline, N=11; Q1, N=12; Q2, N=11; Q3, N=12; Q4, N=9.

Baseline Scores

All land trusts with a baseline report received positive baseline scores. Positive baseline scores were normally distributed around a mean of 15 and ranged from 2.5 to 26.5. Scores were divided into quartiles with the following values: Q1 = 2.5-12.5, Q2 = >12.5-15, Q3 = >15-18, and Q4 = >18-26.5. Of the five groups of baseline scores (no baseline plus four quartiles), the percentages of parcels in each group for all, fee owned, and easement parcels are skewed slightly towards Q3 (Figure 2).

Baseline score quartiles were positively correlated with the percentage of quartile that had an electronic spreadsheet to record all data on baseline reports ($R^2 = 0.93$); that applied their baseline report to ≥90% of land acquired between January and December 2007 ($R^2 = 0.81$); that had a written prioritization strategy for land acquisition ($R^2 = 0.69$); and that considered biodiversity a primary priority ($R^2 = 0.57$) (Figure 3**).** Considering biodiversity a secondary priority was negatively correlated with baseline score quartile

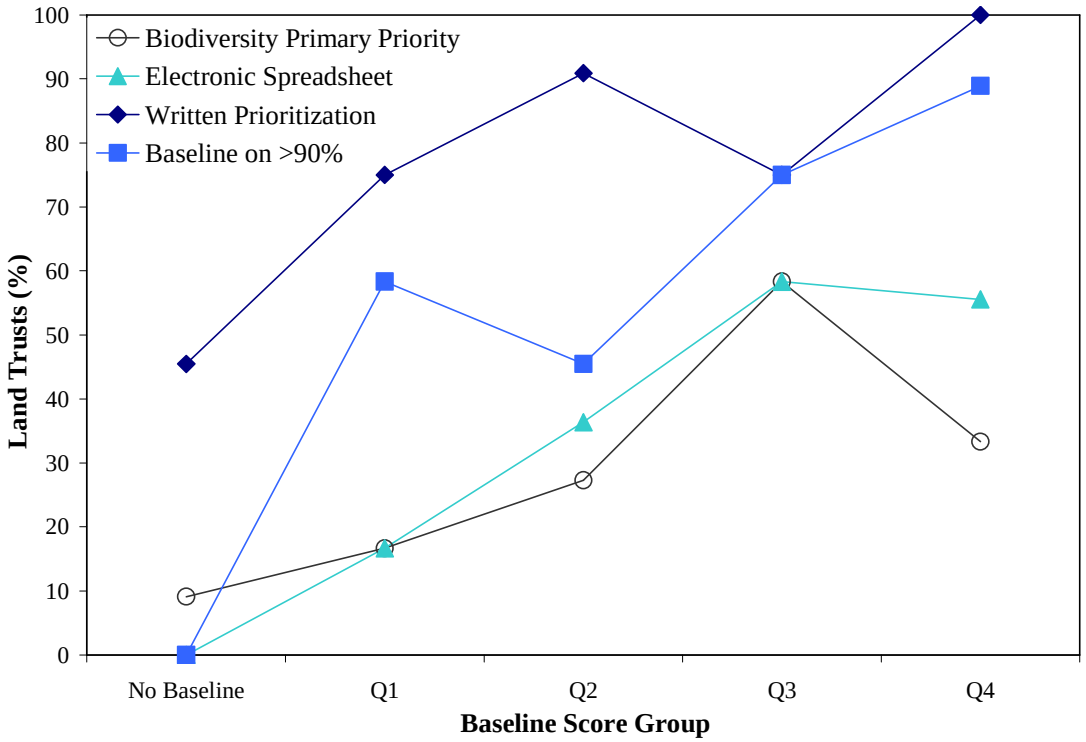

Figure 3. Percentage of respondents with written prioritization strategies, baseline reports completed on ≥90% of their properties, an electronic spreadsheet to track the data recorded in all baseline reports, and biodiversity as a primary priority, according to their baseline scores. No

(R^2 = 0.95). Budget had a very low positive correlation, although the two lowest groups had median budgets $50,000 lower than the top three groups.

Baseline scores were also significantly higher for land trusts that had an electronic spreadsheet to record all data on baseline reports (p= 0.045, N=44), that considered biodiversity a primary priority (p= 0.018, N=55), and that had a written prioritization strategy for land acquisition (p= 0.024, N=52). Those with larger budgets also had baseline scores that were significantly higher (p= 0.0097, N=48).

DISCUSSION

The most salient finding of this study is that land trusts that responded to the survey require highly diverse data to be recorded in their baseline reports for every property. Only 5 of 30 variables in the survey were required to be recorded on baseline reports by more than 70% of those with baseline reports: land use, land cover, acres of land cover, rare or endangered species list, and feet/mile of shoreline. The other 25 variables were required to be recorded by between 0% and 63.6% of land trusts.

