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Diagnostic reframing of intractable environmental problems: Case of a contested multiparty public land-use conflict

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ABSTRACT

Intractable conflicts are omnipresent in environmental management. These conflicts do not necessarily resist resolution but need to be fundamentally transformed in order to reach agreement. Reframing, a process that allows disputants to create new alternative understandings of the problem, is one way of transforming these conflicts. Cognitive and interactional reframing are the two major approaches to conflict transformation. These approaches have some drawbacks. Cognitive reframing does not guarantee commensurate consideration of all disputants' views about the problem. Interactional reframing is prone to inter-disputant influences that interfere with presenting the problems as accurately as they exist in disputants' minds. Inadequate consideration of other disputants' views and inter-disputant influences often lead to inaccurate problem identification and definition. This in turn leads to solving the wrong problem, enabling intractability to persist. Proper problem identification and definition requires commensurate consideration of all sides of the conflict while minimizing inter-disputant influences. From a problem diagnosis perspective, we show how Q methodology is used to reframe environmental problems, rendering them more tractable to analysis while minimizing the influence of who disputants are talking with, and without ignoring the perspectives of other disputants. Using a case of contentious All-Terrain Vehicle (ATV) use in a state-administered public land, conflicting parties reframed the problem by prioritizing issues, outlining areas and levels of consensus and disagreement, and revealing inherent unrecognized and/or unspoken agendas. The reframing process surprisingly revealed several areas of common ground in disputants' diagnosis of the problem, including lack of emphasis on environmental protection and uncoordinated management factions. Emergent frames were misaligned on some issues, such as the behaviors of ATV riders and the role of management, including political and economic influences on decision making. We discuss how the reframing process enhances tractability of multiparty environmental problems. We point to some limitations of Q methodology as a tool for the diagnostic reframing of such problems.

1. Introduction

Contemporary natural resource management is challenged by predominant protracted and stubborn multiparty environmental conflicts that are ambiguous, complex, and consequently resist resolution. Conflicts with these attributes are often said to be intractable (Burgess and Burgess, 2006). Managing these conflicts, and their characteristic disputes, is central to sustainable resource management. Although prominent in the conflict resolution and negotiation field, intractability remains a contentious term (Burgess et al., 2006; Campbell, 2003). As a tribute to their prevalence and importance, intractable conflicts was the central theme of the 1998 conference of the Hewlett Funded Centers for Study of Conflict Resolution and Negotiation, in Palo Alto, California. During two sessions devoted to 'the meaning of intractability', leading researchers and practitioners in the dispute resolution field were unable to arrive at a precise definition after several hours of deliberations within a two-day period. Participants agreed to substitute intractability with the phrase 'resolution resistant', pending development of a better understanding of intractability (Campbell, 2003).

Since the Palo Alto conference, some insightful definitions have emerged. Burgess and Burgess (2006) define intractable conflicts

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as those that defy resolution. Coleman (2006) views intractable conflicts as those that are destructive, persistent, resist every attempt at constructive resolution, and appear to take on lives of their own. Some caution against viewing these conflicts in the binary context of either tractable or intractable, urging that they be considered as occurring within a tractability continuum and, some ultimately get resolved (Rubinstein, 1998; Thorson, 1989). That is, resolution-resistant conflicts have some degree of tractability, a view that we embrace and illustrate in this article.

In a view of intractable conflicts as ultimately resolvable, Gray (1997) defines these conflicts not as resolution-resistant ones but, rather, as those that must be fundamentally transformed in order to reach agreement. Burgess et al. (2006) cite examples of intractable conflicts that were significantly transformed into much less destructive situations, and some that were ultimately resolved. Thus, transforming intractable conflicts enables them to become more tractable and sometimes, resolvable. This article is an empirical illustration of the transformation, through systematic diagnostic reframing, of an intractable multiparty natural resource-based conflict into a more tractable situation. We illustrate how, through transformation, the conflict is moved towards the tractable end of the intractability continuum. Those faced with resolution-resistant environmental conflicts will find this approach useful in mediating and managing such conflicts.

1.1. Framing in environmental conflicts

The concept and process of framing is rooted in cognitive psychology (Bartlett, 1932) where frames are defined as cognitive structures in human memory, retrieved to help organize and interpret new experiences. In environmental conflict analysis, frames are a way of organizing information about a conflict, such that key elements and potential outcomes are defined (Bardwell, 1991; Gray, 2003). Frames facilitate understanding and clarification of disputants' stance with respect to a conflict (Taylor, 2000). Frames reveal disputants' views of how they and others are implicated in and by a conflict. Because frames clarify disputants' views about a conflict, they enhance understanding of why some conflicts resist resolution and orient efforts towards identifying and addressing outstanding problems (Gray, 2004). That is, "structures [frames] presume functions [orient identification and resolution efforts]" (Brown, 2002). Therefore, intractability in environmental disputes could be explained not only by the frames disputants hold but also because, to begin with, the content and structure of those frames may not be self-evident. Disputants' views are not clearly understood because they are not well organized and articulated—they are said to "lack frame" and hence to resist resolution (Bardwell, 1991).

Additionally, disputants may sometimes unknowingly hold contradictory frames (Benford, 1997). When disputants' views lack frame they may not recognize, and thence acknowledge, their frame contradictions. Unrecognized intra-disputant frame contradictions deepen ambiguity, complexity and consequent intractability. Without well-organized self-evident views of disputants' frames, a conflict is more likely to linger closer to the intractability end of the continuum.

Frames in intractable conflicts are often either prognostic or diagnostic (Asah et al., 2012; Gray, 2004). Prognostic frames aim at providing structure to how conflicts should be dealt with. On the other hand, diagnostic framing, used in this study, focuses on problem identification and definition. We illustrate an approach that pays thorough attention to properly diagnosing, by reframing, an intractable multiparty environmental problem.

