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THE VALUE OF KNOWING: PUBLIC LANDS MONITORING BY NON-AGENCY GROUPS

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In Loving Memory of

Martha Louise Mann Shipe (1921 – 2012)

A model of loving life

And For

Emily Schembra

To whom I get to love life with

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Abstract

It is generally recognized that in order to make informed federal land management decisions, such decisions need to be based on information gathered from monitoring of those lands. While some monitoring is being conducted by federal land management agencies, it is happening too infrequently and is often inadequate for properly informing land management decisions. In an attempt to fill this gap non-agency groups have begun monitoring federal public lands themselves. It appears that through recent congressional authorizations, policy reforms, and agency initiatives monitoring by non-agency groups is being supported at every government level. While theoretically this transfer of responsibility from the federal agencies to non-agency groups looks good on paper in reality there are considerable barriers. This has many groups gathering data that ends up never being used in the decision making process. Despite this barrier, however, non-agency groups continue to monitor while the topic itself garners increased attention. As it stands, our understanding of how non-agency monitoring can affect land management decision making is seen as fairly black and white; data from monitoring is either used by the agency to make decisions or it is not. This study suggests that such a view of monitoring by non-agency groups is too narrow. The values associated with monitoring on federal public lands can be seen as having an internal or external benefit. Internal benefits, such as engaging youth or leveraging funding, are those that primarily only affect the monitoring group. External benefits, such as filling in gaps of agency monitoring or informing adaptive management within the agency, are those that may lead to either directly or indirectly influencing land management decision making. Ultimately, directly influencing federal land management decision making is difficult and may be out of reach for many non-agency groups. However those benefits that affect the group itself may be easier to achieve and could act as a starting point for groups wanting to start monitoring. Over time external benefits can be realized such as building relationships with agency staff, building public support, or informing NEPA reports that can lead to indirectly influencing federal land management decision making. Furthermore, there are differences between how single-interest groups and multi-interest groups value monitoring. Combined, these insights can assist groups in focusing their monitoring goals in order to increase the longevity and success of monitoring activity.

Definitions

Monitoring – "the periodic and systematic collection and evaluation of data to track changes over time" (Moote, 2011, p. 5).

Inventory – "accepted biological methods to determine the presence, relative abundance, and/or distribution of species" (FWS, 1995).

Assessment – "the estimation or judgment of the status of ecosystem structures, functions, or processes, within a specified geographic area (preferably a watershed or a group of contiguous watersheds) at a specific time" (BLM, 2001).

Implementation Monitoring – "also known as compliance monitoring, records actions taken and outputs relative to targets. Implementation monitoring asks, 'Did we do what we said we would do?'" (Moote, 2011, p. 5).

Effectiveness Monitoring – "measures changes in specific conditions relative to desired outcomes. Effectiveness monitoring asks, "Did we achieve our desired results?" (Moote, 2011, p. 6).

Programmatic monitoring – "tracks the implementation and performance of policies and large scale plans rather than specific projects" (Moote, 2011, p. 6).

Quantitative monitoring – "tracks numerical data, such as changes in amounts or sizes" (Moote, 2011, p. 6).

Qualitative monitoring – "is based on descriptive data from structured observation and evaluation rather than numerical data" (Moote, 2011, p. 6).

Multi-party Monitoring – "involves discussion and mutual learning among a diverse group of individuals representing different groups and interests" (Moote, 2011, p. 5).

Third Party Monitoring – "refers to data collection and analysis by a neutral individual or organization independent of the project or program managers" (Moote, 2011, p. 6).

Agency – A federal land management agency that includes the US Forest Service (FS), Bureau of Land Management (BLM), US National Park Service (NPS), and US Fish and Wildlife Service (FWS).

Non-Agency Group – A self-governing group that is not affiliated with any government bureaucracy. This includes 501(c)3 organizations, advocacy groups, activist groups, stewardship groups, and collaborative groups.

Single-Interest Group –A group in which decisions are made by a single interest. This includes activist groups, advocacy groups, and stewardship groups.

Multi-Interest Group – A group in which decisions are made by multiple interests, most commonly referred to as a collaborative groups.

Value – A value in this paper is specific to those associated with monitoring by non-agency groups on federal public lands. They include things identified specifically as a value, a benefit, or something discussed with "relative worth, utility, or importance" (Merriam-Webster, 2013).

Internal Values – Values from monitoring that affect the group itself and have no effect on federal land management decision making.

External Values – Values from monitoring that either directly or indirectly affect federal land management decision making.

A Note on Single-interest and Multi-interest Groups

Because much of this paper discusses the differences of values between single-interest and multi-interest groups it is important the reader fully understand how these terms are used. Collaborative processes in environmental decision making are becoming more common, but this process represents a major shift from traditional forms of influencing environmental decision making. More traditional forms include activist groups, advocacy groups, and stewardship groups. It is the opinion of this author that those forms of organizational operation differ enough that separation is necessary in order to make this paper useful to all environmental or conservation based groups.

However, it would be doing a disservice to all groups to simply group them as being collaborative or non-collaborative in structure. In reality, groups fall along a continuum from being purely collaborative at one end and purely activist at another. But even activist groups may be involved in collaborative processes and attempting to define a collaborative will often change depending on who you ask. In order to make an analysis possible for this study groups still had to be grouped into separate categories. Instead of thinking of groups as being either collaborative or non-collaborative this paper has separated them as being single-interest or multi-interest.

Single-interest groups represent groups that self-identified themselves as being an activist group, advocacy group, stewardship group, or “friends of” group. What these groups have in common is that they operate under a single-interest decision making process, or one in which decisions are made by an elected board, constituency, or individual in order to move forward a particular mission or interest.

Multi-interest groups are those that self-identified as being a collaborative. These groups operate under a multi-interest decision making process, or one in which decisions are made by a group

of diverse stakeholders representing multiple interests that is fully consensus based or at least majority vote based.

Separating groups in this way is largely for practical reasons and is not intended as a judgment of those groups in any way. With this justification in mind it is up to the reader to decide what is relevant to them.

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Background: Filling the Monitoring Gap

Monitoring has long been identified as a critical component of effective natural resource management on public lands (Likens & Lambert, 1998). Without monitoring, agency decision making cannot hope to deal effectively with environmental issues (Vos, Meelis, & Keurs, 2000). As Stem, Margoluis, and Salafsky (2005) put it, "[m]onitoring and evaluation answers questions related to how well a project or strategy is working and identifies the conditions under which a conservation action is likely to succeed or falter… monitoring and evaluation forms the basis for improved decision making" (p. 2). This is especially true for ecological restoration and adaptive management, both of which are increasingly being used in public land management strategies (FS, 2012a). DeLuca, Aplet, & Wilmer (2010) list four reasons why monitoring is integral for both of these management strategies. First, restoration is ongoing and requires attention after initial treatments. Second, restoration is a new science and thus monitoring is needed to verify and refine it. Third, adaptive management is by definition dependent on information from monitoring in order to evaluate whether or not adaption is needed. Fourth, monitoring is needed in order to alter negative ecosystem trajectories before they become too large to effectively deal with.

These four reasons reach beyond just restoration and adaptive management though. Any activity that aims to alter ecological trajectories can benefit from knowing if such activity is successful or not (Margoluis, Stem, & Salafsky, 2009). Collaborative resource management is reliant on monitoring for not just the ecological decisions, but also for the collaborative process itself (Moote, 2013). Furthermore information from monitoring goes beyond project level decision making and is important for informing a wide array of legal (Biber, 2011) and policy decisions (Sanderson, 2002).

At its most fundamental, monitoring is "to watch, keep track of, or check usually for a special purpose" (Merriam-Webster, 2013). A more specific iteration long adopted by the conservation

community defines monitoring as the "intermittent recording of the condition of a feature of interest to detect or measure compliance with a predetermined standard" (Hellawell, 1991). Another more broad definition describes monitoring as, **"**the periodic and systematic collection and evaluation of data to track changes over time" (Moote, 2011, p. 5). The federal public land agencies, which are largely responsible for public lands monitoring, have their own definitions reflecting the various standards and mandates that each operate by. The Forest Service and National Park Service both use the definition of monitoring as, "the collection and analysis of repeated observations or measurements to evaluate changes in condition and progress toward meeting a resource or management objective" (Elzinga, Salzer, & Willoughby, 1998; FS, 2009). The Bureau of Land Management defines monitoring as the "regular collection of data to evaluate: 1) whether objectives or land health standards are being achieved; 2) effectiveness of management actions" (BLM, 2001). Finally the US Fish and Wildlife Service defines monitoring as "accepted biological methods to determine the presence, relative abundance, and/or distribution of species" (FWS, 1995).

While these definitions differ in pros, their meanings remain the same; monitoring is done over time to learn a specific thing. This differs from the sometimes interchanged but incorrectly used inventory or assessment. The Fish and Wildlife Service defines an inventory as "accepted biological methods to determine the presence, relative abundance, and/or distribution of species" (FWS, 1995). An inventory counts something, but it does not try to discover anything more than that. An inventory can require an accepted level of scientific rigor, but it differs from monitoring in that it does not occur over time or try to learn anything more than how much of something exists and where it exists. Although inventories can be used as baseline data for conducting future monitoring they are not generally considered the first step in the monitoring process, largely because they lack the guidance of a specific goal.

An assessment differs from monitoring in that it does not require the same level of scientific rigor and it does not occur over time. The BLM defines an assessment as, "the estimation or judgment of the status of ecosystem structures, functions, or processes, within a specified geographic area (preferably a watershed or a group of contiguous watersheds) *at a specific time* [emphasis added]" (BLM, 2001). Assessments are used to get a general idea of how something is doing. Like monitoring it may have a specific question in mind, however answering that question will rely on making generalizations that are not held to the same scientific rigor as inventories or monitoring.

Resource inventories have been conducted by the federal government since 1928 when Congress authorized the Forest Inventory and Analysis Program (FIA) (Smith, 2002; FS, 2013a). It wasn't until the 1980s, when Congress authorized the National Acid Precipitation Assessment Program (NAPAP) that collecting data on America's natural resources really spread to other federal agencies (Bechtold, Tkacz, & Riitters, 2007). Since then a host of federal agency monitoring, assessment, and inventory programs have evolved. The US Forest Service (USFS) has added the National Forest Health Monitoring Program (NFHM) in 1990 (Potter & Conkling, 2012). The Environmental Protection Agency implemented the Environmental Monitoring and Assessment Program from 1990 to 2006 that morphed into the National Aquatic Resource Surveys (NARS) (EPA, 2013). The Natural Resource Conservation Service has conducted periodic National Resource Inventories since the 1930s but not until 2000 did they become annual (NRCS, 2007). So monitoring of America's natural resources by the federal agencies is still a fairly new activity, some of which is mandated by law and some not.

The Forest Service has specific language in the National Forest Management Act (NFMA) of 1976 mandating programmatic monitoring:

> …specifying guidelines for land management plans developed to achieve the goals of the Program which-… insure research on and (based on continuous monitoring and assessment in

the field) evaluation of the effects of each management system to the end that it will not produce substantial and permanent impairment of the productivity of the land…" (16 U.S.C. 1600 § 6(3)(C)).

Section 219.12 (Monitoring) of the 2012 NFMA Planning Regulations promulgated by the Obama administration interprets this at the policy level as "[t]he responsible official shall develop a monitoring program for the plan area and include it in the plan" (FS, 2012a). The Fish and Wildlife Service has language in the 1997 National Wildlife Refuge Improvement Act that states "…In administering the System, the Secretary shall—… monitor the status and trends of fish, wildlife, and plants in each refuge."(16 U.S.C. 668dd § 5(4)(N)) The Endangered Species Act adds an additional mandate that "…the Secretary shall implement a system to monitor effectively the status of all species with respect to which a finding is made under subparagraph (B)(iii) and shall make prompt use of the authority under paragraph 7 to prevent a significant risk to the well being of any such species" (16 U.S.C. 1531 § 4(g)). Neither the BLM nor the National Park Service have formal monitoring mandates however both have developed monitoring strategies. The BLM has the Assessment, Inventory, and Monitoring Strategy (Toevs, Taylor, Spurrier, MacKinnon, & Bobo, 2011) and the NPS an Inventory and Monitoring Program which includes their Vital Signs Monitoring Program (Fancy & Bennetts, 2012). In addition to the congressional and administrative mandates to do monitoring there also exists a host of soft law standards such as those agreed to in the Montreal Process (Hickey, Innes, Kozak, Bull, & Vertinsky, 2006).

While it may seem that monitoring is being sufficiently conducted on federal public lands, there is a growing body of criticism that, to date, such monitoring is insufficient and ill-suited for informing good management decisions. Even the federal government has been critical of their own monitoring. A 2004 report by the Office of Management and Budget reported that the BLM had "'gaps in the

monitoring of resource conditions to support management decisions' and that the BLM had no reliable mechanism for reporting on the condition of public lands above the local scale" (Toevs et al., 2011, p. 9).

Outside critics point to several factors that have led to insufficient monitoring by federal land management agencies. Some critics point to a general lack of interest in monitoring because it is costly and the agencies fear the data could be used against them in litigation (Biber, 2011; DeLuca et al., 2010). Much of the issue stems from a general lack of Congressional interest that result in reduced funding for monitoring activity. This has some observers calling on Congress to offer leadership and direction to focus on monitoring (National Conference on Science Policy and the Environment, 2000). In the case of the Forest Service, a roughly 12 million dollar reduction to the line item *inventory and monitoring* was allocated for the FY 2013 Budget (FS, 2013b). Even more telling is that in the proposed FY 2014 budget *inventory and monitoring* is altogether eliminated and combined with *land management planning* to become *land management planning, assessment, and monitoring* with a combined cut of 20 million dollars (FS, 2013c). In light of the 2012 Forest Planning Regulations and the requirement for new forest plans on nearly all National Forests, it is unlikely that the Forest Service will be increasing their monitoring activities any time soon.

The courts have largely decided in favor of the Forest Service when not doing project level monitoring. Biber (2011) identifies three reasons for this: "(1) an agency monitoring program is neither a "final" nor specific agency "action" that a court can review or mandate under the APA; (2) the level of compliance by an agency with a mandatory duty is not for the court to review, as long as at least some compliance exists; or (3) the apparently mandatory language in the statute, regulation, or plan is in fact only hortatory" (p. 60-61). This has led to contradictory rulings by the court. In Sierra Club v. Martin, 168 F.3d 1, 6 (11th Cir. 1999) the Forest Service's decision to implement a series of timber sales was found to be arbitrary and capricious and in violation of NFMA because it relied on forest-wide inventories of at

risk species instead of site specific populations at the project level. But in Forest Alliance, Inc. v. U.S. Forest Serv., 325 F.3d 851, 863 (7th Cir. 2007) the court ruled the complete opposite. The opinion in this case was that the Forest Service can in fact use forest wide inventories to make project level decisions based on NFMA requirements. So while mandates exist, those mandates have been interpreted in ways that limit their enforceability. The agencies do have the freedom to focus more resources on monitoring but they often favor other activities that produce more immediate results suggesting larger political barriers exist. A case study by Kusel et al. (2000) found that "[t]he lack of support for consistent monitoring compels questions about congressional and agency commitments to monitoring and adaptive learning."(p. 14)

While a lack of resources is a major barrier to increasing monitoring activity, many critics find significant fault with the relevance of agency monitoring as well. While the many inventories and assessments that land agencies have conducted such as the FIA collect large quantities of data, much of that data is not measuring the right indicators to answer relevant questions of causality or effectiveness of management (Morrison & Marcot, 1995; Vos et al., 2000). Another issue is that, due to the uncertainty of future funding, most monitoring suffers from a lack of consistency over time which reduces its value (Likens & Lambert, 1998).