In general, it appears that land trusts with baseline reports require coarse resolution landscape-level or administrative variables to be recorded more often than high resolution ecological variables. I consider groups of variables like land cover and land use to be "coarser resolution" than groups of variables pertaining to certain species, disease, soil, or water. The latter have a greater capacity to capture the differences in local ecology of a property, and thereby distinguish it from another nearby. Other more commonly required categories are aerial photo, GIS, and ownership. I consider these administrative variables, because they do little to describe the contents of a property but are important for managing it. Within the "higher resolution" ecological variables, the variability is also large. For example, the group rare or endangered species averages 48.5%, water 29.5%, invasive species 12.9%, and disease 2.3%.

This trend of decreased recording of high resolution, ecological variables also exists within categories, as species lists are recorded more often than maps and/or population estimates. Maps and population estimates are "higher resolution" than species

lists, because they identify exactly where and in what numbers a given species exists on the property.

The variability in data required by baseline reports is much lower for land trusts that identified biodiversity as their primary priority. Over 50% of those that prioritize biodiversity required 9 of 13 variables to be recorded and over 75% required 4. In contrast, no variables were required by a majority of those with other priorities (Table 5). For seven of the variables, the percentage of respondents that required it to be recorded was significantly higher for land trusts that prioritized biodiversity compared to all others. Nevertheless, the trend of higher recording of coarse resolution or administrative variables persists within this sub-group. One notable exception to this trend, however, is rare or endangered species list, which was required by nearly all (93.3%) of respondents that identified biodiversity as a primary priority. It ranks above the other administrative or coarse resolution variables of land cover, property boundary, and ownership of neighboring parcels.

The variability in data required did not decrease when analyzed according to operational scope (Table 6). Only 2 of 13 variables were required at significantly different levels: state-national respondents required water quality and a list of diseases more often. However, both were required by less than 25% of state-national land trusts, indicating the practice is not widespread. Again the trend of decreased recording with increasing resolution remains.

The existence of such variability in data recording on baseline reports is not surprising for a number of reasons. First, Maine land trusts have diverse priorities. While most are local or regional in scope, a few are statewide, national, or even international. The statewide or national land trusts tend to favor the priorities of working forests, forests, and biodiversity protection relatively more than local or regional land trusts; the latter prioritize historical and cultural, scenic, and working farmland relatively more than statewide or national land trusts (Roche et al., 2008). These differences mean that on a given property, Maine land trusts will likely value some different characteristics. Additionally, the budgets of respondents range from less than $25,000 per year to over $2 million. Land trusts would likely prefer to record many similar types of data about a protected property, but their varying financial resources can limit their ability to do so.

Second, easements donated or sold by landowners may place many different levels of restrictions on use, limiting which resources are subject to protection and thus which data is needed to protect them (Rissman & Merenlender 2008). For example, if the easement prohibits logging, then a map of wooded areas is appropriate. If it restricts alteration of habitat, however, then a map of specific vegetation types is also needed (Heidenreich & Albanese 2006). Additionally, the important data can vary even among properties with the exact same easement restrictions. Differences in local ecology resulting from geography, geology, microclimates, or other factors will determine which conservation values exist on the property. As a result of this diversity, *S&P* has included the aforementioned requirements for baseline documentation of easements and inventories of fee owned land that grant considerable discretion to each land trust. In this context, it makes sense that there is great disparity between baseline reports that always or sometimes record a given variable.

Prior studies have explored the accomplishments of land trusts - the restrictions of conservation easements, the ecosystems they protect, land trust monitoring - to gauge the conservation values they best protect (Block et al. 2005, Crehan et al. 2005, Kiesecker et al. 2007, Rissman et al. 2007, Rissman and Merenlender 2008). The restrictions and ecosystems protected, however, only inform part of the conservation picture. Land trusts must manage these properties in perpetuity, and they can also acquire more land and easements. The data that land trusts collect on their protected properties will affect how they pursue each of these goals. It will form basis of future decision making about property management and can inform their prioritization of future acquisitions. As a result, the variability in data recorded by land trusts on their baseline reports has important implications for both their ability to protect landscape-level and property specific conservation values.

Protection of Landscape-level Conservation Values

It appears the ability of the land trust community to identify and protect ecological conservation values and threats to them at the landscape-level is restricted due to the variability in data recording. To optimally assess conservation opportunities,

threats, and/or gaps at a regional scale, land trusts need (1) standardized data from all their protected properties, (2) the ability to compare and spatially analyze information at low cost, and (3) access to other the data of other land trusts and conservation organizations. I will discuss the implications of the data on each of these requirements in turn.

Data Standardization

In terms of standardized information, the flexible baseline report requirements now represent a potential problem rather than a solution, as the information required to be recorded varies both among land trusts and properties. Specifically, data that can best capture the variation in the contents of local landscapes, such as lists of rare or endangered, invasive, or important species, water quality, or forest age, were always recorded by fewer baseline reports than lower resolution data such as land cover and land use. Even species lists, however, are only binary variables, indicating if the species does or does not exist on the property. At the regional level, population size estimates can indicate health of a given species population. Since geographic features like habitat do not respect property lines, for larger parcels, on-property maps of species distributions can provide a more accurate understanding species location and density. Unfortunately, such on-property species distribution maps and assessments of population levels are required to be recorded by a smaller minority of land trusts than species lists. Additionally, for commonly recorded data like land cover, the classification nomenclature is non-standardized in that the majority does not use a specific system, and a minority uses a handful of different systems.