1.2. Reframing environmental conflicts

One way in which intractable conflicts can be transformed is by changing how the conflict is framed—reframing the conflict (Gray, 1997). Implicitly, conflicts resist resolution, in part, because of how they are framed. Frames held by conflicting parties, and sometimes mediators, often constitute significant obstacles to resolution (Gray, 2004; Vraneski and Richter, 2003). Hence, several intractable conflict mediation techniques hinge on enabling conflicting parties to reframe the problem. Accordingly, it is necessary to pay attention not only to frames that conflicting parties hold, but to also encourage reframing (e.g., Bodtker and Jameson, 1997; Gray, 2004). Mediators rely on reframing techniques to find common ground among conflicting parties by eliminating noxious language and changing the way issues are presented and accounts of the conflict are framed (Dewulf et al., 2009; Gray, 2005). Thus, reframing—creating new and different understandings of the problem, usually with assistance from a mediator—is intrinsic to conflict mediation and resolution (Gray, 2003; LaBianca et al., 2000). Yet, empirical evidence of reframing in major environmental conflicts and their characteristic disputes is at best scanty (Gray, 2003). Many call for more reframing efforts (e.g., Fischer, 1995; Roe, 1998; van Eeten, 2001) to which this article is, in part, a response.

Reframing imposes perspective taking, involving "standing back, observing, and reflecting" on the multiple ways of framing the problem (Gray, 2003). Despite the ability to find common ground through reframing, tools to facilitate reframing and the comprehensive systematic analyses of frames emerging from the reframing process, in major environmental disputes, are rare (Gray, 2003). We use a case study to show the utility of Q methodology as a tool for reframing multiparty natural resource-based resolution-resistant conflicts. We illustrate how the tool allows for a more systematic analysis of the frames, and areas of consensus and disagreement, that emerge from the reframing process.

1.3. Approaches to framing and reframing

Several approaches to framing and reframing have been espoused in conflict research. In a meta-paradigmatic analysis of these approaches, Dewulf et al. (2009) pointed out that the nature of frames is one of two major causes of conceptual confusion. Frames are either cognitive or interactional. Cognitive reframing strives to get accurate and unbiased views of disputants' frames (Dewulf et al., 2009). Implicitly, some approaches to reframing may lead to inaccuracy and bias. Accurate frames are important because, as mentioned earlier, intractability (e.g., ambiguity and complexity) may result from unclear frame organization and articulation (Bardwell, 1991; Lewicki et al., 2003) and may lead to solving the wrong problem (Interaction Associates, 1986). From a diagnostic perspective, the cognitive approach is desirable because it strives to generate as accurate, and as unbiased, as possible, how disputants identify and define the problem. This approach is especially relevant when the clarity of disputants' views is at issue, typical of intractable multiparty environmental conflicts.

Characteristic cognitive reframing approaches involve individually and separately interviewing or observing disputants or disputing parties, and interpreting frames emergent from those observations (Dewulf et al., 2009). While frames emerging from such approaches may represent as accurate as possible what exists in the minds of individual disputants they may undermine the very biases they seek to minimize. Emergent frames are likely less comprehensively representative of the problem. Interviewing and/or observing, separately, individual disputing parties, often may not allow for adequate consideration of other disputants' views.

Other views cannot be ignored in efforts to understand collective problem framing and the solutions implied in emergent diagnostic frames. The challenge with cognitive reframing, therefore, is for disputants to reframe the problem as accurate as it exists in their minds without ignoring how other disputants frame the problem. In this article, we illustrate how Q methodology accomplishes reframing, largely from a cognitive perspective, while giving commensurate consideration to other disputants' frames.

The interactional reframing approach views conflict frames as interactional co-constructions or socially constructed "ways of making sense of a situation" (Tannen, 1979). Interactional reframing explores the co-construction of the problem and interactions that are negotiated during meta-communicative deliberations (Dewulf et al., 2009). It involves observing interactions among disputants and identifying the sequences of problem co-construction. Interactional reframing focuses on how disputants try to influence the definition of the problem through meta-communication. The general knowledge that what people say depends on who they are talking with applies to contentious multiparty conflict negotiations and may jeopardize accurate problem identification and definition, indispensable attributes of effective conflict management (Dewulf et al., 2004). In tense and minimal trust situations characteristic of such negotiations, the physical presence of disputants in interactional reframing may lead to undesirable outcomes. In an analysis of an environmental collaborative, Dewulf et al. (2004) illustrated undesirable outcomes of social influences inherent in interactional reframing; participants faced difficulties 'connecting' the different frames and were confused and frustrated. Thus, physically interactive reframing may be problematic even under collaborative conditions. Benford and Snow (2000) showed how framing processes lead to "strategic framing", where instead of focusing on problem definition, frames are advanced to accomplish goals like acquisition and mobilization of resources, and to consciously influence others and manipulate the issue.

In interest-based conflicts, typical of multiparty environmental conflicts, disputants influence others, manipulate issues, and mobilize resources to meet their interests. Amidst these influences disputants' problem frames are likely to be inaccurate and biased—different from what actually exists in their minds—are influenced by the interactions, and/or are aimed at strategic framing and issue manipulation (Dewulf et al., 2004). This is undesirable when the purposes of reframing are diagnostic—the search for accurate and least biased (minimally influenced) problem identification and definition. Inaccurate problem diagnosis facilitates the tendency to solve the wrong problem while the real problem persists (Bardwell, 1991). If the goal is to represent the problem as accurately as it exists in the minds of disputants, interactional reframing might be undesirable. Thus, accurate problem representation requires reframing with minimal, if not without, influences from who disputants are talking with.

Given the drawbacks of the cognitive and interactional reframing processes, the question as to how these drawbacks can be minimized to effectively identify and define intractable multiparty environmental problems is vital. Cognitive reframing may not adequately consider other disputants' viewpoints, and interactional reframing may lead to issues arising from inter-disputants influences. But cognitive reframing ensures accurate problem representation while interactional reframing minimizes "one-sidedness". The challenge therefore, is to enable simultaneous cognitive and interactional diagnostic reframing while minimizing inter-disputant influences. Accurate and minimally biased diagnostic reframing requires excluding 'who disputants are talking with' while considering 'what they have to say'. Such reframing must enable commensurate consideration of other disputants' frames, without their physical presence.