There are numerous recommendations for how to increase monitoring on public lands. Biber (2011) lays out a fairly comprehensive list: better interagency coordination and leadership, more funding, and the creation of a new monitoring agency are some of the recommendations. Biber also lists outsourcing monitoring activity to actors outside of the bureaucracy as a potential solution. Aside from using non-agency conservation groups for monitoring activity, which this paper focuses on, there is also outsourcing monitoring to industry, having the courts mandate monitoring, and increasing congressional supervision of monitoring activity. All of these proposed solutions have benefits as well as risks and

outsourcing monitoring activity to non-agency conservation groups is no exception. There is the issue of bias from groups that have traditionally been in conflict with the agencies. Data from such groups, regardless of the quality or methods of the monitoring, may not be usable by the agency for political or policy based reasons. Many non-agency groups may also lack the resources to incorporate many monitoring technologies, implement the technology correctly, or be able to sustain the monitoring over a long enough period of time. In light of these issues relying on non-agency conservation groups to do monitoring activity will likely only be a part of a larger solution. But as Biber points out, "even with these caveats, there are areas in which volunteer monitoring can be quite useful…" (2011, p. 59).

Non-agency conservation groups have been conducting monitoring of their own for some time, but the activity has really only just recently gained significant attention (Stem et al., 2005). Some of this monitoring is tracking activities conducted by the conservation groups themselves. But as public land management agencies struggle to conduct meaningful monitoring of their own, many non-agency groups have begun to try and fill that gap (Biber, 2011; McNeil, Rousseau, & Hildebrand, 2006). It appears that the federal land management agencies and Congress actually support this trend. The Collaborative Forest Landscape Restoration Program (CFLRP), for example, has a mandated multiparty monitoring component which leverages resources from non-agency sources to conduct project level monitoring (P.L. 111–11 Title IV § 4003 (g)(4)). The EPA has created a citizen science monitoring program (EPA, 1996, 2013). The Fish and Wildlife service has formed multiple partnerships with conservation based organizations to assist in their Rare Carnivore Remote Camera Project. In the FY 2014 FS budget a new line item has been created called 'restoration partnerships' and funded with ten million dollars. The CFLRP is continuing to be funded with roughly 40 million dollars. Stewardship contracting, which encourages multi-party monitoring and is up for congressional reauthorization in 2013, was given a modest 400,000 dollar boost. All of this indicates a continued interest in developing partnerships, collaboration, and multiparty monitoring as an alternative to purely agency based monitoring.

Emerging from this Congressional and agency support of multi-party and non-agency monitoring is a growing body of literature suggesting ways to successfully implement it (Clement, Knapp, & Keralis, 2009; Derr et al., 2005; Kusel et al., 2000; Moote et al., 2010; Pilz, Ballard, & Jones, 2006; Pilz, Jones, & Ballard, 2005). Paralleling this body of literature is a growing list of studies that find volunteer and citizen based monitoring is accurate and reliable enough to determine ecological trends (Boudreau & Yan, 2004; Brandon, 2003; Engel & Voshell, 2002; Ericsson & Wallin, 1999; Gillett et al., 2012; Mclaren, 1996; Stepenuck, Wolfson, Liukkonen, Iles, & Grant, 2011; Stokes, Havas, & Brydges, 1990). In addition to these studies are papers that recognize the potential social and community benefits of volunteer and community based monitoring activity such as incorporating local knowledge, facilitating community involvement, assisting with some public lands management decisions, informing and educating the public, and reducing monitoring costs (Bromenshenk & Preston, 1986; Stokes et al., 1990; Yung, 2007). Conservation monitoring in general has garnered increased attention as calls for more and better monitoring of conservation projects and agency activities have grown (Conservation Measures Partnership, 2007; Margoluis et al., 2009; Sayer et al., 2006; Stem et al., 2005).

Despite this growing focus on monitoring, it remains a difficult task to accomplish and many non-agency groups report considerable barriers to conducting successful monitoring (Moote et al., 2007; Muir, 2010). Overshadowing all of these barriers is a lack of funding. In order to compensate for the lack of resources, non-agency groups have had to invent creative ways to gather data that fit their capabilities (Guijt, Arevalo, & Saladores, 1998; Stem et al., 2005). Often this means groups will gather data considered by the scientific community and the federal public lands agencies to be of low quality and insufficient rigor (Bradshaw, 2003; Conrad & Hilchey, 2011; Gouveia, Fonseca, Camara, & Ferrira, 2004). Critics of this trend contend that more focus should be aimed at producing higher quality data (Legg & Nagy, 2006). However, there are others that suggest less rigorous monitoring can be conducted that will produce relevant data for certain types of decision making (Holck, 2007; Reid, Williams, &

Paine, 2011). The challenge then for non-agency groups conducting monitoring is finding a balance between gathering relevant data and the resources they have available for conduct monitoring.

Since the ultimate gap in monitoring on public lands concerns the lack of data to make informed decisions, if non-agency groups hope to fill this gap then presumably data they collect will need to be used in the decision making process. In theory this is a fairly simple idea. Groups do monitoring, present their data to the agency, and the agency incorporates this into their decisions. In practice, however, this does not typically work. Biber (2011) lays out potential limitations of non-agency group monitoring: data quality, database compatibility, trust/bias, as well as sustaining long term monitoring activity. Others have reported these limitations as well, building on a growing understanding of the barriers facing non-agency groups (Kusel et al., 2000; Moote et al., 2007; Savan, Morgan, & Gore, 2003). In some cases data is documented in agency reports, but whether or not the data is used for management decisions is unknown (Fernandez-Gimenez, Ballard, & Sturtevant, 2008). As one study finds, "one of the greatest challenges for Community Based Monitoring is the use of the data collected through the monitoring program. Many groups find their data is not used in the decision-making process…" (Conrad & Hilchey, 2011, p. 281).

The federal government and the scientific community have a long history of resisting any science that does not fit the western science model (Taylor, Williams, & Tahu, 2010). Even in Canada where the use of traditional ecological knowledge (TEK) in ecological assessment and management has become a policy requirement, how to actually achieve this is proving difficult (Houde, 2007; Usher, 2000). The United States may very well be on the verge of confronting this issue as well. Section 219.6 of the 2012 Forest Planning Regulations states that, "relevant private information, including relevant land management plans and local knowledge, will be considered if publicly available or voluntarily provided." While this is not a legally binding requirement *per se*, it has at least the potential to force the FS to

address this issue head on. Significant questions will need to be addressed. What is relevant information? What is local knowledge? What fulfills "considering" information?

Despite the perceived interest from land management agencies themselves at fostering non-agency participation in monitoring, actually achieving meaningful participation remains difficult at best. But despite this frustration, non-agency groups continue to forge ahead with monitoring programs of their own on public lands. As discussed earlier, much of the literature on monitoring focuses on collecting data to inform land management decisions. While this remains an important goal of monitoring what is less understood, and potentially undervalued, are the other benefits from monitoring besides affecting the decision making process. While it is recognized that these other benefits exist, they are often discussed as secondary or residual benefits. What this paper aims to discover is where these other benefits fall in comparison to affecting land management decisions for non-agency groups doing monitoring. By asking what value individuals perceive from monitoring a detailed typology of these values was created offering insight into what actually motivates non-agency groups to monitor on federal public lands. It is the hope of this author that those groups struggling to maintain a monitoring program or groups thinking of starting a monitoring program will find this information useful for informing those activities. While this professional paper is aimed at non-agency groups it should also be useful to federal land management personnel looking to better understand what motivates non-agency groups to monitor on public lands. Finally, since this subject appears to be a growing field it is hoped that this paper can inform future studies and research

Overview of Paper

This paper is divided into two main sections. The first section, Results, covers in detail the complete list of values identified through the study. This list is presented as a complete typology of values associated with public lands monitoring by non-agency groups. The results section breaks this typology in to general categories, gives examples of these values from the interviews, and also presents the typology in tables listing the number of interviewees that identified each value from single-interest and multi-interest groups.

The second section, Discussion, is an analysis of the typology and the implications of the findings from this study. Part 1 is a more detailed comparison of values held by single-interest and multi-interest groups. This comparison is intended to give an idea of where single and multi-interest groups share or differ in their motivations to monitor and why the goals of monitoring may be different between these two types of groups.

Part 2 is a discussion of the importance and implications of separating values into those that affect the group (internal values) and those that may affect land management decisions (external values). This separation of internal and external values goes a long way in explaining the complexity of how monitoring activity by non-agency groups can navigate the pathways of affecting land management decisions. It can also go a long way in helping groups focus the goals of their monitoring so as to increase its success and longevity.

The paper is then concluded with a synopsis of the findings and a list of recommendations to groups working to maintain a monitoring program or groups thinking of starting a monitoring program.

Methods

Semi-structured interviews were used to collect qualitative data aimed at creating a typology of individually perceived values of public lands monitoring, as well as any relationships between those values and information pertaining to the represented non-agency groups. See appendix A for the interview guide. This study is focused on the perceived values of those individuals interviewed and does not necessarily reflect the opinions of the group as a whole or others in the group. For this reason the use of the generic term "group" will be synonymous with "interviewee representing a group".

A total of 17 groups were represented through 22 individual interviews. When it was possible two representatives from a group were interviewed. This was possible for only six of the groups. The remaining 11 were represented by only one interviewee. Groups were purposefully selected to be geographically diverse across the Western United States, as well as equally representing both non-agency multi-interest and single-interest groups involved in monitoring on public lands (see definitions for an explanation of single and multi-interest groups). Groups were selected through a process of case study reviews, online searches, and discussions with professionals in the field. Potential groups were contacted via an outreach e-mail, asked to confirm that they were doing some form of monitoring on public lands, and, if so, would they be willing to schedule an interview. A total of 23 groups were contacted in this way of which six either did not respond to the outreach, were not actually doing monitoring, or were not available for an interview. As was expected, interviewees often had suggestions for other groups potentially involved in monitoring and three groups were discovered in this way.

Because the number of groups doing this type of monitoring is unknown it is impossible to calculate what percent of the total number of possible interviewees this sample makes up. Seventeen groups does, however, fall within the range of other similar studies. Danielsen, Burgess, and Balmford (2005) analyzed 17 case studies of groups conducting locally-based biodiversity monitoring in

developing countries to see if these were leading to tangible results on the ground. Fernandez-Gimenez, Ballard, and Sturtevant (2008) based their paper on five case studies of community-based forestry organizations in the western USA doing monitoring for adaptive management. Other non-published papers range from a survey of 29 organizations conducting conservation monitoring (Muir, 2010), a report on the lessons learned from 50 community groups involved in the Multi-interest Forest Restoration Program (Moote et al., 2007), and another report on the status of three all-party monitoring pilot projects on Forest Service lands (Kusel et al., 2000).

In all, eight multi-interest groups represented by 12 individuals were interviewed while nine single-interest groups represented by 11 individuals were interviewed. One interviewee represented both a multi-interest group and a single-interest group accounting for the discrepancy between total interviews and interviews per group type. Groups were largely self-identified as either being a multi-interest or a single-interest group in the interview. This self-identification was necessary because the term "multi-interest" can take on multiple meanings depending on who you ask. In general groups that considered themselves collaboratives could be described as being involved in "…multiparty natural resource management projects, programs, or decision-making processes using a participatory approach and explor[ing] the range of evaluation approaches that have been applied to such efforts." (Conley & Moote, 2003) Many of the single-interest groups participated in collaboratives but only as stakeholders. Again these individuals made it a point to say they were not multi-interest groups but groups that had a particular mission and constituency. These groups ranged from advocacy and/or activist groups, stewardship groups, or "friends of" groups.

Non-agency groups were not selected based on what type of monitoring they were conducting or how long they had been doing monitoring, only that they were doing monitoring on federal public lands. Federal public lands included those managed by Forest Service (17), Bureau of Land Management(8), National Park Service(0), and Fish and Wildlife Service(0). The sample was further

refined to be locally based groups and not national groups such as the Sierra Club or Nature Conservancy, both of which do conduct monitoring.

Interviewees were self-selected as outreach e-mails were often forwarded to others in the group most knowledgeable or involved in the monitoring activity. Six interviewees were board members or chairs, eight were executive directors, six were monitoring coordinators or project managers, and two were hired third-party consultants. Interviewees ranged from being involved with the group for more than 20 years to just over one year. Most interviewees had been involved with the group for between five and ten years.

An interview guide (Appendix A) was created asking general questions about the group such as its formation, mission, and size. Questions were also asked regarding the involvement of the interviewee in the group and the monitoring. Questions were also asked about the monitoring itself such as the type of monitoring, how long the group has been monitoring, and what the barriers were to successful monitoring. The bulk of the interviews consisted of in-depth questions asked about what the interviewees valued about the monitoring and how it benefited them or the group. Values for this study were those that were either explicitly described as a value or benefit or as being important to the interviewee. When appropriate further probing questions were asked to gain a deeper understanding of the interviewees' perceptions or meaning. Interviews averaged 40 minutes in length. All but three of the interviews were conducted over the phone and all interviews were recorded on a computer using Reaper Digital Audio Workstation. Interviews not conducted over the phone were conducted in a location chosen by the interviewee. Recorded interviews were then manually transcribed verbatim.

Transcribed interviews were then coded using suggestions from Saldana (2009) for identifying and categorizing relevancy in the narrative and Gibbs (2007) for analyzing relationships among the coded results. These suggestions led to an analysis of the interviews in three stages. The first was to identify specific values for each interviewee. The second level was to identify where values overlapped

and group them into categories based loosely on the literature of multi-party and citizen based monitoring (Conrad & Hilchey, 2011; Derr et al., 2005; Fernandez-Gimenez et al., 2008; Kusel et al., 2000; Moote, 2011). See Table 9 for how identified values in these papers fell into the selected categories. From this grouping a typology of values was created which was used to inform the results section. See Appendix B for the complete typology. The typology and results were then used during the third level of analysis which looked for nuanced relationships and meaning between the values, interviewees, and types of groups. This final analysis was used to inform the final discussion.

Results - Monitoring Activity, Affiliations, and Barriers to Monitoring

Before exploring the results of identified values it is worth laying out a context for those values. Questions were asked regarding the types of monitoring that groups were doing, how they were doing it, what agencies they were working with, the barriers to monitoring that were reported, and why they thought the agency was not monitoring.

Groups were somewhat mixed in the forms of monitoring they were conducting. Four multi-interest groups were doing multi-party monitoring while the other four were doing third-party monitoring. One single-interest group was doing multi-party monitoring while seven were doing third-party monitoring. One single-interest group was involved in both multi-party and third-party monitoring.