The differences in application of baseline reports decrease data standardization further. Not all land trusts have a baseline report, although this will likely improve as accreditation becomes increasingly universal. For land trusts that apply their baseline only to easements, it is unclear what data they choose to record about fee owned land. There is quite likely the same or more variability in data recorded on fee owned land, as *S&P* only requires an "inventor[y] of natural and cultural features." Accreditation, under the current requirements, will not reduce this variability.

Data standardization may be further lacking due to temporal variability, because most data will have been recorded at different times. *S&P* requires land trusts to complete baseline reports upon acquisition of a property, which inherently occur at different times; it does not require the data to be re-recorded again in the future. A majority of the respondents (63.6%) do have a strategy to update the baseline reports by re-collecting some or all of the data in the original report; however, the majority (78.6%) of those are unwritten strategies, making it less likely that they will adhere to it than if it was written. Further, over half (55.5%) of land trusts with strategies only update their baselines when "significant changes to property occur." This indicates that these trusts are only catching the most visible changes, which omits more subtle changes to the landscape or property contents.

Land trusts will likely identify such significant changes during monitoring efforts, as that is their only designated time to access easement properties. Positively, 13 of the 15 land trusts that update their baseline reports only when "significant changes" occur monitored all of their protected properties between January and December 2007; however, just under half (41.2%) of all respondents did not. Additionally, monitoring is meant only to discover violations of easement restrictions or, on fee owned land, management problems of "trespass, misuse or overuse, vandalism, or safety hazards." Such violations are important to find and remedy, but will not likely provide a nuanced picture of ecological changes on the property. Even the largest land trust in the world, The Nature Conservancy, does not quantitatively monitor nearly 80% of the conservation targets on its easements (Kiesecker et al. 2007).

Temporal variability is of importance not only because nature is inherently dynamic, but because its dynamism is increasing due to the human-facilitated spread of invasive, non-native species, introduced pathogens, and climate change. These currently represent three of top threats to biodiversity worldwide, after habitat loss.

Overall, the minority of the Maine land trust community that records a list of invasive species (27.3%) and the smaller minority that records a list of disease (2.3%) on their protected properties indicate that the land trust community is not well equipped to identify such threats on a regional scale. Invasive species and disease can establish themselves rapidly in a new location, and their impacts are non-trivial. Invasive species

imperil nearly half (42%) of species listed as threatened or endangered by the US Endangered Species Act (Wilcove et al. 1998), and their impacts can result in the loss, sometimes permanently, of ecosystem services (Vilà et al. 2009). In the US invasive species annually cost an estimated $120 billion in losses, damages, and control efforts (Pimentel et al. 2005). In the past 20 years alone, disease has caused the local extinction of numerous species and global extinction of at least 11, although many suspect the number is much higher (Baillie et al. 2004; Mace et al. 2005). In addition, they can chronically depress some populations once established (Daszak et al. 2000). As one example in Maine, its Department of Inland Fisheries and Wildlife has made prevention of chronic wasting disease (CWD) a top priority, as it could impose immense financial burdens on the state. Among other impacts, deer hunting and farming contribute $200 and $1 million, respectively to the Maine economy (DIFW 2007b).

Climate change has been shown to have already caused range shifts in the majority (~80%) of the species studied (Root et al. 2003). This process will undoubtedly continue, as temperature is predicted to continue to rise, to varying degrees depending upon the scenario (Carter et al. 2007). While protected properties will not shift, their contents will. Understanding these range shifts will be crucial to assessing gaps in species protection, identifying new threats, and altering prioritization strategies effectively for to protect targeted species or habitat.

Overall, any regional aggregation of data would currently suffer from the inability to distinguish if a given conservation value did not exist on a property, if there was simply no data, or if the existing data is obsolete due to the passage of time.

Data Comparison and Spatial Analysis

In terms of analyzing the data that is or could become available, most Maine land trusts face high costs. Less than half (42.2%) of land trusts with baseline reports have a master electronic spreadsheet (or equivalent tracking mechanism) that contains information from all baseline reports, providing an overview of all protected properties. This means that the majority of land trusts would have to read through individual baseline reports to compile such data, a time intensive process for a group of organizations that

has already self-reported a lack of funding for staff and volunteer support. The master electronic spreadsheet would also allow land trusts to perform relatively quick computational analysis of their land holdings. The data recorded on working farm and forest properties also reflects the difficulty in compiling data within a given land trust: over 60% of land trusts either definitely did not record or listed as unavailable general data, such as if a working farm is certified organic or if the logging in a working forest is certified, to any standard.

A powerful way to store and analyze spatial data is through Geographic Information System (GIS) analysis, which allows users to link discrete spatial entities, such as properties, with attributes, such as species or natural resources that exist within them. However, many challenges currently exist to such analysis. First, just over half (54.5%) of land trusts require a digitized property boundary that could be incorporated into a GIS data layer. Those that have a master electronic spreadsheet could easily link the property characteristics (attributes) with the digitized property boundaries, but few land trusts have such a spreadsheet. Lastly, the attributes must be standardized across properties (Rissman & Merenlender 2008), which is currently lacking.