We illustrate, in this article, how to create authentic diagnostic frames of multiparty intractable environmental problems while minimizing the drawbacks of bias and social influences. The approach is not an alternative, but rather a complement, to physical interactional reframing. Besides enabling clear articulation of the problem, it allows disputing parties and mediators to more clearly identify how and to what extent frames shift with and without inter-disputant influences, which may further facilitate tractability.

For the first time, in the context of diagnostic reframing of intractable environmental conflicts, we illustrate how the contents of frames, and areas of consensus and disagreement are systematically prioritized to facilitate the efficient allocation of scarce conflict mediation and resolution resources. The approach is shown to facilitate systematic shifting of the conflict towards the tractability end of the continuum. By minimizing inter-disputant influence, disputants focus on representing the problems/issues as accurately as they exist in their minds. Our approach is therefore largely cognitive. We remove "venomous" language and carefully select statements, through qualitative descriptive coding followed by thematic analysis (Saldaña, 2010), to maximize equal representation of all disputant frames, making our approach also interactional. We discuss how systematic diagnostic reframing highlights contradictions and latent agendas tied to the problem, and help identify plausible sources of intractability. We show how these are accomplished while minimizing the influences of who disputants are talking with without eliminating what other disputants have to say about the problem. Environmental resource planners, managers, and mediators will find this illustration useful. This approach may be useful not only in conflicts but also in confusing and complex circumstances. In the following section we provide a background of the case study followed by a rationalization of Q methodology's suitability for diagnostic reframing.

1.4. The case study

Our case study is a long standing conflict about All-terrain Vehicle (ATV) use in Minnesota state public lands. Motorized recreation was allowed in most lands administered by the Minnesota Department of Natural Resources (MN DNR) until the mid-1980s (MN DNR, 2008). Increased motorized recreation, associated social-ecological impacts, and consequent disputes among various forest users led MN DNR to begin actively managing ATVs; some forests were closed, while trails and related facilities were developed on others. As the conflict continued, MN DNR, in 1996, classified these lands as either open or closed to motorized recreation. They began holding open house sessions in 1998 to discuss proposed forest classifications and route designations with stakeholders, and to solicit input on drafted ATV plans. Later that year, the DNR commissioner launched interim classifications for motorized recreation in all 58 State Forests (MN DNR, 2008).

These efforts did not sufficiently curb the conflict; the state legislature intervened in 2002, requiring the MN DNR to create a Motorized Trail Task Force (MTTF). Twenty-two members were appointed to the task force, representing off-highway vehicle users, non-motorized forest interests, non-state forest land managers, DNR, and other appropriate parties (MTTF, 2003). Through an interactional co-construction process, the task force reviewed eight issue areas, and made recommendations to the 2003 legislature. The task force could not agree on any recommendations pertaining to the issue area of "natural resource protection concerns regarding ATV trail use including, but not limited to, soil erosion and noise impacts" (MTTF, 2003). Paradoxically, this issue area was a major spur for the creation of the task force. A MTTF participant said, "I

was also troubled by our inability to reach consensus on even the most basic recommendations regarding the prioritization of protecting natural resources over recreational use" (MTTF, 2003, Appendix C-9).

While some task force members thought the process was good, many were disappointed with the nub of the interactional co-construction mediation process—"unanimous informed consent". Participants claimed it "worked against" more natural resource protection and stronger enforcement, and was an inefficient use of resources (MTTF, 2003). One task force participant mentioned that, "many of these recommendations were voted down by one or two votes …" (MTTF, 2003, Appendix C-13). These recommendations, although were short by one or two votes to meet unanimous consent, were certainly of higher consensus than those voted down by many more disputants. But, the outcome report did not clearly outline how recommendations that did not pass the unanimous consent process were prioritized. None of the task force's recommendations were adopted by the legislature. These persistent struggles among diverse competing interests about ATV use in Minnesota, despite several mediation and management efforts at different scales, exemplify the intractability of multiparty environmental problems. Disagreement on the very issue that spurred creation of the task force epitomizes the limitations of conventional interactional reframing approaches, which often result in reproducing the extreme positions characteristic of the problem (van Eeten, 2001).

Who task force participants were talking with, including verbal and non-verbal cues, significantly influenced the outcomes, according to participant feedback. One participant mentioned,

> *"… several of us task force members were chastised by other members, including the chairs, for not agreeing on a recommendation. It is definitely a moment in time I will not forget. Ultimately, the recommendation missed the mark as they have little focus on trails, period, which was to be the objective of this [task force]" (MTTF, 2003, Appendix C-10).*

As an example of the drawbacks of inter-disputant influences typical of interactional reframing processes, what this task force participant "will not forget" has more to do with other disputants than with trails, which the disputant considers to be the focus of the task force. According to another task force participant,

> *"The [task force participants] had a wide range of professional backgrounds and special interest to which I initially felt some resentment"* (MTTF, 2003, Appendix C-7).

These quotes are evidence that the substance of these interactions was subject to significant inter-disputant influences—who disputants interacted with. Such influences oriented the focus of negotiations away from deliberating issues as accurately as they existed in the minds of disputants (Maxwell, 2000).

Preliminary document analysis and interviews with disputing parties—a largely cognitive approach—revealed, at one extreme of the problem, pro-ATV stakeholders framing themselves as victims of pro-environmental claimants striving to deny their legitimate rights to enjoy public lands. On the other extreme, anti-ATV sentiments cluster around ecological damage and noise pollution. In-between were various frames of the problem in terms of access, equity, and justice; regulation and enforcement; trail signage, connectivity and maintenance; and political and economic influences on the attitudes and behaviors of actors such as environmental advocates, non-motorized public land users, ATV riders, and managers. These extremes and the multiplicity of frames in between, raise several questions that we attempt to address in this article. Are these frames as antagonistic as they appear from our interviews—a cognitive reframing approach—and from the outcomes of the task force process—an interactional reframing approach? Are these frames equally relevant; can they be reframed such that their relative saliencies become obvious to disputants and managers, and to better understand the problem and thereby enhance the potential for better articulation of solutions? Can these be accomplished while excluding who disputants are talking with without eliminating what they have to say?