Every multi-interest group was monitoring forest health. Roughly half were monitoring restoration projects while the other half was monitoring timber projects. A few were monitoring both restoration projects and timber projects. Two multi-interest groups were monitoring road maintenance requirements, five were monitoring water quality, two were monitoring wildlife, and two were monitoring socio-economic indicators.

Two single-interest groups were monitoring timber projects and two were monitoring restoration projects. Only one single-interest group was monitoring forest health while five were monitoring motorized use impacts and road decommissioning. Three groups were monitoring water quality, one was monitoring fish habitat, one was monitoring air quality, and six were monitoring wildlife.

All but one group reported doing implementation monitoring in some form. Seven reported doing effectiveness monitoring and only one group reported doing validation monitoring. Two groups

reported doing impact monitoring, three groups reported doing baseline inventories, and two groups reported doing assessments.

Groups employed a wide array of strategies to actually get the monitoring done. A few had outsourced the actual monitoring and analysis to a third-party consultant. Only two groups relied solely on volunteers to do the monitoring, analyze the data, and report their findings. Overwhelmingly the model of choice among all groups was to hire a monitoring coordinator or project leader and have either fully paid or partially paid staff, student interns, or volunteers assist in data gathering. A few groups had student interns do the analysis and reporting of findings but most relied on paid staff for this. Several groups were also in partnerships in which data gathering was done with agency staff and analysis was done entirely by an agency staff. Nearly all groups doing multi-party monitoring reported having agency staff assisting with collecting and analyzing data. Three groups reported assistance from universities in data analysis and reporting.

When asked who the audience of their final reports were all but four said an agency. Those that did not target the agency were single-issue groups and targeted their reports at the group itself, other groups, or universities. Every group reported targeting the reports at the group itself in the case of single-issue groups, or at stakeholders in the case of multi-issue groups. Only one group reported targeting their reports at the scientific community.

Most groups had their analysis written into a report. This was almost always made available online. Multi-interest groups also often reported their findings on field trips with stakeholders and agency staff present. Single-interest groups also often reported their findings on field trips but this was more typically with group staff, other groups, volunteers, and the public. A few single interest groups did say that agency staff sometimes participated in field trips as well. In addition to these ways of reporting

their findings groups presented their findings at private or public meetings, conferences, or were invited to report their findings for other groups or at universities.

Every group was monitoring on Forest Service land. Only about a quarter were monitoring on BLM land. No group was actually monitoring on NPS or FWS land, although a few groups were monitoring on FS land in a partnership with FWS. Several single and multi-interest groups were monitoring on private, state, or county land while doing water quality monitoring.

When asked what the major barriers to successful monitoring were 15 said funding putting this squarely at the top as the biggest barrier. More than half of the interviewees reported that a major barrier was that their data was not used by the target agency to inform their decision making. A few groups were not interested in giving their data to the agency at all. With this in mind nearly three quarters of groups that want to give their monitoring data to an agency reported that the agency was not using that data.

Other reported barriers was figuring out what to monitoring, not having clear goals, recruiting and maintaining volunteers, failing to treat monitoring as a research question, group or agency turnover, lack of coordination in the agency or among groups, and a lack of technical expertise to plan and implement the monitoring.

When asked why they thought the agency was not doing monitoring overwhelmingly interviewees said that it was a lack of federal funding. A few said they felt there was a general lack of interest within the agency to do the monitoring but most seemed sympathetic in that the agencies were unable to do monitoring due to decisions outside of their control.

Results - Values Associated with Public Lands Monitoring

A total of 98 different values from monitoring by non-agency groups were identified (see Appendix A – General Typology) which fell into eight categories.

1. Increases Organizational Capacities
2. Increases Agency Capacities
3. Leads to Accountability, Legitimacy of Group, and Trust Building
4. Builds Relationships
5. Assists with Communication and Education
6. Engages Public
7. Leads to Positive Socio-Economic and Environmental Outcomes
8. Leads to Directly Influencing Agency Management Decisions

These categories reflect how interviewees discussed specific values and emphasized the importance of those values. Some values were fairly similar but would be discussed specifically in a different context. For example monitoring was valued for increasing communication in general, which fell under communication and education. Monitoring was also valued for increasing communication that specifically led to trust building. In this case that value fell under Trust and Legitimacy.

Values were also discussed in a wide range of specificity. A common example was that monitoring led to increased support. Often the interviewee would not specify what type of support or how that support was garnered. In cases such as these, the value was attributed to a 'general' value, such as monitoring helps garner support in general. When an interviewee identified a more specific value it was recorded as such in the list of values.

While this is a qualitative study it was still possible to quantify the frequency of specific values which is reflected in the tables for each category. This draws a general picture of how values are shared across all interviewees and how values differ between multi-interest and single-interest groups. In some cases differences where overwhelmingly apparent and are noted here in the results and further explored in the discussion. In general, single-interest groups had more values identified in the categories of Increasing Agency Capacities, Engages Public, and Assists with Communication and Education. Multi-interest groups had more identified values in Directly Influencing Agency Decision Making and Trust and Legitimacy. Both types of groups had even representation in Organizational Capacities, Relationships, and Socio-Economic and Environmental.

1. Increases Organizational Capacities

Increased organizational capacity is the most diverse and populated category. Because of its size the category has been further broken into four subcategories: Helps Leverage Resources, Helps with Group Decision Making, Increases Various Organizational Capacities, and Increases Support of Group.

Table 1 – Increases Organizational Capacity outlines the identified values within each subcategory.

Table 1 – Increases Organizational Capacities

Values	Multi-interest Totals	Single-interest Totals	**Total**
Helps Leverage Resources			
Helps Group Leverage Funding	7	5	**12**
Helps Group Leverage Expertise	2	5	**7**

Table 1 – Increases Organizational Capacities

Helps Increase Group Membership	0	5	**5**
Helps Group Leverage Government Sponsored Programs	3	0	**3**
Helps with Group Decision Making			
Produces Information that Helps with Group Decision Making	6	8	**14**
Verifies or Refutes Theories Leading to Better Group Decision Making	8	3	**11**
Helps Inform Future Projects by Group	2	5	**7**
Helps Inform Group's NEPA Comment Letters	1	2	**3**
Helps Inform Group's Long Term Strategies	3	0	**3**
Gives Group Confidence they Are Making Good Decisions	1	2	**3**
Provides a Framework for Additional Questions	2	1	**3**
Helps Inform Appeals and Lawsuits	0	2	**2**
Helps Group Decide When to Engage Agency on an Issue	1	0	**1**
Increases Various Organizational Capacities			
Leads to Stronger Organization Overall	6	5	**11**
Advances the Group's Mission	2	7	**9**
Leads to a Stronger Collaborative Overall	8	0	**8**
Gives Group Focus	5	4	**9**
Puts Group in a Stronger Standing With Agency	3	4	**7**
Increases Participation Within Group	4	3	**7**
Allows Group to Support Other Organizations	0	6	**6**
Gets Stakeholders/Group in the Field	3	2	**5**
Helps Make Project Implementation More Efficient for Group	1	2	**3**
Puts Group in a Better Position to Inform Agency Management Plans	1	2	**3**
Leads to a Better Understanding of how the Agency Operates	3	0	**3**
Helps Group Build Stronger Partnerships	0	2	**2**
Helps Avoid Wasteful Duplication of Activities	2	0	**2**
Incentivizes Agency to Address Group's Concerns When Drafting NEPAs	1	0	**1**
Increases Support of Group			
Helps Garner Support in General	4	7	**11**
Helps Garner More Exposure from Media Sources for Support of Group Backed Projects	1	3	**4**
Helps Garner Political Support of Group Backed Projects	2	2	**4**
Helps Garner Public Support of Group Backed Projects	2	3	**5**
Helps Garner Support from Other Organizations	2	1	**3**
Helps Garner Support from Timber Industry	2	0	**2**

Helps Leverage Resources

This sub-category represents values placed on monitoring to bring in additional resources. Leveraged resources benefit the in general or the monitoring activity itself. This set of values was often discussed with uncertainty. Interviewees often used words such as 'I think' or 'probably' when talking about how monitoring helped leverage resources. This was especially the case for leveraging funding which was a commonly identified value despite interviewee's hesitation to be certain of its truth. As one interviewee said, "I would assume that it has [helped leverage funding] to an extent because that's something you can put down that you've been participating in, which is part of the warm and fuzzy stuff going on now." Similarly another interviewee speculated that "[w]e do have three foundations that like monitoring, and that's probably what has encouraged them to give us money."

This was also the case with interviewees that said monitoring helped leverage government sponsored programs. As one interviewee speculated, "I think that [monitoring] is part of the reason why we got the CFLRP because we already have this great partnership and we are already doing a lot of things that the CFLRP projects are meant to do."

Some interviewees did express confidence when talking about how monitoring helped leverage funding. In these cases interviewees felt that their monitoring activity showed the group was doing good work which increased the likelihood of receiving grants.

> It's helped secure funding for planning efforts and for project-based stewardship efforts simply because we - if we go to a foundation with a specific purpose in mind, because we are familiar with the area we can help use that knowledge to fund actions that need to happen in those places. If we hadn't been there to take pictures, to see the issue first hand, we would have a lower chance of getting funding - listing an issue on paper in a brief summary based on what you

think is different than listing empirical observations. When you have a concrete issue backed up by evidence you are much more likely to get funding for projects.

Another interviewee specifically mentioned youth engagement in this capacity;

It makes us much more appealing for funding; instead of just having lawsuits and being grumpy. That has been a secondary benefit that I didn't think of when I first started. Donors like to see you engaging young people and doing things like this.

Leveraging expertise was commonly identified as a value that benefited both the organization in general as well as the monitoring activity specifically. Very often this expertise came from partnerships with universities or stakeholders in a collaborative. Less commonly expertise would come from retired agency staff or volunteers. Typically this value was associated with the technical skills needed to do the actual monitoring, but expertise in other capacities could also help build relationships or help find funding sources.

[The retired Fish and Wildlife biologist assisting us with monitoring] encouraged us to apply for a grant and we did that. With the grant money we received we were able to purchase 27 cameras and hire a part-time coordinator.

Interviewees representing single-interest groups were the only ones to identify the value that monitoring leads to increased membership. This in turn led to increased funding because those memberships required a fee. Several of the interviewees also discussed increased membership as a means of simply increasing their contact list of people willing to help the group.

We have a lot of folks in our database that do not necessarily give us money but they support what we are doing. That support can be demonstrated in a number of ways like write a comment letter, or volunteer for the monitoring… So the monitoring was a way for people to

become a supporter of the group without having to pay any membership dues. So with the monitoring when people show up for the training or collecting data we take their information and add them to our database and we have found that a lot of people have turned out for this project that did not really know about us or our work.

Helps with Group Decision Making

Interviewees that spoke of the value monitoring had for helping the group make decisions did so with certainty and enthusiasm. Through an increased understanding of the resource and issues related to managing the resource, interviewees said that monitoring directly influenced the group's ability to make smarter decisions. Fourteen interviewees mentioned that monitoring helped with decision making in general.

We get to discussing something and we always try and have a representative on the monitoring crew or the lead person on the monitoring crew within that discussion. Because something will come up and the person on the monitoring crew will go "well here's what we've found, here's what we think is causing that, and why that is happening." And we put a lot of weight into that. A lot of weight.

However many interviewees described more specific ways in which monitoring helped with decision making. The most common was that monitoring verified or dismantled theories of what was perceived as right or wrong leading to more informed decision making.

We want to know the answer to this thing we are all concerned about. Not prove that this is definitively a problem because we decided it was or that it isn't a problem because we decided in advance. We are moving well towards avoiding "this is what I know is true and we're going to

prove it" to "these are things we are all concerned about and we would like to come up with an answer we are all willing to listen to even if it is not what we thought."

Monitoring was also valued by groups designing and implementing their own stewardship or restoration projects for its use in informing future projects. Those representing multi-interest groups framed this value as informing the group's long term strategy or providing a framework for asking additional questions. A few interviewees discussed the value of monitoring as giving the group the confidence to make certain decisions.

> We came to different conclusions from the Forest Service based on our observations. Whether that was directly beneficial for the court's decision or not I don't know, but in any case the judgments of the Forest Service was to withdraw the project. Whether or not the monitoring affected that judgment, I don't know. But we think it is beneficial to do (monitoring) so that we're confident our information is different than what the Forest Service claims going into something like that.

A few Interviewees representing single-interest groups talked further about how monitoring helped to inform appeals, litigation, or NEPA comment letters.

> [Monitoring] is a huge part of informing appeals or litigation; ground-truthing and data collection on the ground, not necessarily our more scientific-based monitoring stuff. It is an enormous part of how people engage in the administrative process. Because if you have data that shows impacts then you raise that in an appeal and if that is denied you have the capacity to bring that to litigation.

Increases Various Organizational Capacities

This subcategory represents various values related to increasing the overall capacity of the group. Generally speaking most of those interviewed said that monitoring made the group stronger. One interviewee even went so far as to say that without monitoring "we might be nonexistent… I think we survived with it for sure." Most, however, spoke of monitoring as being an important part of the group's strength but only in combination with other attributes.

> Where would we be without monitoring? We would just be a contractor going out and being directed to do work. As a restoration organization we realize it's a big piece of the puzzle. I don't think we would be who we are without it.

Those representing multi-interest groups often spoke more directly in terms of the monitoring making the collaborative process stronger.

> The only thing, and if I haven't said it loud enough - I think monitoring and collaboration combined are the only way to do business into the future. I don't think communities will survive without doing that. I'm a strong believer in that.

A large number of the interviewees mentioned that monitoring helps advance the group's mission or interests in general. Often this was a simple or broad statement; "The monitoring goes directly into our mission," or "…the monitoring ties into our mission really well."

Monitoring also increased a group's capacity through helping them focus. Interviewees reported that the activity of monitoring as, well as the data from the monitoring, helped the group stay focused around a clear objective.

> …the monitoring gives us a focal point - when we work out the protocols together; what we're going to do, and how we are going to do it - where and when - and then we go do it, touch base on what the preliminary results are, and then the final - it builds communication and that's been positive.

An important value identified by several interviewees was that monitoring helped put the group in a stronger position with the agency. This did not necessarily directly lead to management changes but it made the interviewee feel that the group had a greater chance of engaging with the agency and that that engagement would be more productive than if the group was not monitoring.

> I think that it is much easier to engage with the agency if you have data. That data could be related to anything. It can be social data as well as scientific data. Just as long as you have real examples and real data you have better engagement with the agency.

In addition to having better engagement with the agency monitoring helped the group better understand how the agency operates. Learning how the NEPA process translates into a contract and how the contract played out in a project allowed the group to be more effective at communicating their interests.

> If you're just some group that says "you should do that or you should do this" but you haven't actually gone out or talked to anyone that does then how do you really have an understanding of how that works and what the challenges are? Because we are monitoring we have an understanding of what they do, what really is entailed in management, and in a prescription, plus the social component that we talked about, so we are pretty well employed to provide recommendations.