Access to Other Land Trusts' and Conservation Organization Data

Sharing data with other land trusts to create a regional data set would be the final step to facilitate comprehensive landscape level analysis. There are 93 land trusts operating in Maine alone, meaning that that multi-region or even state-wide analysis will require the cooperation of numerous organizations. If such data are to be relied upon for analysis and decision making, it will also need to be compiled and then updated, maintained, and checked for accuracy. This process will require time and money, and currently there is no organization at the state or national level fulfilling this role.

While some states have created GIS data layers that incorporate land trust protected land, their funding is often not guaranteed (Rissman & Merenlender 2008). For example, the California Protected Areas Database reports on its website that it "does not currently have ongoing funding for maintenance" (GreenInfo Network 2009) and funding

has been inconsistent for the Vermont Conserved Lands Database in the past few years, preventing full updates from occurring (Capen 2009).

Protection of Property-Specific Conservation Values

Property-specific conservation values are highly variable and may include endangered species, working forests or farms, pleasant views, nature trails, sensitive habitat, and/or ecosystem services, among others. Maine land trusts appear well suited to adapt their data recording requirements depending upon the unique property-specific conservation values. As evidence, ≥75% of land trusts at least sometimes record a majority (16) of the variables in the survey on their baseline report. In addition to the coarse resolution and administrative variables, those 16 variables also include some of the higher resolution variables, such as species lists of rare or endangered species, important species, and woody plants; and maps of rare or endangered species and woody plants. Further, over half of land trusts with baseline reports at least sometimes record lists of invasive species and flowers and herbs, maps of flowers and herbs, and populations sizes of rare or endangered species. Therefore, it appears that a substantive number of land trusts have the capacity to record higher resolution variables if necessary.

To return to standardization, the threats of invasive, non-native species and/or disease can compromise, many, if not most, of the diverse property-specific conservation values to varying degrees. They may drive endangered species to local extinction, compromise the growth of working forests, alter views or aesthetics on trails, or replace organisms that provide or contribute to ecosystem services.

Only a small minority of Maine's land trust community is in a position to identify such threats on all of their protected properties. Further, if invasive species or disease do exist, few land trusts are equipped to monitor the spatial changes in their distribution, as less than 10% of all respondents require in their baseline reports a map that includes invasive species and/or disease. Monitoring efforts will probably not capture the spread of invasive species or disease throughout a property. First, monitoring is designed to find violations, misuse, and safety hazards. Invasive species or disease will likely not violate the restrictions of an easement or constitute misuse of fee owned property, but they could

seriously degrade the conservation value. Second, not all properties are actually being monitored annually: just over half (54.8%) of respondents monitored all of their protected properties from January to December 2007.

It is important to note that the data in this survey originate from blank baseline report forms, so they do not provide a link between the actual data recorded in a baseline report and the easement restrictions or conservation values on individual properties. Analysis of completed baseline reports is needed to establish if and with what frequency land trusts record sufficient data to truly protect specific conservation values on their properties. I can, however, make one inference about such recording practices based upon my data. One would expect that all land trusts would have answered that they at least sometimes record all variables in question. Every variable could conceivably help protect a conservation value if it existed, so none should be ruled out. While many more land trusts record a variable at least sometimes than always, only four are at least sometimes recorded by all land trusts (See Table 4). This means that some land trusts never record 26 of the variables. This could result from a misinterpretation of the question; however, it may indicate that some land trusts do not feel that certain variables could assist them in management and/or protection of their property in the long-term.

Lastly, some land trusts always recorded more variables more often than others. These land trusts could be doing so to standardize variables across properties and enable themselves to perform landscape scale analyses. I hypothesize that some land trusts may also require themselves to record more data, because it helps them identify conservation values and threats to them. By requiring their land trust to record more specific data, the trust may learn more about the property than it would have during a general site inspection.

Future of Data Recording and Protection Efforts

It is uncertain if, and to what extent, land trust data recording will improve. The majority of respondents (62.7%) expressed opinions that indicated that they would like to improve their recording system; however, there are numerous improvements, both large and small, to which they could be aspiring. To provide some insight into the nature of

those desired improvements, a majority of land trusts without a baseline report, with unwritten or no strategy to update their baseline reports, and that do not apply their baseline to fee owned land feel their land trust needs to improve its recording system. The respondents seem split as to their desire to record more ecological variables or track them more strictly: 60.0% felt that biodiversity criteria are necessary to include in a baseline report, and 46.0% felt that updating baseline reports was necessary.

Additionally, land trusts that had an electronic spreadsheet to record all data on baseline reports and that had a written prioritization strategy had significantly higher baseline scores, indicating that they are recording more variables. I consider higher baseline scores indicative of better recording practices, because the variables used to calculate the baseline scores are primarily ecological in nature. While this relationship merely indicate correlation, not causation, it is plausible both characteristics may lead to better baseline recording practices. The written prioritization strategy may stimulate trusts to think more critically about what characteristics of land they want to protect and hence which characteristics to record. The spreadsheet may also facilitate the discovery of gaps in recorded data and/or standardization between protected properties. Both measures may be relatively inexpensive methods to improve baseline data recording.