2. Q methodology

Q methodology has been used to understand environmental issues characterized by wide-ranging views (e.g., Frantzi et al., 2009; Takshe et al., 2010). The methodology is shown to facilitate problem identification and solution generation, and to out-perform the Nominal Group Technique in conflict management (Maxwell, 2000; Maxwell and Brown, 2000). It has been used to facilitate tractability in otherwise intractable policy problems (Focht and Lawler, 2000; Van Eeten, 2001). But, as far as we know, its application in the diagnostic reframing of intractable environmental management problems is non-existent despite numerous calls for the reframing of such conflicts.

Q methodology is especially suited for reframing. Statements characterizing disputants' frames are taken back to them for reframing—choosing and ranking according to a given condition of instruction. A carefully designed Q methodology exercise involves sampling statements such that they represent the varied array of viewpoints on the problem ensuring comprehensive representation of disputants' frames. Frame sampling also includes the removal of toxic language.

The sorting process obliges disputants to consider what other disputants have to say about the problem. Sorting involves reacting to frames different from theirs, weighing the relative merits of several frames/statements, and selecting the most and least preferable ones. This imposes perspective taking, enabling disputants to stand back, observe and reflect on the multiple frames that other disputants bring to bear on the problem and by so doing makes the reframing process interactional. Disputants perform the reframing alone, if they so choose, in a location of their choice, allowing reframing to occur with minimum social-contextual influences, enabling the reframing process to be largely cognitive. Thus, reframing using Q methodology is both cognitive and interactional, as it entails deliberating with other parties' frames, but in the absence of those parties. The mediator's role is reduced to comprehensively sampling disputants' frames, removing offensive language that may sidetrack from the substance of accurately identifying and defining the problem, administering the reframing exercise, and analyzing and interpreting the results in concert with disputants. By enabling simultaneous cognitive and interactional reframing, Q methodology can unveil real positions held by disputants, and reveal underlying unrecognized agendas connected to the problem, which enhances understanding of the problem and explanation of intractability (Addams and Proops, 2000; Maxwell and Brown, 2000). Analysis of disputants' sorts results in quantitative systematic delineation, prioritization and organization of perspectives, as well as outlined areas, and respective levels, of consensus and disagreements. This ability to reveal real positions, while considering other disputants' views, yet minimizing inter-disputant influences, is at the core of Q methodology's utility in reframing difficult environmental problems (Brown, 1993).

2.1. Procedure

A series of steps were critical to reframing the problem. First, to reflect the entire range of problem frames, we collected 600 frame statements, mostly from conflicting parties' verbatim comments

submitted to the DNR via its many public participatory forums: open houses, emails, and public meetings. These included verbatim comments from the public, ATV riding clubs, environmental groups, and other disputants and verbatim responses to these comments from MN DNR ATV managers. The comments were particularly useful because they easily reproduced the varied range of problem frames encountered during interviews with individual disputants. We supplemented these frame statements with those collected from interviews, newspaper articles, and the MTTF report. We independently conducted a descriptive coding analysis of the 600 frame statements into themes or issue areas (Saldaña, 2010); our codes were compared and revised to ensure inter-coder reliability. The main issue areas that emerged from thematic analysis include: ecological protection and damage; the social, economic and ecological benefits of ATVs; access, equity and justice; ATV regulation and enforcement; ATV trail signage, connectivity and maintenance; political and economic influences on ATV planning and management; attitudes and behaviors of ATV riders and anti-ATV groups. We sampled statements such that each theme was represented and replicated. The resulting 60 frame statements were each printed on 2 × 3.5 inch cards for subsequent reframing by disputants.

Next, 117 disputants from 17 major groups performed the reframing. Eleven of the sorts were unusable; some disputants refused to place the statements as requested arguing that they contained too many pro or anti-ATV statements. Some were sheer errors; we did not follow-up with disputants given the relatively larger than usual person sample we obtained—≥3 replicates per disputant group.

The identification and recruitment of disputants external to MN DNR was assisted by MN DNR staff. External disputant sub-groups embedded within the major groups included riders with physical disabilities, private business owners serving ATV riders, and five members of the Trail Task Force. We ensured disputants' privacy and other concerns by obtaining institutional review and approval, and seeking disputants' consent prior to reframing.

Reframing occurred in two phases. First, disputants read carefully through each card in the deck and sorted them into three piles: a pile for frames statements they agreed with, another for frames they disagreed with, and a third for those that were either neutral or inconsequential to how they identified and defined the problem. Second, disputants made finer distinctions by placing their statements in a bipolar continuum from −5 to +5 as illustrated in Table 1.

This procedure allowed disputants to stand back, take perspective, and consider the views of other disputants while choosing and ranking frame statements. By ranking these statements in a location of their choice and alone, disputants were free of the physical influence of other disputants and thus most likely to represent the problem as accurately as it exists in their minds. This is the cognitive aspect of the reframing process. But, the process was also interactional because disputants had to make choices and redefine the problem while fully considering and reacting to the problem frames of other disputants. Disputants were able to avoid who they are talking with, without ignoring what they have to say. By so doing we minimize the drawbacks of both cognitive and interactional reframing; that is, the biases of non-inclusion of other disputants' views and the confusion, frustration, issue manipulation, and strategic framing problems associated with interactional reframing. We asked disputants to comment on the study and to respond to a Likert scale assessing their frequency of ATV use for "practical" and "recreational" purposes. These frequencies were used to make finer distinctions among ATV-riding disputants.

Table 1
Bipolar continuum used for the Q-sorting reframing exercise.

Most disagree								Most agree		
Statement scores										
−5	−4	−3	−2	−1	0	+1	+2	+3	+4	+5
Number of statements										
3	5	5	6	7	8	7	6	5	5	3

We used PQMethod software version 2.11 for data analysis (PQMethod, 2002). A correlation matrix of the 96 sorts was generated and subjected to principal component factor analysis with varimax rotation (Brown, 1980; Stephenson, 1953, 1964). Typical of factor analysis, emergent problem frames were retained based on several subjective criteria including R^2, marked differences from other frames, positive inter-frame correlation less than 0.5, and at least one disputant loaded highest on that frame (Brown, 1980).