Another common way that monitoring increased a group's capacity was that it increased participation of existing group members and got those members and other stakeholders in the field. This extra participation helped the group feel more vibrant and that it was actually doing something productive rather than just saying what it wants.

> Because if you are just using the planning process... that's a teaser. It isn't until you start scrutinizing what they are doing on the ground that you become more of a player. It's really helped to give us something more to sink our teeth into and know that we're going to be getting something that is one, real and two, it actually could lead to some changes… That really gets us motivated and we look forward to it.

Monitoring also allowed single-interest groups to support other organizations rather than its own. Multi-interest groups never mentioned this as a value. As one interviewee said, "[t]he information that we have gathered… has helped to inform where other organizations put their energies in terms of asking for protective designations… or whatever. Our data helps to inform those folks.

Monitoring helped make project implementation more efficient for those groups involved in stewardship or restoration projects. Two interviewees representing single-interest groups said that monitoring helped to build new and stronger partnerships. Two multi-interest representatives felt monitoring was important for avoiding duplication among participants of a collaborative. One interviewee felt that monitoring incentivized the agency to address the group's concerns without needing to even engage with them. Three interviewees identified monitoring as putting the group in a better position to better inform revisions on upcoming Forest Plans, Resource Management Plans, or Travel Plans.

> So right now the collaborative is working on a landscape assessment… So the objective is to inform this Resource Management Plan. We want to provide feedback for that and the fact that

> we monitored… puts us in a really good position - this was from some of the resource managers in the BLM that said this - it puts us in a really great position to provide them with suggestions for the [Resource Management Plan] because we have been doing that monitoring.

Increases Support of Group

Support stood out as its own sub-category because of the variety of ways interviewees felt monitoring increased support and the importance that they put on garnering support for the group's efforts. Nearly half of the interviewees identified at least in a generic way that monitoring led to increased support of the group and its projects such as, "[w]e were able to identify a new market for our supporters. It helped to expand our support base," or "[b]ecause of public education and engagement [through monitoring] you are building constituents to support your cause." Most of the identified values for support were from those interviewees representing single-interest groups.

Single-interest groups also valued monitoring for its ability to increase exposure and support from media outlets. This in turn helped build support for the group in general. Two interviewees representing multi-interest groups identified monitoring as being able to help garner support from the timber industry which helped improve project compliance. For those that mentioned that monitoring helped garner political support it was viewed as being highly valuable.

> Oh definitely monitoring helps [build support]. I was giving a presentation of the [program] to a [Senator] a few years ago and one of the first questions he asked was how many of these projects are happening in [the area] because he was really interested in that area because of the Bull Trout. So we just looked at the data and were able to tell him how many projects that directly benefiting Bull Trout. When you can make those dots connect for the legislative staff

they can go back to the Senator and say “this is exactly what you want done.” That helps get support for it.

Those interviewees that identified public support as a value gained from monitoring did so with great enthusiasm. This value was often associated with other values such as increasing public participation and making citizens more effective environmentalists.

I think that you create a constituency for those critters. People will value and support conservation of the animals if they have a closer connection to them, so I think that the people that come out and participate [in the monitoring] and have a bobcat or wolverine show up at their site, I think that is pretty inspiring for people. They then become advocates for these critters. Without that experience they might support conservation, but perhaps not to the level had they not had that experience… While they might not be doing the professional work that we are doing at an organizational level, I think they become public supporters of the work we are doing and the conservation of wildlife habitat.

2. Increases Agency Capacity

This category represents ways that monitoring by the non-agency group was valued for increasing agency capacity. While it can be assumed that increasing agency capacity would lead to changes in management decisions this is not explicit in these cases, and furthermore increasing agency capacity does not guarantee that those changed decisions are the ones preferred by the group. This also does not reflect how agency staff themselves feel. There exists the chance that agency personnel would not see monitoring by non-agency groups as adding to their capacity even if the non-agency group feels that way.

Table 2 - Agency Capacity lists the values identified within the context of increasing agency capacity.

Table 2 - Increases Agency Capacity

Values	Multi-interest Totals	Single-interest Totals	**Totals**
Allows Group to Fill Gaps in Agency Monitoring	5	7	**12**
Allows Group to Better Support Agency in General	3	5	**8**
Helps Group Inform Agency of Issues	0	7	**7**
Brings to Light Better Ways for Agency to Manage Resources	3	4	**7**
Helps to Streamline the NEPA Process	3	2	**5**
Allows Group/Agency to Leverage Funding for Projects/Programs	1	3	**4**
Helps Agency Implement Projects More Efficiently	2	2	**4**
Can Lead to a Reduction of Appeals and Litigation	3	1	**4**
Gets Agency Staff in The Field	2	2	**4**
Allows Group to Inform Agency of Violations	0	3	**3**
Gives Agency More Flexibility in Management	2	1	**3**
Reduces Project Costs For Agency	1	0	**1**

Interviewees that mentioned that they valued monitoring for helping to support the agency was often in a general sense such as, “our monitoring goes to supporting agency policy and budgets and procedures to restore watersheds.” There was a common sentiment among those that mentioned this that supporting the agency through monitoring in the end supported the resource in general. As one interviewee empathized, “these guys are trying to manage our resources and we want to try to contribute to their expertise and their knowledge so they can make good decisions.”

Of the more specific ways that monitoring supported the agency, the most common was that monitoring by their group helped fill gaps within agency monitoring programs.

> We started to back fill a lot of the agency’s monitoring needs that they didn’t have the time or money to do…Part of what we really realize is that the agencies are not going to have the funding capacity to do the monitoring, so it is incumbent on us to go out and find other resources. That is what is on our agenda now, to go out and find outside resources to back fill what the agencies have to get the monitoring done.

Of note is that nearly all interviewees that mentioned this as a value did not vilify the agency for not monitoring but simply stated that it was important that they could fill that gap. It is also important to note that while the interviewee felt they were filling in gaps of agency monitoring it was rare that the monitoring data ended up being used by the agency.

A few interviewees talked about how through the monitoring efforts and the partnerships that came from that activity they were able to help the agency itself leverage funding for their monitoring projects.

> Fish and Game has received funding from the Fish and Wildlife Foundation to do a much larger wildlife monitoring project over the next two years, and they are taking the [monitoring]

experience they have had with us and using it to engage communities elsewhere. In the grant request they reflected on the positive outcome from last winter with the engagement they had with us and other involved groups.

Some interviewees felt that their monitoring brought to light new ways for the agency to manage the resource and also gave the agency more flexibility in their management. In these cases the value was simply to bring to light what the interviewee perceived as a better way to manage the resource. In those cases where monitoring led to greater flexibility it was that the monitoring by the group helped identify certain types of habitat or helped identify that the habitat was being well managed. One interviewee explained that "[w]e have…collected data that shows they are improving wildlife habitat and that gives them more flexibility to manage their forest because they have better habitat."

Two related values that were entirely from those representing single-interest groups was that the monitoring helped to inform the agency of resource issues or violations. In these instances it was a value by itself to be able to inform the agency. Such information did not necessarily lead to management changes. Where groups were able to inform the agency of violations was specific to illegal off-road vehicle use.

Some of the benefits were that we were able to see what was going on in the forest. It surprised a lot of people, all of the unauthorized routes and where they were going. So the monitoring sort of brought it to the forefront because you could see it and we were able to identify all of these unauthorized routes that the Forest Service didn't know about and at least tell them about it.

In a few instances interviewees felt that the data from the monitoring helped to make the agency more efficient. This was through streamlining the NEPA process, making project implementation

more efficient, or in one case the monitoring led to actually reduced costs of project implementation for the agency.

> Another interesting one was marking trees for timber sales. We looked to see if the contractors could just do the marking instead of the Forest Service, and we found that in fact the contractors did just as good a job sometimes better. This saved the Forest Service a lot of time and money. That was because of our data.

A few interviewees felt that the monitoring through partnerships with the agency created an opportunity to get the agency staff in the field. They felt this was important for the agency because it allowed them to see firsthand how the projects would affect the resource.

> Almost more important [than the monitoring getting us into the field] is getting the people from the BLM out in the field. That was something that was brought up a lot in these learning conversations. We had these people from the BLM saying, "oh we can't do that here because it says so in this document," instead of going out there and being able to say, "oh, well looking at the situation it isn't going to cause a problem so it should be okay."

Interestingly a few interviewees expressed confidence that the monitoring helped to reduce appeals and litigation. This was associated with trust building and assurances through the partnerships or multi-interest groups build around monitoring projects. This allowed the agency to focus resources on project implementation rather than costs associated with lawsuits.

> Yes. [The monitoring] has definitely helped [reduce litigation], because the people on the stewardship group have not threatened or put forth an appeal since 2002. Now has it stopped outside groups from litigating, who aren't a part of the stewardship group? In every case one of the members of the environmental community who is in the stewardship group has gone and

visited those environmental groups and said, “look, we helped design this, we are monitoring this, we are involved in it so please trust us, we’re doing what we think is right. We’ll let you know because of the monitoring if it’s right or wrong.”

3. Leads to Accountability, Legitimacy of Group, and Trust Building

This category represents those values that are generally related to issues of trust. Three sub-categories emerged from this analysis; accountability, legitimacy, and trust building. These values were regarded as being highly important and were often the catalyst for starting a monitoring program.

Table 3 – Accountability, Legitimacy, and Trust outlines identified values associated with that category.

Table 3 – Accountability, Legitimacy, and Trust

Values	Collaboration Totals	Single-interest Totals	**Totals**
Accountability			
Helps to Hold Agency Accountable for its Decisions	6	6	**12**
Helps Build Trust and Transparency with Public Towards Agency	2	1	**3**
Gives Assurance to Outside Environmental Groups That Agency is Being Watched	2	0	**2**
Leads to Greater Transparency in General	2	0	**2**
Helps to Hold the Timber Industry Accountable for its Practices	1	1	**2**
Legitimacy			
Helps to Legitimize the Data Because it is From a Non-Agency Source	6	3	**9**
Leads to a Greater Legitimacy of Group in General	3	5	**8**
Helps Group Gain Legitimacy from Agency	3	2	**5**
Helps Group Gain Legitimacy from Other Organizations	2	3	**5**
Verifies or Refutes Theories Leading to a Stronger Legitimacy of Group	1	2	**3**
Helps Group Gain Legitimacy from Local Community	0	3	**3**
Makes Group More Neutral Leading to Increased Legitimacy in General	1	0	**1**
Trust Building			
Dismantles Preconceived Notions of What Works and What Does Not Leading to Trust Building Among Stakeholders	7	1	**8**
Helps Group Gain Trust of Agency	5	2	**7**

Helps Agency Gain Trust of Group	4	2	**6**
Builds Understanding Among the Agency, Stakeholders, and Group Leading to Trust Building	5	0	**5**
Helps Build Trust in General	4	1	**5**
Increases Communication in General that Leads to Trust Building	1	0	**1**
Creates Opportunities for Mutual Learning that Leads to Trust Building	1	0	**1**

Accountability

That monitoring could help hold the agency accountable was value held equally among single-interest and multi-interest groups. A few interviewees mentioned that monitoring helped hold the timber or mining industry accountable, but overwhelmingly it involved the accountability of the agency. Interviewees would often mention this value as if it was expected that monitoring would be used for this purpose and did not offer more specific ways in which monitoring led to accountability. This value was also sometimes the reason that groups would begin a monitoring program. As one interviewee explained, "I think primarily [we started monitoring] to make sure that what the agencies said they were doing was actually happening. From there it grew into other things."

The subject of transparency did not often come up although a few interviewees associated accountability with greater transparency in general. More commonly monitoring gave the public assurance that the agency would be held accountable for their decisions. This in turn led to more support of projects from the public.

> Our appeal wasn't going to address all of the issues that the homeowners had… So we sat down and said 'let's monitor this and find out.' We'll go ahead with the project and if the enforcement doesn't happen and illegal use continues we will revisit this.

This assurance was also the case for other environmental groups worried that the agency would not comply with project terms. This was also related to reducing appeals and litigation in some instances but also for simply getting groups to sign off on a project. When asked if monitoring was an assurance to other groups one interviewee responded,

> Oh exactly. And the salvage that is coming up on this [fire], we've got some things - we're going to be up front when we go out with the [Environmental Assessment] on this; that we are not certain - we believe this is what will happen to these populations if we do this and this, but there is no known research that says that. But we believe this. We will have monitoring plots tracking that. So if we are wrong we will tell [them] that.

Legitimacy

Unlike accountability the sub-category of legitimacy was primarily aimed at the group itself or the data being generated and not the agency. Commonly interviewees associated monitoring with making the data more legitimate. As one interviewee stated, "[w]e realized that the broader the level of involvement from different groups the stronger the support for the data and the resources."

Another common value among interviewees was that the monitoring helped to legitimize the group in general or more specifically legitimized the group in the eyes of other environmental groups, the agency, or the public. This was often expressed in terms of credibility. One interviewee specified that the monitoring made the group more neutral which in turn led the group to gaining more legitimacy. It was also specified by a few interviewees that it was specifically that monitoring led to a better knowledge of the resource which in turn gave the group more credibility.

> I think that there is some element of credibility that we get out of doing the monitoring. We can say we've been out there searching around and we found this and this and that gives us a basis of credibility that we would not have otherwise; with the public, with supporters, and with the agencies.

Interviewees also said that monitoring helped to legitimize the group in the eyes of the agency. This led to the agency being more accepting of the data or putting the group in a better standing to engage the agency.

> There were originally some questions about there being bias in the data, which I think is at a higher level of the agency, but that question is gone, that we would be biased in any way. They respect our work and take it as if it was their own… [If we hadn't been doing monitoring] we could still be doing restoration work, we could still be doing on the ground work - there is no doubt about that. But I think that the monitoring has given us a lot of credibility.

Trust Building

For those interviewees that discussed trust building it was very often held as one of the most important things that monitoring could do. This value was overwhelmingly shared among those representing multi-interest groups and not those representing single-interest groups. The most common way that monitoring was attributed to building trust was that it created a forum to dismantle preconceived notions of what works and what does not regarding management strategies. This in turn led to increased trust when those notions were collectively proved true or false. In the case that they were proved false owning up to that false notion was a huge contribution to building that trust.

> …we have shown some things that are wrong [through monitoring]. What we thought logically was right, such as skid trails and the sub soil - to break up that compaction. That was wrong, it does more damage than good. It was damaging the existing trees left - the root systems, introducing noxious weeds - it was wrong. Scarification worked perfectly fine. And it was a lot cheaper… And that is not a fault of staff or anything, we all thought skid trails needed sub soils when they are compacted - seemed like the logical thing to do - but it wasn't, you know... And that has created trust. That group has got so much trust in each other it is amazing what we are doing here.

A few interviewees were very specific in how monitoring built trust. For these interviewees monitoring increased communication and created opportunities for learning which then led to increased trust among stakeholders. For the most part the trust building was between the agency and the multi-interest groups and only a few cases with the stewardship and single-interest groups. This trust building went both ways; the agency trusting the group and the group trusting the agency. A few interviews identified that the monitoring built trust with the public towards the agency.