Also, the many state-national and local land trusts that do have improved recording and tracking systems could transfer their knowledge and expertise to other trusts. This would be especially valuable because designing baseline reports and update strategies requires resources, often scarce in non-profit land trusts. Further, these trusts could lead an effort to enhance data standardization. By discussing their experience with different recording and update strategies, they could develop one or several common baseline reports and other strategies that the whole community could use. One potential variable for standardization is land cover, using the Maine Natural Areas Program Natural Communities Classification Key (MNAP). Most (75%) land trusts with baseline reports already record land cover in some way, and MNAP is currently the most popular among the systems. Additionally, there is an on-line, interactive dichotomous key that trusts can use to identify the land cover in question. The system is quite specific having 98 different community types, making it valuable to land trusts and scientists. For each community, the site also contains considerations for conservation, wildlife, and

management (MNAP 2005). Land trusts could use these recommendations to decide which types of data would be most advantageous to record on that property.

From one standpoint, their ability to achieve such goals currently appears limited by a lack of funding, volunteers and/or staff. Additionally, as organizations that depend, to a large degree, upon donations of funding from the public, a depressed economy will likely limit the capacity of land trusts to devote resources to such new projects. As land prices decline with real estate values, it may increase the incentive to focus resources towards conserving new land rather than improving data recording efforts

In spite of upfront costs, the possibility of reaping tangible benefits may spur improved data recording and standardization. First, public support of conservation efforts has been shown to increase with public awareness of the issue (Mack et al. 2000; Fraser et al. 2006; Bremner 2007). If land trusts learn more about the special characteristics of their properties, the challenges and threats faced, and/or gaps in protection, then they will have more data available to use to increase and deepen public awareness. Also, a study of donors of conservation easements found that a "concern for ecological stewardship" was the secondary motivation of donors (McLaughlin 2004). With better recording and tracking, land trusts can provide better stewardship, in theory.

Improved data collection could also increase the value of open land to the public. In rural and suburban areas, open land often has a low marginal value due to its relative abundance (Janofsky 2003; Vogt & Marans 2003; Kaplan & Austin 2004), which is made lower in all densities of development by the "extinction of experience" – ecologist Robert Pyle's term to denote humans increasing detachment from nature and subsequent devaluation of its importance (Miller 2004). As a result, support for conservation can remain quite low in both rural and urban areas. By involving the local community in restoration or stewardship programs, land trusts may be able to improve the connection of the community to, and marginal value placed upon, open land (Leopold 1939; Higgs 2003; Jordan 2003). Such an increase could likely translate into more financial support for land trusts.

Survey Validation

I feel that my findings constitute a representative sample of the land trust population in Maine. A comparison of the respondent and non-respondent groups using two measures indicated that they had largely similar characteristics. Comparing the keywords in mission statements verified that respondents and non-respondents had roughly the same distribution of priorities. Comparing the two groups using the four question survey allowed me to verify that the two groups had similar distributions of organizational structure. As seen from the analysis, both priority and organizational structure, such as the existence of a written prioritization strategy or baseline report, can indicate the number of variables a land trust will record.

I also believe that results similar to these from Maine land trusts can be expected from the land trust community in other states and nationwide. The data recording requirements of *S&P*, to which the majority of land trusts nationwide are either currently working towards or aspiring, are broad, flexible, and open to interpretation. Further, other than monitoring, *S&P* does not require any substantive updates of data on either fee or easement lands. As a result, even universal land trust accreditation would not likely improve the *status quo* of standardization appreciably.

Additionally, Maine is a leader in many indicators of land trust accomplishment, has one of the oldest land trust communities in the nation, and has an established land trust network. These characteristics suggest that land trusts in Maine have had time to develop and refine their recording strategies and to communicate their interests and experiences collectively. If a great diversity of recording practices exists in Maine, it may very likely exist in states with more nascent land trust communities. Lastly, the two most common priorities of land trusts in Maine were also the two most common among land trusts nationwide (LTA 2009b).

CONCLUSIONS

Maine land trusts are recording very different types of data on their protected properties and updating the data to different degrees at different intervals; however, there

is more standardization among those that identified biodiversity as a primary priority than others. State-national and local land trusts were similar in the variability of their recording requirements. Maine land trusts typically record coarse resolution, administrative variables more often than high resolution ecological variables. My findings suggest that the Maine land trust community has a limited ability to conduct landscape level analyses that require synthesizing standardized ecological data. Further, the lack of data recording for invasive species and disease for many land trusts signifies that many on-property conservation values may also be at risk. Assuming that Maine land trusts are indeed representative of the national land trust community, these implications extend to them as well.

Given the limited ability of the general land trust community to conduct landscape level analyses, I make the following suggestions: (1) the national land trust community should reconsider how and to what degree it wants to pursue enhanced data recording, updating, and collaboration, (2) land trusts should consider more fully involving local, state, and federal officials in their deliberations, because they could help allocate resources to support some of the improvements in recording or updating, and (3) any changes to land trust recording, updating, or tracking should be included in a revised *S&P*.