3. Results

From the reframing process emerged three problem frames—alternative configurations and definitions of the problem with ATV use in Minnesota state public lands. Most importantly and to emphasize the interactional nature of the process, emergent frames represent co-constructions by all disputants who correctly participated in the reframing process. Frame A was labeled *Poor Resource Protection and Management,* Frame B labeled Problematic ATV Activity, and Frame C, *A Few "Bad Apples", Unclear Rules and Signs*. These frames represent how participating disputants identify and define the problem with ATVs in Minnesota state public lands. It is worth distinguishing between frames as statements and frames as narratives composed of a series of statements delineating and prioritizing issues; the latter, are the subject of our output discussed and presented in Table 2. Q methodology outputs include statements that distinguish each frame from the others. Those statements were used to describe emergent problem frames; numbers in parentheses refer to the statements listed in Table 2. We discuss identified contradictions within frames, to highlight and elucidate ambiguity. We explain how these frames relate to ongoing circumstances surrounding the problem. Our interpretations of emergent frames were verified by disputants whose sorts most closely match that given frame (defining sorts).

We report our findings using the normalized factor scores (*Z*-scores)—indicating how many standard deviations a statement is away from the neutral (zero) point of the Q-sort distribution. *Z*-scores provide finer distinctions among statements with the same factor rankings. Negative *Z*-scores represent disagreement while positive ones denote agreement with a frame. Results also include key areas of consensus and disagreement.

Table 3 provides the number of disputants who significantly agree or disagree with each frame, including the number of those who agree with multiple frames. Significant agreement or disagreement was computed using the equation: Loading Score $= 2.5^{*}1/\sqrt{N}$, where N is the total number of statements (60) in the Q sort (Brown, 1980); scores $\geq |0.32|$ are significant.

3.1. Frame A: Poor Resource Protection and Management

According to Frame A, *Poor Resource Protection and Management*, ATV activity causes environmental damage, the true cost of which is not paid by ATV riders (#34). Within this frame the MN DNR is complicit in this damage through poor management practices—inadequate enforcement and ineffective penalties for ATV violations (#s21, 22, 29, 44, 56, 58). This frame expresses skepticism that the DNR will manage ATVs to protect the environment given their tendency to yield to pressure from powerful

Table 2
Statements used for reframing and their *Z*-scores for each emergent frame.

#	Statement	Frame *Z*-scores		
		A	B	C
1	Excessive noise of ATVs may result in harmful effects on animals and humans.	0.85	1.14	−1.07
2	Motorized recreation helps maintain the logging trails and fire prevention roads.	−0.85	−0.41	0.16
3	For people who want to visit their buddy down the road at the cabin, ATVs are a lot cheaper and cleaner way to travel than using a car.	−0.49	−0.20	0.16
4	I believe in preservation of our woods and wetlands, but not to the exclusion of other taxpayers.	−0.35	−0.48	1.05
5	Road and trail closure from ATV use discourages outdoor enthusiasts of a certain age and physical condition from enjoying nature.	−1.09	−1.10	0.02
6	The motorized to non-motorized mileage ratio for state forests is heavily weighted towards motorized proponents.	0.80	0.35	−1.05
7	Part of the problem with ATVs is the feeling of entitlement on the part of ATV users without a corresponding acceptance of responsibility for damage caused to the environment.	1.52	1.55	−0.71
8	I don't think the level of non-motorized use justifies the current acreage reserved for it.	−0.78	−1.27	−0.28
9	I am painfully aware that ATV recreation does not have the numbers or the dollars that the enviro-extremists groups throw at this issue to sway the outcome.	−1.34	−1.71	0.45
10	The pleas of ATV riders, bolstered by industry backed lobby, is enough to sway career natural resource experts to compromise forest ecological integrity and the legitimate rights of silent users.	1.32	−0.96	−1.07
11	There are enough places for "solitude-like" experiences in MN because State parks, and other units (Wildlife Management and Natural Areas), provide better opportunities for solitude.	−1.75	−1.58	0.54
12	The answers to ATV problems seem obvious but no one is bold enough to make the decisions without being politically swayed.	1.40	−0.10	−0.43
13	The DNR has given into the "big business" and "money talks" pressures that come from the manufacturers of these machines and those who can afford to ride them.	1.52	−0.92	−1.20
14	Limiting ATV use to certain dates (Memorial Day to Labor Day) irrespective of on-the-ground conditions is unfair; it significantly shortens the season and hurts a wonderful family pastime.	−0.79	−0.49	0.51
15	Ideally, there should be zero miles of rutted trails but the ruts are not as bad as ATV opponents would like people to believe; the damage caused by ATVs is highly overrated.	−1.60	−1.24	0.67
16	It is ironic that there is a special trail for every type of motorized recreation vehicle, yet solitude recreationists are expected to share the forest with ATV riders.	0.92	0.54	−0.88
17	ATV use has tourist-based economic benefits to local businesses and communities.	−0.15	1.37	1.76
18	The lack of agreement on recommendations calling for protection of natural resources in the ATV management process stands in the way of a better ATV system in MN for the future.	0.54	0.52	0.45
19	ATVs are useful for hunting and the retrieval of game carcasses from hard-to-get-to areas.	0.20	0.45	1.14
20	ATV users sometimes trespass because there are no connecting roads to get to the trails, especially when other roads and trails are nearby.	−0.12	−0.001	0.29
21	There is inadequate enforcement of ATV abuses, so violators have little incentive to obey laws.	1.24	0.51	−0.52
22	The MN DNR create problems and increase ATV damage to our forest trails by designating far more miles of trails than they have resources to enforce.	1.64	−0.60	−1.45
23	We don't need trail signs everywhere because area boundaries are typically well-defined and easily recognizable to ATV users.	−1.06	−1.69	−1.61
24	Trail signs are clear as to where ATVs are allowed and not allowed.	−0.48	0.05	−1.14
25	Some ATV trail violations are because the distinction between forest minimum maintenance roads, ATV trails, and forest system roads are not clear to ATV riders.	−0.16	0.08	0.98
26	The current permitted uses in state/federal forests roads and trails are clear and easy to know what is allowed where.	−0.79	−0.52	−1.47
27	There are too many uncoordinated factions (feds, state, county) who make ATV rules and that is confusing to riders.	0.07	0.34	0.89
28	I am impressed with the preparation and diligence of DNR personnel to ensure that ATV riders and other public land users co-exist.	−1.41	1.18	0.51
29	The DNR is looking to our future and is committed to protecting the integrity of Minnesota public forests.	−1.37	1.50	0.85
30	We can't make thousands more miles of trails, but overly limited riding areas get torn up faster and riders look even worse to the environmentalists.	−0.45	−0.19	0.32
31	ATV groups claim that they can police their members, but the unrestrained damage caused by riders, shows that ATV groups are ineffective in policing their members.	1.56	0.47	−0.95