> I think people are much more inclined to trust the multiparty monitoring group than they are the BLM. If the BLM can say 'this is the resolution we've come up with but we got feedback from the multiparty monitoring group and we incorporated that' it's better than just 'we made a mistake and we fixed it.' I think trust is a big issue. There is a history of a lack of trust with the agency around here. The multiparty monitoring can help with that.

4. Builds Relationships

Those interviewees that said monitoring helped to build relationships with the agency or other stakeholder groups viewed this value as being not only important but also very apparent. Interviewees were often confident that their monitoring helped build relationships. This was most often with the agency but also with stakeholders in a collaborative.

Table 4 – Relationships lists the values associated with relationship building.

Table 4 – Builds Relationships			
Values	Collaboration Totals	Single-interest Totals	**Totals**
Helps Group Form a Stronger Relationship With Agency	4	9	**13**
Leads to Stronger Relationships Among All Stakeholders and Group	4	3	**7**
Gets Agency, Stakeholders, and Group to Meet Face to Face Leading to Stronger Relationships	5	1	**6**
Helps Group Build Personal Relationships with Agency Staff	2	4	**6**
Creates Opportunities for Stakeholders to Work Together	4	1	**5**
Can Shift group to a more Multi-interest and Meaningful Relationship with Agency	1	3	**4**
Leads to Stronger Cooperation Among Stakeholders	3	0	**3**
Helps Build a Sense of Community Among Participants which Builds Relationships	0	1	**1**

Dominating this category was the value that monitoring led to stronger relationships with the agency. This was especially true for single-interest groups that nearly unanimously identified this as a value. For multi-interest groups building relationships among stakeholders was more typical. For the most part mention of building relationships was non-specific such as, "[t]here is a value to us [in monitoring] in forming a relationship with Fish and Game and the Forest Service,"

While the Forest Service was a common agency identified as having built stronger relationships with through monitoring activity it was the relationships with other agencies that interviewees felt was more unexpected and surprising.

> We had contact with the EPA but did not have that much work with them. Now we work with them quite a bit. We had some contact with the division of reclamation and mine safety, but now we work with them quite a bit. We have always worked with the Forest Service because there is so much forest land within our watershed, but I really think it is the other agencies that we have built a relationship with so much more.

Most of those that said monitoring helped build relationships went on at some point to clarify that it was with individual agency staff that relationships were built. Many of these individuals are agency staffers who actively support the group's monitoring interest.

> The relationship with the agency has been improved through… well it's really the people in the agency, the champions, which are really particular individuals that see an importance to including monitoring in the project. They have been able to; I wouldn't say institutionalize it, but elevate it to an important part of the project.

Interviewees specified further that it was stronger relationships that eventually led to stronger understanding and cooperation among individual stakeholders. In this sense monitoring activity provided a place for diverse stakeholders to work together, foster personal relationships, and ultimately helped the stakeholders to compromise or cooperate to get projects approved or completed without additional holdups.

> There has been a teambuilding side of this. Just the act of getting out there and driving around with someone else that you might not know or have known. Even if you don't have much in

> common with them politically you might actually discover that you both, for example, you both really like to hike. Maybe one of you is coming at it from a hunting perspective and the other is coming more from a conservation ecology perspective, you might just find that both of them care about it and learned a lot about the other person.

A few interviewees talked about how they hope to use the monitoring experience to help shift the group to a more collaborative and meaningful relationship with the agency.

> The information has also been great. The GIS has come out of it which is going to have a huge benefit for [us], and also for the forest - which should help us work with the Forest Service. Hopefully that will help us collaborate and come together and not just butting heads.

Some interviewees expressed considerable surprise that relationships with the agencies were built at all. This was especially true when an agency would approach a group when they needed additional support. In these cases monitoring played a more minor role. While the monitoring helped to establish the relationship it was in addition to other factors that caused the agency to ask for assistance.

> Interestingly I would say five or six years ago we were busily plotting appeals of travel planning and being upset with the agencies because they were not doing a good enough job. Then this other side sort of came to the fore and is really vocal and threatening and the agencies ended up calling us saying 'how can you help us with our public relations? How can you help us with these people and the public?' They needed someone to back them up. So suddenly we are in the odd position of saying 'right on Forest Service! Enforce those regulations even though we don't think they are strong enough!' So we are behind them saying they are doing the right thing. So we have softened our stance quite a bit in order that we can credibly back the agencies up. And they appreciate that because everybody else hates them

5. Assists with Communication and Education

Values associated with communication and education were often discussed together by interviewees. Monitoring was found to increase the group's capacity to communicate which had various benefits such as being able to better inform the agency or the public. Specifically interviewees discussed an increased capacity to communicate within a context of elevated education. Specifically, monitoring provided effective opportunities to educate people which were often described as difficult to find.

Table 5 – Assists with Communication and Education outlines the identified values associated with communicate and education.

Table 5 – Assists with Communication and Education

Values	Collaboration Totals	Single-interest Totals	**Totals**
Increases Group's Ability to Communicate with Agency	5	8	**13**
Creates Opportunities to Educate on Issues and Environment	3	8	**11**
Increases Group's Ability to Communicate Public Lands Issues in General	3	5	**8**
Provides an Effective Forum for Group/Public to Communicate with Agency	3	3	**6**
Leads to Stronger Public Outreach in General	1	3	**4**
Better Able to Communicate Concerns of Public	3	0	**3**
Advances Scientific Understanding of Resources/Issues	0	2	**2**
Helps Group Communicate Concerns of Timber Industry to Public/Agency	1	0	**1**
Helps Group to Communicate Issue to Public on Behalf of the Agency	0	1	**1**

Very often interviewees mentioned that communication and education were values without much clarification such as, "…and again there are all of those public support benefits and education benefits that come with that [monitoring]," and "[monitoring] builds communication and that has been positive."

A more specific value was that monitoring helped to increase the group's ability to communicate with the agency. This was often associated with other values such as trust and relationship building but specifically it was that the group was provided with more opportunities to communicate with the agency.

> You want them to get this information but we have our own person looking at it and then we are saying, "hey what about this?" And that has helped a little bit, to have a little more leverage and go in and speak to them more on an even level.

A few groups that were engaged in highly scientific monitoring said they valued the monitoring because it helped to advance the knowledge and understanding of the issue which increased the ability for others to communicate and educate on the issue.

Those groups that were engaging in socio-economic monitoring found that it helped them to better communicate the concerns of the public and timber industry to the agency.

> I think they were really excited to be able to share their thoughts. They had a lot of things to say. I don't think people really talk to them very often. This wasn't the ecological monitoring but the social qualitative component of the monitoring and I think they really appreciated getting the call. They wanted the opportunity to have an avenue to get that information to the agency in the hopes that things can be done better.

One interviewee said that the monitoring helped the group communicate to the public on behalf of the agency.

> We have found that we can play a more vital role in terms of being able to promote the project and through our other outreach connections we can be more of a public relations for the project

than Fish and Game can. So we can bring not just a collection of the data but also the communication of the data to the rest of the community.

Aside from increasing the group's capacity to communicate and therefore educate on the issue, monitoring was highly valued for creating opportunities to educate. As one interviewee said, "It gives us enormous educational opportunities in addition to advancing the science and advancing the knowledge base of the issue." Another points out that monitoring is unique from other activities in this capacity; "We have to do training so that people can set up the stations and how to collect the samples. So it really becomes an opportunity for education and citizen involvement that would not be available with our other projects."

6. Engages Public

The value that monitoring can increase public participation stood out as its own category because of the number and variety of ways interviewees discussed this value. The discussion was often related to other values such as communication, education, and building support but was typically talked about as a value in and of itself. Included in this category is youth engagement which was often discussed with a lot of excitement and enthusiasm. In most cases the interviewees had a considerable amount to say on this topic. This category is more populated by those in single-interest groups and stewardship groups rather than multi-interest groups, however nearly all interviewees mentioned a value in this category at least once.

Table 6 - Public Engagement lists the values associated with public participation and engagement.

Table 6 - Engages Public

Values	Collaboration Totals	Single-interest Totals	**Totals**
Engages Public in General	4	8	**12**
Gets Public in the Field	3	7	**10**
Engages Youth	5	5	**10**
Increases Public Awareness of Issues	1	5	**6**
Creates an Opportunity For Public to Engage in Issues After NEPA Process	2	3	**5**
Gives Individuals a Feeling of Contributing to Resolving Issues	3	1	**4**
Makes Citizens More Effective Stewards/Environmentalists	0	4	**4**
Empowers Citizens to Voice Concerns and Influence Management Change	1	2	**3**

The most commonly identified value from this category was that monitoring was an effective way to engage the public. In these cases monitoring simply offered a tangible thing for the public to do,

which was expressed as a rare and difficult thing to find. More specifically interviewees often talked about how monitoring engaged the public by getting them into the field. This value had tremendous potential to expand on other values such as education, relationship building, and building support. Another common theme among those that identified this value was the knowledge of place and how getting people into the field produces that knowledge which had additional values that were difficult to foster in programs that did not include monitoring.

> It is absolutely one of the most important things. Getting people actually into the field through monitoring gets people to see firsthand what we have here. Getting them out into the field to me is really important part of what we do and the more tools we have to getting them out there the more ways we have to getting them engaged personally on the ground with the place. They simply become more passionate about protecting its values. People identifying with the place is really important and seeing it first hand is a very valuable tool.

Other interviewees talked about how monitoring was not just a way to engage the public but actually gave the public a way to engage with public lands issues. This in turn gave those participants a feeling that they were helping to resolve an issue rather than just comment on it. This was often discussed in the context of the NEPA process.

> The monitoring is really the only action that is left to participants. The decision is signed and the trail building is going to happen with contractors so locals will not be out there with heavy equipment so implementation of the projects does not have a lot of local participation and we are not going to be changing the decision. So the only thing left to do is monitor to make sure that things are done the way they said they were going to be done. Monitoring helped people feel engaged. It gives them something to do.

Similarly a few interviewees valued monitoring for its ability to empower citizens to be better environmentalists and to provide a certain type of engagement that makes public lands management more democratic.

> People really learn the mechanisms by which these management decisions are made and upheld [through monitoring]. The general public is woefully ignorant about the management on their public lands. So this is certainly a way that educates people in how they can be involved or even if they do not want to be involved they at least understand the processes. I like to think of monitoring as democracy at work. It is a participatory thing. You can get out there and actually do something that will with any luck have some influence on the management of your public lands.

Aside from empowering citizens another interesting value identified by several interviewees was that monitoring had personal benefits for thosewho participated.

> One hundred percent… that careful observation of your actions on the ground and how these systems function. That correlates to your life. One hundred percent - monitoring your own actions and your interactions with other life forms on a daily basis. It extrapolates to the personal life. Really a lot of it is about being mindful, about how you approach life, both when you work with ecosystems and people. The whole human ecology piece of this stuff is really interesting. And I think that is the same for the other people I work with.

Many of the groups had youth programs or intern programs. Monitoring was very often a huge component of those programs. Additionally several of the groups did their monitoring by hiring youth as interns. Very often the value here was that monitoring was a way to both assist the group and assist the students in getting real world experience and provide an opportunity to learn about both the environment and the public lands management system.

> So typically we hire college students or graduates as interns. There are two reasons that we do this intern program. One is to get some assistance with the work we are doing. But I think that in some respects more important than that is to offer the experience and some practical experience outside of the University setting so that students can learn about what conservation is like from an NGO perspective in the real world.

Those interviewees who talked about engaging youth were very enthusiastic and excited about those programs. To them using monitoring to engage youth was almost value enough to continue the monitoring program.

> And beyond the forest monitoring to be able to see local kids, who are so darned smart, doing the stuff that they do and going all the way through college and giving them a paycheck... Wow. And they are involved in the forest and it doesn't matter if it is 30 years down the road and they live in LA or something, that forest will always be a part of them. How do you measure the wealth of that? I learn every time I hear one speak what they are getting out this monitoring program as an individual. It's just amazing. It is the true wealth of the program, that social side… that is sometimes unexplainable

7. Leads to Positive Socio-Economic and Environmental Outcomes

This category reflects two sets of values that did not neatly fit into the previous seven. These were socio-economic values and values specific to environmental outcomes.

Table 8 - Socio-Economic and Environment lists the values associated with these two categories.

Table 7 - Leads to Positive Socio-Economic and Environmental Outcomes			
Values	Collaboration Totals	Single-interest Totals	**Totals**
Socio-Economic			
Helps to Support a Timber Based Economy	4	0	**4**
Creates Jobs	1	0	**1**
Helps to Inform Industry of Timber Supply Potential	1	0	**1**
Environmental			
It's the Only Way to Know if Restoration is Working	5	3	**8**
Will Help Address Climate Change	2	4	**6**
Leads to Better Environmental Health	0	5	**5**
Helps to Reduce Fire Risk	3	0	**3**

Only multi-interest groups identified values in the socio-economic category. In general this is a fairly small category populated mostly by the value that monitoring helps to support a timber-based economy.

> The people we talked to really cared about the principles of the objectives and the ecological restoration principles. You know, not trying to cause damage and working in a sustainable fashion. That was important to them too. They don't have jobs if you don't do it like that. That's why they support the monitoring too.

Only one interviewee mentioned that monitoring helps to create jobs and one mentioned that they were able to use monitoring to inform the local timber industry of supply potentials for certain types of wood.

Some interviewees discussed monitoring as ultimately helping to improve environmental quality. As one put it, "it isn't so much what the group is getting out of [the monitoring] but what the land is getting out of it." This was something that only single-interest groups identified as a value.

Monitoring was associated with helping reduce fires by three interviewees representing multi-interest groups. This was often associated with forest restoration projects or groups involved mostly in restoration based work. A few groups also talked about how monitoring will help with answering questions about climate change as well whether or not ecological restoration is working in a changing climate.

> One of the things I hope that the monitoring will help answer is the restoration question. The agency says we will do these treatments and restore fire regimes. But what does that mean in the age of climate change and are we doing it on a large enough scale that will actually affect natural fire and should be doing that to begin with. Monitoring should be able to answer is it worth it. That is why I think there is a lot of interest from the environmental community from monitoring results because there has to be some validation of the assertions that they were given.

8. Leads to Directly Influencing Agency Management Decisions

Directly affecting agency land management decisions was a value discussed as being highly elusive. Most interviewees talked about making direct impacts on the agency more as a 'hope' rather than an actual value. Directly influencing agency management decisions is different from other values that might have indirect influences, such as building public support or building relationships with the agency. In this case data from the monitoring would be given to the agency which would in turn be directly used to inform management decisions. The agency would either incorporate this into their database or publicly announce that non-agency monitoring reports led them to making a specific decision. This is the smallest category simply because most interviewees were hesitant to confirm that their monitoring was capable of doing this.

Table 8 – Leads to Directly Influencing Agency Management Decisions lists values associated with directly affecting agency land management decisions.