Many considerations would have to be discussed among land trusts for any standardization effort. Perhaps most importantly, land trusts have finite financial resources and improving data collection will require more time and money. A shift in efforts will therefore necessitate a shift in resources. Many land trusts do not prioritize biological conservation values and likely would not want to devote scarce resources to tracking such data. Land owners may not want to have certain data tracked on their properties, and some types of data could be important to specific geographic regions. There is also a question of marginal value. Recording every minute biological detail of each property is probably not worthwhile, as diminishing marginal returns will set in at some level of data collection. Additionally, the variation in size of land trust holdings affects the marginal value of their data recording. A land trust with hundreds of thousands of acres could likely provide much more useful data than one with two acres.

Finally, the frequency with which baseline data is updated will also affect its value to the land trust.

Due to these considerations, data recording and updating requirements could be tailored according to budget, location, size of land holdings, land trust priority, or other factors. As long as some standardization is agreed upon in terms of variables, frequency of updates, and which land trusts adhere to those rules, then land trusts, researchers, and policy makers can understand the limitations of the data and work within them. While the current *S&P* is an excellent and much needed document that will improve land trust operations around the country, I feel that it can and should be revised to help the land trust community realize its full conservation potential.

The majority of land trusts in Maine expressed an opinion indicating that they would like to improve their recording system and that biodiversity criteria in the baseline report are necessary to fulfill their mission. There is support for some level of enhanced recording and data tracking, but land trusts must have additional discussions to decide how to accomplish this.

Land trusts should not be expected to bear the burden of improving data recording alone, because their conservation actions affect the broader public. Land trusts are already operating at a level that affects entire regional landscapes, and their impact will continue to grow. The collective 37 million acres land trusts conserve nationally represents an area 1.8 times the size of Maine and over 47 times the size of Rhode Island (Aldrich & Wyerman 2006). Land trusts in Maine and Vermont conserve over 7% and 9% of the state, respectively (Aldrich & Wyerman 2006). Linkages with publicly conserved land can increase their conservation impact, too. Trends in the rate of increase in easement acquisition and land trust establishment indicate that their role will expand further.

By definition, land trusts place restrictions on conservation land that legally limits its use in perpetuity. As a result, the location of these properties and the restrictions placed upon them will affect the maintenance of ecosystem services, biodiversity, landscape appearance, and future development patterns – factors which are important to residents, and local, state, and federal officials. Additionally, climate change will likely lead to long-term changes in the flora and fauna of nearly all regions in the US. Land

trusts are well positioned to be a source of data about these changes, their effects for biodiversity and/or to be the providers of newly protected habitat for shifting species. If they fail to take on such a role, it is unclear who will.

That land trust conservation actions have the potential to influence our communities in a variety of ways suggests that local, state, and/or federal governments could contribute to discussions about land trust recording practices. Their participation could generate new opportunities for land trusts and the government to collaborate, share resources, and improve land use planning. The public already supports land trusts by granting tax deductions to land owners that donate conservation easements. Further assistance, financial or otherwise, could strengthen this vital connection.

Lastly, regardless of data recording, land trusts of all sizes and priorities have been and will continue to be valuable tools to help protect our landscapes. I discuss the aforementioned concerns to highlight that land trusts could potentially, but are not currently able, to improve their protection by more effectively collecting, updating, sharing, and analyzing standardized data. Many land trusts in this survey have already begun or made this transition, and I commend their achievements. These trusts could be models from which the entire community could learn.

PERSONAL COMMUNICATIONS

Bob Van Nest – President, Western Foothills Land Trust

Carrie Walia – Executive Director, Loon Echo Land Trust

Cheri Domina – Executive Director, Great Pond Mountain Conservation Trust

Geoffrey Young – Member of Board of Directors, Frenchman Bay Conservancy

Lee Dassler – Coordinator, Western Foothills Land Trust

Mark Berry – Executive Director, Downeast Lakes Land Trust

Megan Shore – Maine Land Trust Program Manager, Maine Coast Heritage Trust

Nina Young – Lands Program Manager, Maine Farmland Trust

Peter McKinley, Ph. D. – Director of Forestland Conservation, Forest Society of Maine

Tom Blake – Member of Board of Directors, South Portland Land Trust

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APPENDIX A: SURVEY

I. Organization Information

1. Contact Information
    a. Organization Name
    b. Office Address (use mailing address if no office)
    c. City/Town
    d. State
    e. ZIP
    f. Year Founded
2. Which best describes your organization's scope of operations? (Check only one)
    a. Options: Local, Statewide, or National
3. What is your organization's primary mission? Please choose ONE of the following as a PRIMARY mission. Then, please specify if other choices are SECONDARY missions or NOT A MISSION
    a. Historical or cultural resources
    b. Open space, unspecified
    c. Recreation lands, including trails
    d. Scenic lands
    e. Urban parks, gardens, or open spaces
    f. Water resources, including wetlands
    g. Wildlife habitat or important biodiversity features
    h. Working forest lands
    i. Working farms or ranchlands
    j. Other missions (please specify as Primary or Secondary)