(*continued on next page*)

Table 2 (*continued*)

#	Statement	Frame *Z*-scores		
		A	B	C
32	I am comfortable with the fact that state forests are roaded and accessible, and have traditionally hosted a mix of motorized and non-motorized recreational opportunities.	−0.32	1.07	1.31
33	Minnesota's system of providing trails is bound to fail because anytime a new type of motorized recreation vehicle is created there is an automatic demand for their own special trail.	0.26	−1.01	−1.14
34	ATV riders do not pay the true cost of their sport: erosion, water quality, wildlife etc.	1.67	1.66	−1.60
35	Walkers, bird watchers, etc. enjoy the forest and so should someone riding responsibly on an ATV.	−0.04	0.62	1.63
36	ATV trails provides a place for deer, coyotes and wolves to walk more easily.	−0.54	−1.20	0.29
37	ATV riding, to many people, is not about slinging mud or tearing it up; it often means a vacation, a family outing.	−0.20	0.70	1.79
38	Many environmentally friendly people ride ATVs in Minnesota public forests.	−0.13	1.23	1.64
39	Like everything else, a few ATV riders give ATV riding a bad name.	−0.20	0.16	1.72
40	There is no place for motorized recreation in Minnesota public forests.	−0.54	−1.76	−2.11
41	The fanatics are trying to keep ATVs away just so they can say that they saved the forest from uses other than what they view as right for the forest.	−1.45	−1.42	0.40
42	One of the major issues with ATVs is that the motorized and non-motorized factions have unhealthy, deep suspicions and mistrusts of each other's' motives.	0.38	1.36	0.45
43	Without a clear statement that says the DNR must put the environment first, the ATV program will continue to face criticism, opposition and obstruction from environmentalists.	1.23	0.00	−0.28
44	The penalties for ATV violations are not severe enough to prevent ATV riders' misbehaviors.	1.27	0.67	−0.61
45	As humans, we have lost something if we cannot maintain the peaceful solitude of the forest.	1.52	1.45	−0.54
46	Having motorized and silent users share the same recreational areas in state forests show either ignorance or disregard for the user conflict and the obvious solutions to the conflict.	0.97	−0.41	−0.79
47	A few passing ATVs does not drive wildlife out of the area; wildlife only go a short distance into the forest.	−0.86	−0.70	1.04
48	Too much shutting down of ATV access in proposed areas is unfair because we have places like the Boundary Waters Canoe Area for remote wilderness experiences.	−1.55	−1.94	0.30
49	The problem is not so much about having ATVs in the forest; it is about the unlawful behaviors of some riders.	−0.24	0.73	1.20
50	All forms of recreational trail use carry with them the potential for negative environmental effects.	0.14	1.53	1.27
51	I think lack of enforcement of ATV riders is the biggest problem.	0.63	0.04	−0.83
52	People who hunt with ATVs can carry bait deeper into the forest, which gives them unfair advantage over other hunters.	0.16	0.17	−0.93
53	Private land owners in neighboring public forests are subjected to excessive ATV abuse on their property.	0.69	0.58	−0.67
54	There are as many conflicts between other forest road users, like hunters and horseback riders, hikers, etc.	−0.65	−1.10	0.16
55	Sure there are few bad apples in the ATV riding crowd, but that applies to any vehicle, piece of machinery, or material object that can be used.	−0.54	−0.09	0.85
56	The MN DNR has improved its commitment to ensure that better control of ATV use in state lands is indeed fulfilled.	−1.34	1.25	0.72
57	No respect by ATV riders is a big problem, especially the teenage to upper 30-year-old thrill seekers.	1.04	0.68	−0.41
58	The DNR uses sound natural resource and recreation management principles in addressing recreational challenges.	−1.58	1.11	0.27
59	Most ATV riders are from the Twin Cities; why does northern MN have to provide the playground for them?	0.25	−0.80	−1.41
60	The DNR and environmental groups have done endless research, but in the end, ATV decisions are just up to someone with political gains to make.	1.39	−1.21	−0.61
	% Explained variance	20	14	17

interest groups (#s12, 13, 60). One post-sort interviewee noted that two of the three largest ATV manufacturers in the country are based in Minnesota; resolution is impossible without acknowledging and addressing the economic contributions of these industries to the state, including jobs and tax revenues, and their potential influences on disputants, including political decision-makers.

Frame A argues that without explicit priority given to environmental protection, the problems will persist (#43). It asserts that there are not enough places for quiet recreation, a sign that humans have lost something important (#s11, 45). The frame expresses riders' inability to meet their claims of policing their members and matching their feeling of entitlement to ATV-recreational use with the responsibility for damages caused by such uses (#s7, 31).

Twenty of the 41 DNR internal stakeholders agreed with this frame despite its critique of the agency's role in the problem (Table 3). In other words, there could be a significant number of individuals within the agency who see the role of the agency as problematic. Four of seven enforcement officers agree with this frame and therefore, its claims of inadequate enforcement and insufficient penalties for ATV violations—none of the participating enforcement officers disagree with this frame. Five of seven participants from the Trails section (the section leading DNR's

Table 3
Number of disputants associated with emergent problem frames.