Table 8 – Leads to Directly Influencing Agency Management Decisions

Values	Multi-interest Totals	Single-interest Totals	**Totals**
Used to Inform Adaptive Management Decisions Within Agency	8	1	**9**
Allows Group to Inform Agency Management Decisions Leading to Better Management	6	3	**9**
Leads to Improved Outcomes in Agency Management	4	5	**9**

This category is dominated by those representing multi-interest groups who often had actual outcomes to back up there claims. Those representing single-interest groups were either too unsure if their monitoring led to actual changes or felt that so far it definitely had not led to any positive

management changes. A few did have examples of their monitoring leading to positive management changes but these were the exception. Those representing multi-interest groups mostly talked about this value as being able to better inform the agency while single-interest groups talked about their monitoring leading to improved outcomes in management.

Adaptive management was overwhelmingly a value with multi-interest groups and not single-interest groups. In fact, many of those representing single-interest groups were highly suspicious of adaptive management associated with agency activity.

> Some adaptive management is good but some is not terribly effective. It all depends on whose adaptations you are adapting. For instance over the years we've been involved in some monitoring in collaborations that have been trying to use adaptive management in livestock grazing issues - permit renewals and stuff like that. Adaptive management got kind of a bad name in the grazing world because it could be used and framed in any way to support outcomes anybody wanted.

Those representing multi-interest groups however often cited adaptive management as the central reason that they were engaged in monitoring.

> We do believe adaptive management is one of the foundations of the coalition and in order to perform adaptive management you have to have monitoring. Otherwise you don't know what to adapt to or from. So that's sort of the basis in addition to the trust building.

Similar to the value associated with increasing organizational capacity and that monitoring puts the group in a stronger standing with the agency, some interviewees said they were able to better inform the agency which led to direct changes in management decisions.

We found that the normal excuse not to work in beetle kill was misplaced… [The Forest Service] decided it was worth implementing a policy to break the [area] into plots to prevent another sweeping fire and removed a lot of wood around roads to protect larger stands. They turned a lot of that wood into firewood… It was really neat... There was always a sort of friend-foe relationship between the Forest Service and the community, but this was really a positive thing. Over the next few years that went even further to protecting identified areas of higher value. Originally they were just going to let it burn but now they have a policy to protect them. That is because of our [monitoring] research…

Another interviewee felt confident that they helped the BLM with a gas leasing decision.

So through our initial monitoring and research we were able to show that there is a lot going on down there and we need to think about that more before we just approve all of these oil and gas leases. So this last go around the BLM had a February lease sale. There were six parcels in [the county] and there are a lot of activist groups within the county that were pretty involved, but I really think that the BLM took what we were doing into consideration when they actually pulled all of those parcels from their sale.

Those interviewees who said their monitoring led to improved outcomes in agency monitoring typically had examples to back up the claim. Additionally they valued monitoring as the most important component or the only reason they were able to influence those changes.

The results of the monitoring have helped us achieve real conservation we would not have been able to do otherwise. For example in the off-road monitoring the information, the data that we have collected, has influenced Forest Service decision making on travel planning. Certain areas have been put off limits because there were resource concerns. Those areas were closed based on some of our monitoring data. With the mercury monitoring, the regulations that came out of

that from the EPA was pretty profound. That not only benefited Idaho, but it also benefited the nation. Without that hard evidence I think it makes it difficult to make a compelling case to decision makers that something needs to be done.

Discussion Part 1 – A Comparison of Values Held by Multi-interest and Single-interest Groups

There is a growing body of literature that discusses in some capacity the various benefits of monitoring by non-agency groups. Most of this literature is based around multi-party monitoring and overcoming the various barriers to successful monitoring programs. Table 9 outlines six prominent papers regarding monitoring that discuss benefits of monitoring. The benefits identified in the papers have been organized into the eight categories discussed in the results to demonstrate the variation in reported benefits across papers.

While these papers are important for understanding how to implement successful monitoring programs they only begin to scratch the surface of the values that motivate non-agency groups to monitor. Also largely missing from this body of literature are similar papers specific to single-interest groups. Too little is known in terms of monitoring by single-interest groups especially when it comes to understanding the values that motivate these groups to monitor. While this study cannot speak to all the various types of non-agency groups with an interest in federal public lands it does shed light on how monitoring is used and valued among the differing types of non-agency groups. This is important to know in a time when both collaboration and partnerships are increasingly being used as a means of meeting agency management goals (Cheng, 2006; The National Forest Foundation, 2005). Because both the agencies and the non-agency groups will have to decide when and how to interact with one another regarding monitoring activity it will be valuable to know what the expected benefits will be in both a multi-interest and single-interest context (Dukes & Firehock, 2001).

Categorically those representing multi-interest and single-interest groups shared values in increasing organizational capacities and building relationships. Single-interest groups had more representation in increasing agency capacities, assisting with communication and education, and public

Table 9 – Literature Review	Pilz et al., 2006	Moote 2011	Derr et al., 2005	Kusel et al., 2000	Fernandez-Gimenez, Ballard, & Sturtevant, 2008	Conrad & Hilchey, 2011
Organizational Capacity	Stretches limited resources, helps share work, and work more effectively		Increases understanding of the effects of restoration actions	Helps to address data-base integration issues		
Agency Capacity						Increased benefits to government
Trust and Legitimacy	Reduces conflict and litigation, shares accountability and responsibility, and improves community relations	Provides mutual learning for trust, and accountability			Builds trust and credibility	
Relationship Building				Gets people working together, and brings all stakeholders together		
Communication and Education	Simultaneously meets local and larger-scale needs for information, and increases public education				Leads to shared understanding of the ecosystem, fosters social learning, community involvement in monitoring leads to communication of monitoring findings to the broader community	Increases Scientific Literacy
Public Engagement				Engages private landowners, scientists, environmentalists, and interest groups		Increases citizen inclusion in local issues
Environmental and Socio Economic Outcomes	Improves land stewardship, ensures access to a resource for economic or traditional use, assists in community development, helps build community capacity, increaes employment opportunities, provides market-based incentives, and ensures social and economic justice			Connects local and large-scale issues	Helps build community	Increasing Environmental Democracy, Increases Social Capitol, Increased benefits to ecosystems
Directly Influencing Agency Decision Making	Influences policy or management decisions	Aids with adaptive management	Supports adaptive management, and set a course for future management		Community involvement in monitoring increases the likelihood that monitoring information will be acted upon and used to make decisions	

engagement. Multi-interest groups had more representation in accountability, legitimacy, and trust building, and directly influencing agency management decisions.

While both types of groups had equal representation in building organizational capacities there were clear differences among specific values. For multi-interest groups two values stand out: monitoring leads to a stronger collaborative process and monitoring verifies or refutes theories leading to better group decision making. Interviewees representing multi-interest groups almost unanimously said that monitoring made their collaborative stronger. This supports a dominant line of thinking among proponents of multiparty monitoring. In a study of several multi-interest multi-party monitoring projects Kusel et al. (2000) report that, "[t]hough project successes differed, groups agree that all-party monitoring offers a robust process for enhancing collaboration between local and distant stakeholders, attracting scientists, and integrating sustainable ecosystem management and community well-being" (p. 12). Monitoring also helped the collaborative make better decisions when it verified something was true or false. Often, because the monitoring was coming from a trusted source, those in the collaborative were willing to change their own modes of thinking based on this new information which helped to put participants on the same page when it came to making a decision. This is supported in other multi-party reports such as Clement et al. (2009) that state, "[t]he process of data collection can build trust between diverse stake-holders as they learn about a landscape and agree to collect data together in standardized ways" (p. 12).

Single-interest groups also had two specific values that stood out in this category: monitoring helped to increase group membership and monitoring allowed the group to better support other organizations. Monitoring led to increased membership by allowing the group to create a new and engaging activity for volunteers that would sometimes lead to bringing in new members. This was not just in paid memberships but also discussed as simply increasing e-mail contact lists. That monitoring

helped the group support other groups is an interesting and unexpected finding. Many of the interviewees that identified this value often talked with pride that they were able to assist other groups and in general help the environmental community. This assistance was through providing other groups with data, technical assistance, understanding of the resource issue, or additional volunteers knowledgeable in monitoring.

Both types of groups shared a lot of the same values regarding building relationships. For the most part there was not a significant difference between them except that single-interest groups valued monitoring for helping the group form a stronger relationship with the agency and multi-interest groups valued monitoring for getting the agency and stakeholders to meet face to face. Multi-interest groups in this study indicated that monitoring activity or the sharing of monitoring data created a compelling opportunity to get all stakeholders in the same place, going long way towards building stronger relationships among those in the group. Single-interest groups had a slightly different take on this. For them it was building a relationship specifically with agency staff. For some groups monitoring was the only reason they had interacted with agency staff at all.

Multi-interest groups valued monitoring for accountability, legitimacy, and trust building more than single-interest groups did. Building trust is often discussed as being a central and often first step in forming a successful collaborative. Daly's Collaboration Handbook (2006) states, "[p]atience has to be the order of the day until participants become more comfortable with each other and have developed some trust in each other's good faith" (p. 11). Monitoring in a collaborative environment has been documented as a way to foster this trust. Fernandez-gimenez, Ballard, & Sturtevant (2008) found that while trust building was not often a goal of the monitoring it was often a reported outcome. Ann Moote (2011) speaks to this plainly by saying "[t]he primary goal of multiparty monitoring is to help project participants and other interested parties better understand each other's' viewpoints and build trust in

each other and in specific management activities" (p. 8). For this reason it makes sense that the multi-interest groups in this study report that monitoring helped with building trust more than single-interest groups.

The only value that both single and multi-interest groups shared equally in accountability, legitimacy, and building trust was that monitoring helped to hold the federal land management agency more accountable. This is a reported benefit in other case studies of community-based monitoring (Danielsen et al., 2005) and papers on participatory monitoring and conservation monitoring by NGOs (Guijt et al., 1998; Stem et al., 2005). What is not known from this study is to what degree the monitoring is actually holding the agency accountable. There is recognition that the accountability gap with federal public land management is very large. It is unlikely that monitoring by non-agency entities can completely close this gap, but third-party monitoring is thought to hold considerable potential (Biber, 2011). That many interviewees in both multi-interest and single-interest groups valued their monitoring for holding the agency accountable at least supports this mode of thinking.

Multi-interest groups overwhelmingly indicated that monitoring helped dismantle preconceived notions of what works and what does not leading to trust building. In addition, multi-interest groups also indicated that monitoring helped to legitimize the data because it was coming from a non-agency source. The only place that single-interest groups displayed even a small majority of representation was that monitoring helped to legitimize the group in general. In this sense, monitoring helped multi-interest groups internally build trust and foster an environment of shared understanding whereas for single-interest groups monitoring is seen to be more valuable in its ability to improve the group's image externally.

That monitoring by non-agency groups helped increase agency capacity was an unexpected finding especially since it was single-interest groups that appeared to value this more than multi-interest

groups. This is not often discussed in the literature, and where it is, it most often is associated with collaborative environments suggesting that such values from single-interest groups are being underappreciated. While not explicitly discussed the very fact that federal agencies appear to be eager to get involved in collaborative processes or partnerships indicate that the agencies themselves are receiving value from these forms of engagement. In a publication prepared by the USDA the Forest Service has indicated that it plans to expand collaboration when dealing with restoration projects (USDA Forest Service [FS], 2012a). But when it comes to monitoring specifically there is little discussion on how monitoring can increase agency capacities. In response to agency managers lacking sufficient resources to gather sufficient data to fulfill their mandates Lynch et al. (2004) find that "Broadening participation to include those people who harvest nontimber forest product resources emerged as a viable option" (p. 12). Some papers allude to this type of relationship related to government programs such as the Multi-interest Forest Landscape Restoration Program (Derr et al., 2005) or Stewardship Contracting (Moote, 2011) in which multi-party monitoring has the potential to reduce costs associated with project implementation, however it is not known if this potential has played out. In a 2006 report by the Pinchot Institute titled "Stewardship Contracting: A Summary of Lessons Learned from the Pilot Experience," it was found that "[s]ome costs can be reduced by incorporating non-profits and/or Resource Conservation & Development (RC&D) Districts to assist in the contract administration activities" (p. 12). Multiparty monitoring was sometimes a component of these early pilot projects but it is not known if such cost reductions can be achieved through non-agency monitoring activity. Biber (2011) expresses doubt that increased public participation in monitoring will decrease project costs due to the additional time and resources needed to coordinate those efforts, but other volunteer and community based monitoring papers do talk about the potential of reducing agency costs because volunteers participate without pay (Stokes et al., 1990; Yung, 2007)

Since this study did not interview any agency representatives it is not known whether or not the monitoring was seen by them to increase their capacity or reducing costs. Only a few interviewees indicated that reducing agency costs or making project implementation more efficient was a value they perceived from monitoring. This may be an indication that such cost reductions are difficult to achieve through multiparty or third party monitoring. It could also be that interviewees either do not know that their monitoring reduces these costs or that they simply do not see this as being of particular importance.

Aside from costs, those representing single-interest groups did value monitoring for being able better inform the agency of resource issues or violations. This was discussed in the context that such information was helpful to the agency. There was a common sentiment among nearly all interviewees, both representing multi-interest and single-interest groups, that the agency was generally understaffed and underfunded leading to a lack of agency personnel on the ground. This was especially true of the agency's inability to do more monitoring, and as a result both types of groups valued their own monitoring for helping to fill that gap, even though most of that data was not actually used by the agency. Single-interest groups especially felt that the lack of funding and staff prevented the agency from even knowing what was happening on their management unit. Therefore, the value that single-interest groups got from monitoring was being able to inform the agency of resource issues or violations that the agency otherwise would not know about. Often such information would lead to an agency staff visiting the site or patrolling the area more often.

Both multi-interest and single-interest groups identified values in assisting in the group's ability to communicate and educate, however single-interest groups were slightly more represented in this category. In general, interviewees indicated that monitoring created opportunities to educate as well as allowed the group to better communicate with the agencies. The first is fairly straight forward.

Monitoring was a means of getting people together in the field; an ideal place to educate them on various issues of concern. The second is more nuanced. Monitoring increased the group's ability to communicate with the agency. It created opportunities to meet with agency staff which was a key time to communicate, and monitoring also increased the group's understanding of the issue, as well as the agency itself, allowing them to be more effective in discussing their concerns.

Single-interest groups differed in this category from multi-interest groups by identifying more values related to engaging the public. More specifically, single-interest groups felt that monitoring was highly valuable for engaging the public in general, getting the public into the field, increasing public awareness of issues, and making individuals more effective environmentalists and more engaged citizens. That monitoring can have a positive influence on the public by making them more engaged in community issues is well documented. Conrad and Hilchey (2011) point out that there is evidence that "[c]itizens in communities with community-based monitoring tend to be more engaged in local issues, participate more in community development, and have more influence on policy-makers" (pg 280) Danielsen, Burgess, and Balmford (2005) support this finding in their own case-studies showing that where citizens are involved in community-based monitoring the community benefits from increased community involvement. Bell et al (2008) suggest that monitoring activity is an effective way to engage the public because it offers a unique chance for citizens to interact with nature, socialize with other like-minded people, learn about nature, be involved in resolving environmental issues. These papers discuss community monitoring activity within a wide range of organizational contexts from American non-profits to citizen initiated projects in developing nations and do not shed light on why multi-interest groups mentioned public engagement as a value less often than single-interest groups. Collaboration is a process that attempts to solve conflicts and the mission of a multi-interest may not always focus on increasing public engagement (Daly, 2006). This could be the same for single-interest groups, but in this study many of those that mentioned public engagement as a value worked for groups that had mission

statements that aimed to increase public engagement in environmental issues. It could be that single-interest groups valued public engagement more simply because it fit with the greater purpose of the group.