II. Prioritization Strategy

1. Does your organization have a WRITTEN prioritization strategy for land and/or easement acquisition?
    a. Options: Yes or No
2. If "Yes" to Question 1, who has access to it? Check all that apply.
    a. Options: Board members, Members, Public through website, Public through office, and Other (Please specify)

III. Baseline Report I

1. Does your organization have a baseline report to record the condition of protected lands upon acquisition?
    a. Options: Yes or No
    b. *If "Yes" respondent continues to IV. If "No" respondent skips to X.*

IV. Baseline Report II

1. For which properties does your organization use the baseline report? Check only one.
    a. Options: Fee owned, Conservation Easement, or Both
2. On approximately what percentage of ALL lands acquired and/or protected by your organization last year (Jan-Dec 2007) did it also

complete a baseline report? Choose "Data Unavailable" if you do not know.
    a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable
3. Who has access to the completed baseline reports? Check all that apply.
    a. Options: Board members, Members, Public through website, Public through office, Landowners (easement only) and Other (Please specify)
4. For conservation easements, do landowners automatically get a copy of the baseline and any updated baseline reports?
    a. Options: Yes or No
5. Does your organization maintain a master electronic spreadsheet (or equivalent tracking mechanism) that contains information from all baseline reports, providing an overview of all protected properties?
    a. Options: Yes or No

VI. Baseline Content

** Does the baseline report explicitly ask for the following information to be recorded or collected?
    a. Options: Yes, Sometimes, or No
    b. Definitions:
        i. Yes - variable ALWAYS recorded for ALL property types by baseline
        ii. Sometimes - variable LIKELY recorded, but is not asked for explicitly (i.e., baseline asks for a general narrative of conservation values which could include the variable "endangered species") or the variable is only recorded on SOME types of properties
        iii. No - variable is NOT recorded by baseline

1. Land cover
    a. Major land covers present on parcel (as determined by organization)
    b. Approximate acres of each land cover on parcel
    c. Map containing distribution of major land covers on parcel
2. Land use
    a. Primary land uses on parcel (as determined by organization)
    b. Map containing distribution of primary land uses on parcel
3. Forests
    a. Primary woody plant species
    b. Map containing distribution of primary woody plant species
    c. Approximate age or successional stage of forests
    d. Copy of forest management plan (working forests only) – *not analyzed*
4. Other Plants
    a. Primary grass, flower, and/or herb species
    b. Map containing distribution of primary grass, flower, and/or herb species

5. Water Bodies
    a. Water quality of water bodies
    b. Water level of water bodies
    c. Approximate feet or miles of shoreline
6. Invasive Species Present in the Parcel
    a. Invasive species in parcel
    b. Map containing distribution of invasive species in parcel
    c. Population sizes (approximate) of invasive species in parcel
7. Diseases Present on Parcel
    a. Types of animal or plant diseases in parcel
    b. Map containing distribution of diseased plants in parcel
    c. Species of diseased animals in parcel
8. Other Species Present on Parcel
    a. Rare, threatened or endangered species in parcel
    b. Map containing distribution of rare, threatened or endangered species in parcel
    c. Population sizes (approximate) of rare, threatened or endangered species in parcel
    d. Other important species in parcel
    e. Population sizes (approximate) of other important species in parcel
9. Soil Type
    a. Primary soil type(s) on parcel
10. Use: Past and Present
    a. Documentation of previous owners and any pertinent effects on the property
    b. Map OR description of ownership of contiguous/adjacent parcels
11. Digitized Information and Photographs
    a. Digitized property boundary (i.e., GIS or CAD)
    b. Digitized features within property (as determined by your organization)
    c. Aerial photo of property at an appropriate scale taken as close as possible to the date of acquisition

VII. Updating Baseline Reports

1. Does your organization periodically update the baseline by recollecting some or all of the information in the original report?
    a. Options: Yes AND we HAVE a written policy for the frequency of updates; Yes BUT we DO NOT HAVE a written policy for the frequency of updates; or No
    b. If "Yes AND we HAVE" respondent continues to VIII. If "Yes BUT we DO NOT HAVE" respondent skips to IX. If "No" respondent skips to XI.

VIII. Written Update Policy

1. How often does your organization update a baseline report?
    a. Options: Annually, Every 2 years, Every 5 years, Other (please specify)

b. *Respondent skips to XI.*

IX. No Written Update Policy

1. How often does your organization update a baseline report?
    a. Options: Annually, Every 2 years, Every 5 years, Other (please specify)
    b. *Respondent skips to XI.*

X. No Baseline Report

1. Why does your organization not have a baseline report? Check all that apply.
    a. Options: Lack of Funding, Do Not Need, and Other (please specify)
2. Does your organization plan to develop and implement a baseline report?
    a. Options: Yes or No
    b. If "Yes" in what year does your organization anticipate implementing it?