Disputant groups	Number of disputants			
	Frame A	Frame B	Frame C	Multiple frames
DNR internal disputants				
Office of Management & Budget Services, & Management Resources (5)	4	4	0	3AB
Fish & Wildlife (7)	5	4	0	3AB
Enforcement (7)	4	5	2	3AB; 2BC
Forestry (8)	3	3	5	1AB; 2BC
Parks & Trails (Trails) (7)	0(−5)	4	7	4BC
Parks & Trails (Parks) (3)	1	1	0	0
Ecological Resources (4)	3	4	0	3AB
DNR external disputants				
County Recreation Planner/Manager (3)	1	2	3	1AB; 2BC; 1ABC
ATV Club Members (11)	0(−2)	0	11	0
Non-motorized recreationists (7)	4	4	2	1AB; 1BC
Private land owners (6)	5	2	−1	1AB
Practical Riders, Low Recreational Use (9)	5	2	4	2AB
Practical Riders, High Recreational Use (4)	1(−1)	0	3(−1)	0
Balanced Riders, High Recreational Use (5)	−2	0	4	0
Balanced Riders, Low Recreational Use (3)	1	2	0	0
Environmental Advocates (4)	4	0	0	0
ATV-Related Researchers in Academia & Federal Agencies (3)	1	3	3	1ABC; 3BC
Total (96)	42(−10)	40	44(−2)	34

Note. The numbers in parenthesis in column one are the total number of participants for that stakeholder group; the negative numbers indicate the number of disputants who significantly disagree with that frame; the loading cut-off for participants' significant association with a frame was $\geq|0.32|$.

ATV management effort) significantly disagree with this frame—apparently reinforcing anecdodal evidence that within-agency differences contribute to the problem. The other five disputants who disagree with this perspective are high recreational ATV riders and ATV club members. This is the most contentious frame, with ten stakeholders significantly disagreeing with it; all ten are from the ATV planners and riders disputant parties. All four disputants who identified themselves as environmental advocates agree with this and only this frame, suggesting that the 'heat' of the conflict is between environmental advocates on one hand and ATV managers and users on the other.

Interestingly, and rather contradictory, Frame A sees a place for motorized recreation in state forests, yet expresses discomfort with the forests accommodating a mix of motorized and non-motorized recreation opportunities. Furthermore, this frame denies claims that the problem is less about having ATVs in the forest than it is about the unlawful behaviors of some riders (#49). Most interestingly, this frame denies claims that many environmentally friendly people ride ATVs (#38). One of the disputants whose sorts defined this perspective attributed discomfort to rider and management behaviors rather than to the mixed use of the forest, underscoring that having ATVs the "way we have them now" is as much a problem as unlawful behaviors. Another defining sorter admits that some but not "many" environmentally friendly people ride ATVs.

3.2. Frame B: Problematic ATV activity

Like Frame A, Frame B holds that ATV riders do not consider the full costs of ATVs—harmful effects on natural resources, wildlife and humans (#34). It claims that riders have a feeling of entitlement to ride ATVs without accepting responsibility for ATV-associated damages (#7). Unlike Frame A, this frame maintains that "many environmentally friendly people" ride ATVs (#38) and holds that despite improving its commitment, diligence, and responsibility to ATV management, the DNR needs to do more (#s23, 28, 29, 56). While recognizing that all forms of recreational trail use have negative environmental impacts (#50), this frame highlights the insufficiency of quiet recreation opportunities (#11). It acknowledges the social and economic benefits of ATV recreation (#17), but disagrees that restricting ATV use is unfair (#s5, 48).

This frame inconsistently argues for peaceful solitude experiences in state forests while disagreeing with arguments against sharing the same areas by motorized and non-motorized recreationists (#s45, 46). One interviewee whose sort defined this perspective explained that "the same recreational area" was taken to mean the same forest in which it is possible to have both without noise pollution for quiet-seeking recreationists. Twenty-five internal DNR stakeholders agreed with this frame; no environmental advocates nor ATV club members and high recreational ATV users agreed with this frame. No disputant significantly disagreed with this frame (Table 3).

3.3. Frame C: A Few "Bad Apples", Unclear Rules and Signs

Frame C views the problem as caused by a small minority of irresponsible ATV riders and their "unlawful behaviors" (#s39, 49). It suggests that the MN DNR has significant room for improvement in clarifying permitted uses, and trail signs (#s23, 24, 26). This frame argues that unclear distinctions between minimum maintenance roads, ATV trails, and forest system roads partially explain ATV trail violations (#25). The frame denies claims that ATV riders do not consider the true ecological and social costs of ATV activity, and that excessive noise from ATVs could have harmful effects on animals and humans, viewpoints that markedly situate this frame at odds with the other two (#s1, 34).

This frame accepts that some ATV riders engage in unlawful behaviors but denies claims that penalties are not severe enough to deter such behaviors. This appears somewhat contradictory, given the frame's denial of claims that ATV riders are unable to police their own members (#s31, 44, 49). Additionally, the frame rebuffs claims that lack of enforcement is the biggest problem (#51). A defining sorter of this frame explained that educating those few bad apples "is our best bet at curbing their unlawful behaviors". The MN DNR funds education activities, some via organized ATV rider clubs, and according to another defining sorter, an ATV club

member, "the education efforts have been more successful [in curbing unlawful behaviors] than enforcement efforts would have been".

All but one high recreational ATV rider and ATV club member agreed with this frame (Table 3). Thus, it is not surprising, but worrying, that this frame plays down the social-environmental effects of ATV activity and disagrees with claims of the need to preserve the quiet experiences some disputants seek. This frame more strongly disagrees with claims about political-economic influences on ATV management, DNR's inadequate capacity to manage ATVs, and the need to improve trail signs, than with claims about ATV riders' ability to police their members (#s10, 13, 21, 22, 23, 24, 31). That is, claims of the inability of ATV riders to police their members is less salient of a problem than political influences on ATV management, trail signs, and the effectiveness with which the DNR manages ATVs in state public lands.

This frame seems to shift blame away from ATV riders and onto other issues such as poor management (inefficient trail signs, unclear distinctions between ATV trails and other roads, inadequate trail connectivity, lack of clarity on permitted uses, and uncoordinated management activities; #s20, 23, 24, 25, 26, 27). And, despite attributing the problem largely to poor management, they praise the DNR's management efforts (#s28, 29), denying claims that they designated far more trails than they have resources to enforce (#22). But, this frame's praise of management efforts is relatively less salient (lower absolute *Z*-scores) than other issues such as the economic benefits of ATVs, the fact that environmentally friendly people ride ATVs, and the usefulness of ATVs for hunting.