There was one value in this category that was shared across both types of groups. This was youth engagement. In many cases the monitoring itself was done by students in an intern or paid capacity which reduced the cost of the monitoring as well as allowed the group to leverage funds related to youth. In other cases the monitoring was an opportunity to bring in classes to educate students on the environment. But overwhelmingly interviewees talked about engaging youth through monitoring as a way to empower the youth themselves through the experience. The use of monitoring to engage students has been documented by others (Conrad & Hilchey, 2011; Fernandez-Gimenez et al., 2008) Many interviewees talked passionately about how they felt that engaging youth through monitoring was an outstanding way to get them involved in natural resource management. Although no one indicated that engaging youth by itself was enough of a reason to continue a monitoring program, this value stands out as being of particular interest because of how passionately interviewees discussed it. It would be valuable to have a more focused study on engaging youth through monitoring programs.

Multi-interest groups identified values in directly influencing management decision making much more than single-interest groups did. While single-interest groups did indicate on occasion that their monitoring data was used directly by the target agency to make management decisions, these were the acceptations. Even for multi-interest groups the overall number of interviewees that mentioned values in this category was far less than in other categories. Explanations for this are speculative but may include issues with data quality, concerns of bias from single-interest groups, an inability of agencies to accept data, or a lack of interest from agency to consider data.

It is important to consider how multi-interest and single interest groups fit into the monitoring framework on public lands. Both will approach monitoring in different ways and will be more appropriate in some cases and less in others. This is especially true as collaboration has taken on increased interest in recent years. As described in this section single-interest groups have more values associated with increasing agency capacities, assisting with communication and education, and public engagement. Multi-interest groups have more values associated with accountability, legitimacy, and trust building, and directly influencing agency management decisions. Both single and multi-interest groups hold similar values in increasing organizational capacities and building relationships.

Discussion Part 2 – Continuum of Pathways to Affecting Land Management Decisions through Monitoring

Ecological monitoring is largely regarded as a scientific endeavor. It is used to accept or reject a hypothesis which requires a high standard of scientific rigor. This scientific data can then be used by the federal land management agencies to make informed management decisions. This is the long accepted pathway of using monitoring to affect public lands management. In theory management decisions based on this science would be accepted by everyone and lead to positive outcomes. In reality, however, the story is much more complex. Science, good or bad, is not often accepted by everyone. Section 219.3 of the 2012 Forest Regulations mandates the Forest Service to use the "best available science" when making decisions. The question of what is best available science will undoubtedly become a center of contention. This is especially true when contrasted with the language in Section 219.6 that "relevant private information, including relevant land management plans and local knowledge, will be considered if publicly available or voluntarily provided."

This of course would be at least a little less complicated if there was sufficient monitoring occurring on public lands. But this is where the gap exists. Federal public lands agencies lack the needed data from monitoring to make informed management decisions. As a result of this non-agency entities are stepping up and doing their own monitoring in the hopes they can fill that gap. It is natural at this point to assume that the monitoring done by these non-agency groups would meet that traditionally accepted standard of scientific rigor. Since management must be based on the "best available science" then all monitoring must meet that criteria to be used to make public land management decisions.

Most of the literature on monitoring focuses on this issue; how to do monitoring that meets that criterion. Some go so far as to say that anything less is a waste of time and that "[w]hen planning budgets managers should either give scientists sufficient funds and time to carry out a high power test of the null hypothesis, or not fund them at all" (Legg & Nagy, 2006, p. 5). But most non-agency groups

lack the funding for this. In fact, the agencies themselves lack the funding for this (Biber, 2011). Should non-agency groups monitor if it can't meet traditional scientific standards? This study suggests that there are times when this is appropriate.

There exist two pathways of affecting land management decisions. The first is the traditional pathway. This pathway requires monitoring to meet high scientific standards and is used to directly affect land management decisions. As discussed this pathway can be resource intensive and beyond the reach of many non-agency groups. The second pathway is more nuanced. Here the monitoring is used to increase various capacities of the group. Through these increased capacities the group may be able to have indirect influences on land management decisions. The scientific standards in this pathway are more flexible and need only meet the goal of the monitoring activity. The rest of this discussion is focused on this second pathway.

There is evidence in the literature that this second pathway is already being explored. In a collaborative context Kusel et al. (2000) suggest that,

> [a]ll-party monitoring is not simply an attempt to provide better quality or more comprehensive data. Although technical details such as specific data collection and analysis methods are important, they are no more important than development of the multi-interest processes. It is the multi-interest processes that advance the objectives of obtaining more accurate or more comprehensive data (pg 14).

In a discussion of community based monitoring Danielsen, Burgess, and Balmford (2005) found that,

> [r]ather than being seen as ‘‘quick and dirty’’, if properly designed such [monitoring] approaches have the potential instead to be low cost, rapid, and locally relevant. In reality, in many areas the alternative to local schemes would be no monitoring at all (p. 2526).

To what extent the data must balance cost effectiveness with data quality is a question that cannot be answered here. Such a question must be answered on a case by case basis and could use further study. An easy example of this would be engaging youth versus informing adaptive management strategies. For the purpose of engaging youth the monitoring would need only to be a reason to get them in nature rather than collecting usable data. However, if you were to use it to inform adaptive management strategies the monitoring might need to be of a high enough quality to know if certain management strategies are working or not. This is complicated further by the debate of using qualitative versus quantitative monitoring methods for determining ecological trends. In some instances simply taking photo-points may be sufficient where in other instances full random plot surveys may be needed. The use of volunteers further complicates the issue. As discussed in the introduction, many studies have been done trying to assess the quality of volunteer data collection. While it appears that volunteers can in fact collect good data it varies depending on what is being monitoring and how. The takeaway is that the focus on producing scientific and highly rigorous data may not always be applicable in the context of monitoring by multi-interest or single-interest groups.

While most of the interviewees in this study expressed the desire to produce high quality scientific data that could be used to directly influence agency management decisions, more than half of the interviewees mentioned that a barrier to their monitoring was that the agency was not using their data. Most commonly it was a lack of resources that prevented this. But other barriers exist that complicate it beyond just funding. There are concerns of bias and unduly influencing the agency. Data often needs to fit existing agency databases. The agency may simply be unresponsive because they have

no formal requirement to address the data (although this may change as discussed earlier due to the 2012 Forest Regulations). There was sentiment shared by most interviewees that monitoring was hard and getting an agency to use the data was even harder. One interviewee summed this up nicely.

> The biggest [lesson] for me is that [monitoring] is hard. I entered into this thinking… [we] will have our monitoring plan in place, and will have projects being designed according to collaborative wishes, and after a few years we'll have a new Forest Service and a new MO for forest management… I have substantially modified my expectations.

Table 10 - Top 13 Values of Monitoring

Value	**n=**	Influence
Produces Information that Helps with Group Decision Making	**14**	Internal
Increases Group's Ability to Communicate with Agency	**13**	External
Helps Group Form a Stronger Relationship With Agency	**13**	External
Helps Group Leverage Funding	**12**	Internal
Allows Group to Fill Gaps in Agency Monitoring	**12**	External
Engages Public in General	**12**	Internal
Helps to Hold Agency Accountable for its Decisions	**12**	External
Verifies or Refutes Theories Leading to Better Group Decision Making	**11**	Internal
Leads to Stronger Organization Overall	**11**	Internal
Helps Garner Support in General	**11**	Internal
Creates Opportunities to Educate on Issues and Environment	**11**	Internal
Gets Public in the Field	**10**	Internal
Engages Youth	**10**	Internal

But when asked if they felt that monitoring had the potential to have an effect that same interviewee answered, "Yes. I am actually pretty high on the potential." How to fulfill that potential then becomes the question and it may not need to be through the traditional pathway. As is evident by the typology interviewees reported a wide range of values associated with monitoring. What is striking about this typology is that many of these values are not associated with informing agency management decisions at all.

Table 10 lists the thirteen values that were shared by at least ten interviewees. Of

these 13 values only four are directly associated with agencies and of these there is no direct link between the monitoring and influencing management decisions. The rest are associated with various capacities of the group or values that have nothing to do with influencing management decisions at all.

Despite the lack of direct links to management decisions interviewees often felt they were still having impacts. One group indicated that they didn't even bother trying to give the target agency their monitoring data. But when asked if the monitoring definitely led to benefits on the land they responded, "[o]h definitely. Like I said the Forest Service isn't going to propose anything that is above the law." In this case the group used their monitoring to inform their appeals and litigation. The interviewee also reported that they felt the monitoring held the agency more accountable which made the agency more careful about what decisions it made. Another interviewee responded to the question of whether or not the monitoring had led to any positive management outcomes by saying it theoretically had, although they weren't entirely sure. But when pressed to elaborate on this they said, "…it empowers citizens and in the best case scenarios - which do not happen all that often these days - it also influences management decisions in a positive way." This interviewee talked at length about how monitoring increased public engagement in land management issues, helped the group educate the public on the issues, and helped build support for the group and its desired management outcomes.

To help explain this indirect relationship between monitoring and influencing land management decisions it is helpful to organize the typology into two categories; internal and external values. Internal values are those that mainly benefit the group or some other intrinsic value. External values are those that are mainly associated with possibly influencing agency management decisions. See Appendix C – Typology: Internal and External Values for tables organizing the values in this way. This conceptual model of how certain values can influence management decisions is meant to illustrate a way of thinking of non-agency monitoring on public lands. It should be understood, though, that in reality these values

fall on a continuum and will vary depending on the group and particular situations. For example, the value 'Engages the Public in General' was often discussed by interviewees as being a value in and of its self. But this value could theoretically influence management decisions by making the public more aware of issues leading to increased public concern and involvement in NEPA comment letters. This goes the other way as well. The value 'Increases Group's Ability to Communicate With Agency' may be more related to influencing agency management decisions, but could also lead to internal benefits that have nothing to do with decision making.

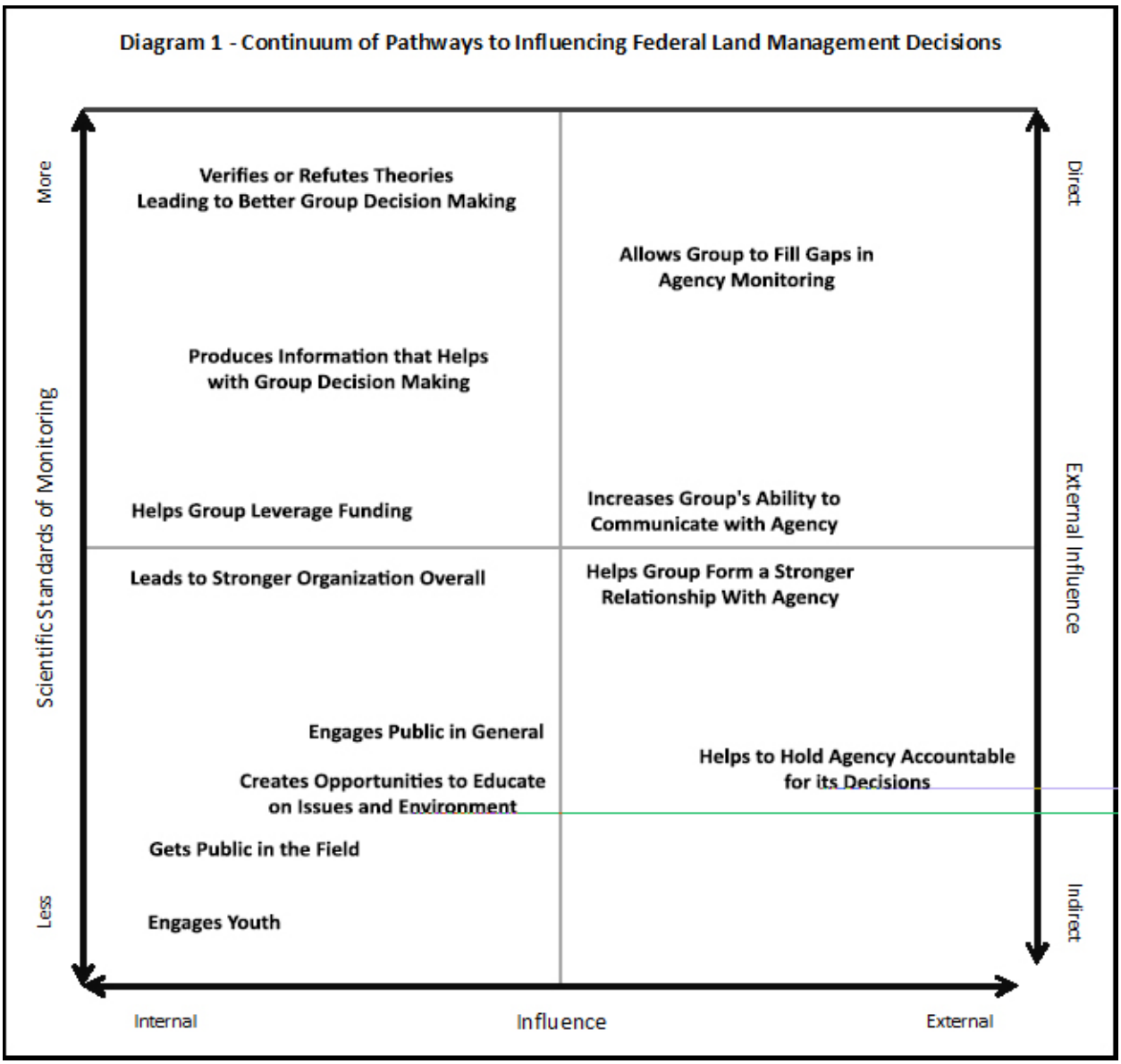

Diagram 1 illustrates this by mapping the top 13 values along three continuums: standard of scientific rigor needed for monitoring, whether that value has internal or external influence, and whether an external influence directly or indirectly influences agency management decisions. While the author has attempted to place values into these categories as consistently as possible, it is ultimately up to the group to decide where a value falls.

The continuums can be thought of as creating four quadrants. The two left hand quadrants have little or no influence on federal land management decision making. The two quadrants on the right can have direct or indirect influence on land management decision making. The lower left quadrant houses values that require less scientific rigor and have only internal benefits. Engaging youth, for example, doesn't have to actually produce data at all. For some groups the main purpose of engaging youth is to simply get them in the field and introduce them to the concept of monitoring. The upper left quadrant houses values that require more scientific rigor but only influence the group internally. Verifying a theory to help make better decisions, for example, will require a certain level of scientific rigor to ensure that decisions are based on fact and not notions of what is right or wrong. The lower right quadrant houses values that require less scientific rigor and can have an indirect influence on agency management decision making. Forming relationships with agency staff may not require very high standards of scientific rigor. Some groups reported that taking photo-points led to increased opportunities to engage with agency staff that over time led to stronger relationships which may over time have indirect influences on future decision making. The upper right quadrant houses values that require higher scientific rigor and can have direct influence on management decisions. Groups that said they were able to fill in gaps of agency monitoring, for example, where often conducting more intensive vegetative monitoring on randomized survey plots.