XI. Monitoring

1. Does your organization have a written policy regarding the periodic monitoring, inspection, and enforcement of the properties it protects?
    a. Options: Yes or No
2. If "Yes" to Question 1, how often does your organization monitor each property?
    a. Options: Annually, Every 2 years, Every 5 years, Other (please specify)
3. What percentage of all protected properties did your organization monitor last year (Jan-Dec 2007)? Choose "Data Unavailable" if you do not know.
    a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable
4. In the past year (Jan-Dec 2007) approximately how many properties had a significant change due to natural causes or a violation of the easement terms? Choose "Data Unavailable" if you do not know.
    a. Options: Data Unavailable or "Number of properties with a significant change or violation"

XII. Land Cover and Use Records

1. On what percentage of all your organization's protected lands has it recorded land cover? Select "Data Unavailable" if you do not know.
    a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable
2. Do you use a certain identification/categorization system or combination of systems to record land cover?
    a. Options: Yes or No
    b. If "Yes" what is the name(s) of the system?
3. On what percentage of your organization's protected lands has it recorded primary land use? Select "Data Unavailable" if you do not know.

a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable

XIII. Productive Lands I

1. Does your organization protect lands containing working forests?
    a. Options: Yes or No
    b. *If "Yes" respondent continues to XIV. If "No" respondent skips to XV.*

XIV. Working Forest Lands

1. On what percentage of its working forest properties has your organization recorded if and to what specification logging is certified (i.e. FSI or FSC)? Select "Data Unavailable" if you do not know.
    a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable
2. On what percentage of its working forest properties has your organization recorded whether or not the logging management plan manages for biodiversity? Select "Data Unavailable" if you do not know.
    a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable
3. On what percentage of its working forest properties has your organization recorded whether or not the logging management plan includes strategies for adapting harvesting and management practices based upon climate change? Select "Data Unavailable" if you do not know.
    a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable

XV. Productive Lands II

1. Does your organization protect lands containing working farms?
    a. Options: Yes or No
    b. *If "Yes" respondent continues to XVI. If "No" respondent skips to XVII.*

XVI. Working Farms

1. On what percentage of its working farmland properties has your organization recorded the number of acres under cultivation? Select "Data Unavailable" if you do not know.
    a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable
2. On what percentage of its working farmland properties has your organization recorded whether or not the land is certified organic? Select "Data Unavailable" if you do not know.
    a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable
3. On what percentage of its working farmland properties has your organization recorded whether or not the farmer uses an Integrated Pest Management system? Select "Data Unavailable" if you do not know.

a. Options: 0%, 10% 20%, 30%, 40%, 50%, 60%, 70%, 80%, 90%, 100% or Data Unavailable

XVII. Organization Opinion

As a represent of your organization, please read the following statements and respond with your opinion

1. Do you believe that your organization's recording system for property characteristics can and should be improved? (An improvement would include the use of a baseline report if your organization does not currently use one). Please rate your opinion on the following scale: 1=Needs Improvement to 7=Does Not Need Any Improvement
    a. Options: 1, 2, 3, 4, 5, 6, or 7
2. For your organization to meet its mission, how necessary is a baseline report which includes biodiversity criteria? Please rate your opinion on the following scale: 1=Necessary to 7=Unnecessary
    a. Options: 1, 2, 3, 4, 5, 6, or 7
3. For your organization to meet its mission, how necessary is UPDATING the baseline report by recollecting some or all of the information in the original baseline? Please rate your opinion on the following scale: 1=Necessary to 7=Unnecessary
    a. Options: 1, 2, 3, 4, 5, 6, or 7
4. Has your organization encountered a violation to an easement that was not fully resolved due to the ABSENCE of a baseline data recording or an INCOMPLETE baseline data recording?
    a. Options: Yes or No
5. What do you think are your organization's most pressing challenges?
    a. Options: Open response
6. How effective was your organization this year compared to last year? Please rate your opinion on the following scale: 1=More Effective to 7=Less Effective
    a. Options: 1, 2, 3, 4, 5, 6, or 7
    b. Can you attribute this to anything specific?
        i. Options: Open response

XVIII. Budget and Protected Lands

1. What was your approximate total operating budget for the year 2007 (Jan-Dec 2007)?
    a. Options: less than $25,000; $25,001-$50,000; $50,001-$75,000; $75,001-$100,000; $100,001-$200,000; $200,001-$400,000; $400,001-600,000; $600,001-$800,000; $800,001-$1,000,000; $1,000,001-$2,000,000; or more than $2,000,000
2. At the end of last year (Dec 2007), how many parcels did your organization protect?
    a. Conservation Easements
    b. Fee Owned Lands

3. At the end of last year (Dec 2007), how many acres did your organization protect?
    a. Conservation Easements
    b. Fee Owned Lands

APPENDIX B: LAND TRUSTS THAT PROVIDED INPUT INTO SURVEY

1. Great Pond Mountain Conservation Trust
2. Downeast Lakes Land Trust
3. Forest Society of Maine
4. Loon Echo Land Trust
5. Maine Farmland Trust
6. Northeast Wilderness Trust
7. South Portland Land Trust
8. Western Foothills Land Trust

APPENDIX C: FOUR QUESTION "ABBREVIATED SURVEY"

1. Does your organization identify as local, statewide, national in scope?

2. Does your organization have a written prioritization strategy for land and/or easement acquisition?

3. Does your organization have a baseline report to record the condition of protected lands upon acquisition?

4. Does your organization have a written policy regarding the periodic monitoring, inspection, and enforcement of the properties it protects?