Based on the values identified in this study non-agency groups may be finding more "successes" with internal values than external ones. This suggests that focusing monitoring on fostering these values may be easier to achieve and require lower standard of data collection that fit with limited resources than focusing on external values which may require higher standards of data collection. Over time, however, as these internal values are increased values may shift towards external influences. Building relationships, trust, and public support all take time and maintaining the program over the long term is necessary in order to let these values mature. By allowing the benefits of monitoring to increase various internal capacities of the group, it may be possible to eventually build a monitoring program that can produce higher quality data able to have external influences. It may also become clear to the group that such a goal is not required and that continuing to monitor with a focus on indirectly influencing management decisions is the best way forward for them.

Conclusion and Recommendations

This study suggests that there are two pathways to affecting federal public land management decisions through public lands monitoring by non-agency groups. The first way is the traditional method in which monitoring data is collected meeting high scientific standards that can then be incorporated by a federal land management agency to make decisions. The second method is though indirect means in which the monitoring activity increases various group capacities which can influence agency decision making over time. Within this second pathway values associated with monitoring can be associated with internal influences or external influences. Internal values are those that mainly benefit the group or some other intrinsic value. External values are those that are mainly associated with possibly influencing agency management decisions.

Groups that are thinking of starting a monitoring program or those struggling to maintain a monitoring program should consider first focusing their monitoring on fostering values with internal benefits. These benefits may lead to more "successes" in monitoring activity increasing the life of the monitoring program. Over time as these internal values mature benefits may shift to external benefits that have indirect influence on agency management decision making.

When considering how to develop a monitoring program non-agency groups should consider the following:

1. There will likely be a different set of values associated with monitoring in a multi-interest context versus a single-interest context.
2. Early monitoring activities should focus on fostering values that internally benefit the group and increase various capacities of the group.

3. Once internal benefits have matured external influences may become apparent or can be fostered in order to indirectly affect agency management decisions.
4. Maintaining long term monitoring activity is important for having indirect influences on agency management decisions, therefor it is important to focus monitoring on values that can be sustained based on available resources.

Appendix A – Interview Guide

1. Let's start with a brief history of your group. Why and how did your group form?
    a. Probe: When did your group form?

2. Tell me a little more about the monitoring? When did you first start monitoring and what were you monitoring?
    a. Probe: What types of monitoring were/are you doing?

3. What about today? Are you monitoring the same things and in the same way?
    a. Probe: Who does the actual monitoring?
    b. Probe: What about analyzing the data? Who does this?
    c. Probe: How do you share your findings and who do you share it with?

4. What were some of the initial motivations for starting a monitoring program?
    a. Probe: Have these motivations changed over time?

5. What are the greatest difficulties that your group has faced regarding monitoring?

6. Have you discovered any secondary or unexpected benefits from monitoring?

7. Where do you think the group would be today if it had never started monitoring?

8. What about detriments? With those previous questions in mind has monitoring hurt the group in anyway?

9. Looking ahead what role do you see monitoring playing in your group?

Appendix B – Typology: Complete

- **Increases Organizational Capacities**
  - **Helps Leverage Resources**
    - Helps Group Leverage Funding
    - Helps Leverage Expertise
    - Helps Increase Group Membership
    - Helps to Leverage Government Sponsored Programs
  - **Helps with Group Decision Making**
    - Produces Information that Helps with Group Decision Making
    - Verifies or Refutes Theories Leading to Better Group Decision Making
    - Helps Inform Future Projects by Group
    - Helps Inform Group's NEPA Comment Letters
    - Helps Inform Group's Long Term Strategies
    - Gives Group Confidence they Are Making Good Decisions
    - Provides a Framework for Additional Questions
    - Helps Inform Appeals and Lawsuits
    - Helps Group Decide When to Engage Agency on an Issue
  - **Increases Various Organizational Capacities**
    - Leads to Stronger Organization Overall
    - Advances The Group's Mission
    - Leads to a Stronger Collaborative Overall
    - Gives Group Focus
    - Puts Group in a Stronger Standing With Agency
    - Increases Participation Within Group
    - Gets Stakeholders/Group in the Field
    - Helps Make Project Implementation More Efficient for Group
    - Allows Group to Support Other Organizations
    - Puts Group in a Better Position to Inform Agency Management Plans
    - Leads to a Better Understanding of how the Agency Operates
    - Helps Group Build Stronger Partnerships
    - Helps Avoid Wasteful Duplication of Activities
    - Incentivizes Agency to Address Group's Concerns When Drafting NEPAs
  - **Increases Support of Group**
    - Helps Garner Support in General
    - Helps Garners Exposure from Media Sources for Support of Group Backed Projects
    - Helps Garner Political Support of Group Backed Projects
    - Helps Garner Public Support of Group Backed Projects
    - Helps Garner Support from Other Organizations
    - Helps Garner Support from Timber Industry

- **Increases Agency Capacity**
  - Allows Group to Fill Gaps in Agency Monitoring
  - Allows Group to Better Support Agency in General
  - Helps Group Inform Agency of Issues
  - Brings to Light Better Ways for Agency to Manage Resources
  - Helps to Streamline the NEPA Process
  - Allows Group/Agency to Leverage Funding for Projects/Programs
  - Helps Agency Implement Projects More Efficiently
  - Can Lead to a Reduction of Appeals and Litigation
  - Gets Agency Staff in The Field
  - Allows Group to Inform Agency of Violations
  - Gives Agency More Flexibility in Management
  - Reduces Project Costs For Agency

- **Leads to Accountability, Legitimacy of Group, and Trust**
  - **Accountability**
    - Helps to Hold Agency Accountable for its Decisions
    - Helps Build Trust and Transparency with Public Towards Agency
    - Gives Assurance to Outside Environmental Groups That Agency is Being Watched
    - Leads to Greater Transparency in General
    - Helps to Hold the Timber Industry Accountable for its Practices
  - **Legitimacy**
    - Helps to Legitimize the Data Because it is From a Non-Agency Source
    - Leads to a Greater Legitimacy of Group in General
    - Helps Group Gain Legitimacy from Agency
    - Helps Group Gain Legitimacy from Other Organizations
    - Verifies or Refutes Theories Leading to a Stronger Legitimacy of Group
    - Helps Group Gain Legitimacy from Local Community
    - Makes Group More Neutral Leading to Increased Legitimacy in General
  - **Trust Building**
    - Dismantles Preconceived Notions of What Works and What Does Not Leading to Trust Building Among Stakeholders
    - Helps Group Gain Trust of Agency
    - Helps Agency Gain Trust of Group
    - Builds Understanding Among the Agency, Stakeholders, and Group Leading to Trust Building
    - Helps Build Trust in General
    - Increases Communication in General that Leads to Trust Building
    - Creates Opportunities for Mutual Learning that Leads to Trust Building

- **Builds Relationships**
  - Helps Group Form a Stronger Relationship With Agency
  - Gets Agency, Stakeholders, and Group to Meet Face to Face Leading to Stronger Relationships
  - Helps Group Build Personal Relationships with Agency Staff
  - Creates Opportunities for Stakeholders to Work Together
  - Can Shift group to a more Multi-interest and Meaningful Relationship with Agency
  - Leads to Stronger Cooperation Among Stakeholders
  - Helps Build a Sense of Community Among Participants which Builds Relationships

- **Assists with Communication and Education**
  - Increases Group's Ability to Communicate with Agency
  - Creates Opportunities to Educate on Issues and Environment
  - Increases Group's Ability to Communicate Public Lands Issues in General
  - Provides an Effective Forum for Group/Public to Communicate with Agency
  - Leads to Stronger Public Outreach in General
  - Helps Group to Better Communicate Concerns of the Public
  - Advances Scientific Understanding of Resources/Issues
  - Helps Group Communicate Concerns of Timber Industry to Public/Agency
  - Helps Group to Communicate Issue to Public on Behalf of the Agency

- **Engages Public**
  - Engages Public in General
  - Gets Public in the Field
  - Engages Youth
  - Increases Public Awareness of Issues
  - Opportunity For Public to Engage in Issues After NEPA Process
  - Gives Individuals a Feeling of Contributing to Resolving Issues
  - Makes Citizens More Effective Stewards/Environmentalists
  - Empowers Citizens to Voice Concerns and Influence Management Change

- **Leads to Positive Socio-Economic and Environmental Outcomes**
  - **Socio-economic**
    - Helps to Maintain a Timber Based Economy
    - Creates Jobs
    - Helps to Inform Industry of Market Potentials
  - **Environmental**
    - It's the Only Way to Know if Restoration is Working
    - Will Help Address Climate Change
    - Leads to Better Environmental Health
    - Helps to Reduce Fire Risk

- **Leads to Directly Influencing Agency Management Decisions**
  - Used to Inform Adaptive Management Decisions Within Agency
  - Allows Group to Inform Agency Management Decisions Leading to Better Management
  - Leads to Improved Outcomes in Agency Management

Appendix C – Typology: Internal and External Values

1. Increases Organizational Capacities	
Internal Values	**External Values**
Helps Leverage Resources	
Helps Group Leverage Funding	
Helps Group Leverage Expertise	
Helps Increase Group Membership	
Helps Group Leverage Government Sponsored Programs	
Helps with Group Decision Making	
Produces Information that Helps with Group Decision Making	
Verifies or Refutes Theories Leading to Better Group Decision Making	
Helps Inform Future Projects by Group	
	Helps Inform Group's NEPA Comment Letters
Helps Inform Group's Long Term Strategies	
Gives Group Confidence they Are Making Good Decisions	
Provides a Framework for Additional Questions	
	Helps Inform Appeals and Lawsuits
	Helps Group Decide When to Engage Agency on an Issue
Increaes Various Organizational Capacities	
Leads to a Stronger Organization Overall	
Advances The Group's Mission	
Leads to a Stronger Collaborative Overall	
Gives Group Focus	
	Puts Group in a Stronger Standing With Agency
Increases Participation Within Group	
Gets Stakeholders/Group in the Field	
Helps Make Project Implementation More Efficient for Group	
Allows Group to Support Other Organizations	
	Puts Group in a Better Position to Inform Agency Management Plans
	Leads to a Better Understanding of how the Agency Operates
Helps Group Build Stronger Partnerships	
Helps Avoid Wastful Duplication of Actitivies	
	Incentivizes Agency to Address Group's Concerns When Drafting NEPAs
Increases Support of Group	
Helps Group Garner Support in General	
	Helps Garner More Exposure from Media Sources for Support of Group Backed Projects
	Helps Garner Political Support of Group Backed Projects
	Helps Garner Public Support of Group Backed Projects
Helps Garner Support from Other Organizations	
Helps Garner Support from Timber Industry	

2. Increases Agency Capacities	
Internal Values	**External Values**
	Allows Group to Fill Gaps in Agency Monitoring
	Allows Group to Better Support Agency in General
	Helps Group Inform Agency of Issues
	Brings to Light Better Ways for Agency to Manage Resources
	Helps to Streamline the NEPA Process
	Allows Group/Agency to Leverage Funding for Projects/Programs
	Helps Agency Implement Projects More Efficiently
	Can Lead to a Reduction of Appeals and Litigation
	Gets Agency Staff in The Field
	Allows Group to Inform Agency of Violations
	Gives Agency More Flexibility in Management
	Reduces Project Costs For Agency

3. Leads to Accountability, Legitimacy of Group, and Trust Building	
Internal Values	**External Values**
Accountability	
	Helps to Hold Agency Accountable for its Decisions
	Helps Build Trust and Transparency with Public Towards Agency
	Gives Assurance to Outside Environmental Groups That Agency is Being Watched
Leads to Greater Transparency in General	
	Helps to Hold the Timber Industry Accountable for its Practices
Ligitamacy	
	Helps to Legitimize the Data Because it is From a Non-Agency Source
Leads to a Greater Legitimacy of Group in General	
	Helps Group Gain Legitimacy from Agency
Helps Group Gain Legitimacy from Other Organizations	
Verifies or Refutes Theories Leading to a Stronger Legitimacy of Group	
Helps Group Gain Legitimacy from Local Community	
Makes Group More Neutral Leading to Increased Legitimacy in General	
Trust Building	
Dismantles Preconceived Notions of What Works and What Does Not Leading to Trust Building Among Stakeholders	
	Helps Group Gain Trust of Agency
	Helps Agency Gain Trust of Group
	Builds Understanding Among the Agency, Stakeholders, and Group Leading to Trust Building
Helps Build Trust in General	
Increases Communication in General that Leads to Trust Building	
Creates Oportunities for Mutual Learning that Leads to Trust Building	

4. Builds Relationships	
Internal Values	**External Values**
	Helps Group Form a Stronger Relationship With Agency
Leads to Stronger Relationships Among All Stakeholders and Group	
	Gets Agency, Stakeholders, and Group to Meet Face to Face Leading to Stronger Relationships
	Helps Group Build Personal Relationships with Agency Staff
Creates Opportunities for Stakeholders to Work Together	
	Can Shift group to a more Collaborative and Meaningful Relationship with Agency
Leads to Stronger Cooperation Among Stakeholders	
Helps Build a Sense of Community Among Participants which Builds Relationships	

5. Assists with Communication and Education	
Internal Values	**External Values**
	Increases Group's Ability to Communicate with Agency
Creates Opportunities for Group to Educate on Issues and the Environment	
Increases Group's Ability to Communicate Public Lands Issues in General	
	Provides an Effective Forum for Group/Public to Communicate with Agency
Leads to Stronger Public Outreach in General	
	Helps Group to Better Communicate Concerns of the Public
Advances Scientific Understanding of Resources/Issues	
	Helps Group Communicate Concerns of Timber Industry to Public/Agency
	Helps Group to Communicate Issue to Public on Behalf of the Agency

6. Engages Public	
Internal Values	**External Values**
Engages Public in General	
Gets Public in the Field	
Engages Youth	
	Increases Public Awareness of Issues
	Opportunity For Public to Engage in Issues After NEPA Process
Gives Individuals a Feeling of Contributing to Resolving Issues	
	Makes Citizens More Effective Stewards/Environmentalists
	Empowers Citizens to Voice Concerns and Influence Management Change

7. Leads to Positive Socio-Economic and Environmental Outcomes	
Internal Values	**External Values**
Socio-Economic	
Helps to Maintain a Timber Based Economy	
Creates Jobs	
Helps to Inform Industry of Market Potentials	
Environmental	
It's the Only Way to Know if Restoration is Working	
Will Help Address Climate Change	
Leads to Better Environmental Health	
Helps to Reduce Fire Risk	

8. Leads to Directly Influencing Agency Management Decisions	
Internal Values	**External Values**
	Used to Inform Adaptive Management Decisions Within Agency
	Allows Group to Inform Agency Management Decisions Leading to Better Management
	Leads to Improved Outcomes in Agency Management

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