3.4. Common ground and disagreements

All three frames agree that "the lack of agreement on recommendations calling for protection of natural resources in the ATV management process stands in the way of a better ATV system in Minnesota for the future" (#18). This was the only Q-consensus statement, reached when all frames unanimously agree or disagree with a statement and their levels of agreement/disagreement are not significantly different. In practice, people might have a consensus without necessitating the same level of agreement or disagreement. Besides the Q-defined consensus, all frames somewhat agree that: (i) too many uncoordinated factions make ATV rules confusing to riders (#27); (ii) disputants have unhealthy, deep suspicions and mistrusts of each others' motives (#42); and (iii) all forms of recreational trail use have potentially negative environmental effects (#50). Additionally, all frames disagree to some extent that: (i) trail signs are not needed everywhere because area boundaries are well-defined and easily recognizable (#23); (ii) current permitted uses in forest roads and trails are clear and easily understandable (#26); (iii) the level of non-motorized use does not justify the area reserved for it (#8); and (iv) there is no place for motorized recreation in Minnesota public forests (#40). The across-the-board disagreement with statement #23 could be eye-opening to managers—this statement was retrieved verbatim from their responses to disputants' complaints about inadequate signage. Unanimous disagreement with statements #8 and #40 are eye-opening contrasts to pre-existing cognitive frames of the problem. Pro-ATV disputants were of the cognitive frame that anti-ATV disputants simply do not want ATV recreational activities, while quiet recreationists primarily hold the cognitive frame that pro-ATV disputants think that too much land is set aside for quiet recreational activities.

There are four contentious issues across the problem frames. The first one is in regard to the behavior of ATV riders and the social-ecological costs of ATV activity. Frames A and B assert that there is negative behavior of ATV riders and adverse effects of ATV activity on humans, wildlife, and the natural environment; Frame C largely denies these claims and limits the problem to a few "bad apples" (#s1, 34, 47). Frames A and B disagree with claims that ATV-caused damages are 'overrated'; Frame C somewhat agrees with the claim (#15). A second contentious area is in regard to the DNR's role in ATV management, whether such a role sufficiently protects the environment and is void of political and economic influences. Frames B and C view the MN DNR's role as favorable and void of significant political influences, while Frame A is critical of the DNR's efforts (#s10, 13, 22, 28, 29). The third contentious claim regards places for solitude-like experiences in Minnesota; Frames A and B claim insufficiency of such places, while Frame C denies this claim (#s 11, 48). The fourth contentious issue deals with the adequacy of enforcement of ATV activity. Frames A and B claim that these efforts are inadequate and ineffective, while Frame C asserts the contrary (#s 21, 44).

Table 4 shows the level of frame clashes and/or alignment, illustrating the level of intractability between frames and the overall conflict. The values in this table are inter-frame associations or correlations and reflect the extent to which frames are either at odds or aligned with each other. Those standardized values range from -1 (when a frame is totally clashing with another, the extremely intractability end of the continuum) to $+1$ (when both frames are in total agreement and are basically the same, the most tractable end of the continuum). It is clearer, from this important output of Q methodology, that Frames A and C are highly clashing with an inter-frame clash value of -0.45. However, that value is still farther away from the -1 extreme of the intractability continuum than from the neutral point (zero—no disagreements or agreements) of the continuum. This finding is somewhat surprising, as the conflict is often expressed as if the level of antagonism, mostly between the environmental groups and high ATV users, is closer to -1. Thus through reframing, the level of intractability in multi-party environmental conflicts can be more systematically gauged.

The combination of both cognitive and interactional reframing processes enabled clearer understanding of disputants' flexibility in framing the problem. Over 35% of disputants, from 11 of the 17 disputant groups, hold more than one frame (Table 3), indicating that they are less rigid in reframing the problem than cognitive approaches may portray. Participating disputants who hold rigid (only one) problem frames include those from the Parks section of the Division of Parks and Trails, environmental advocates, and three of four ATV recreational user groups (Table 3). The reframing process also enables us to more clearly decipher the conflict within the management agency (DNR). Five of the seven participating disputants within the Trails section of the Division of Parks and Trails significantly disagree with Frame A to which the majority of participating disputants in the Divisions of Enforcement, Fish and Wildlife, Ecological Resources, and the Office of Management and Budget Services, and Management Resources significantly agree (Table 3). This clearly places participating disputants within the Trails section of the Division of Parks and Trails at odds with those of the latter Divisions within the agency. Also, participating disputants from the Trails section significantly agree with Frame C, a frame that all participating ATV club members significantly agree with as well. Several disputants from these two groups also

Table 4
Inter-frame associations showing frame clash and alignment.

Frame	A	B	C
A	1.00		
B	0.33	1.00	
C	−0.45	0.26	1.00

significantly disagree with Frame A, indicating the similarity with which both groups frame the problem. By outlining frame contents, the relative flexibility/rigidity of disputing parties, levels of associations/clashes with frames, and areas of consensus and disagreement, Q methodology minimizes ambiguity and complexity by identifying the level and content of intractability, and disputants at the center of such intractability.

4. Discussion

We intended to reframe the problem with ATV use in Minnesota state-administered forest lands and to do so using a tool that combines both cognitive and interactional framing while minimizing the drawbacks of each. Disputants collectively identified and defined the problems—they did so individually while giving commensurate consideration to other disputants' frames. The reframing process resulted in whole narratives of the problem rather than the viewpoints of an outspoken, disliked, and/or extreme opponent, as others have found, thereby depersonalizing the problem (Maxwell, 2000). Whole narratives are also known to destabilize the apparent rigidity of disputants' previously held frames by prioritizing otherwise single standing issues and deciphering disputants' loadings on more than one frame (Elliot et al., 2003). Destabilizing previously held frames, viewing the problem as ranked priorities needing attention versus the viewpoints of an opponent, set the stage for better management of the problem. For example, Table 2 shows that although Frame A views political and economic influences on ATV management as problematic, the attitudes and behaviors of riders and related management activities are more salient—higher *Z*-scores for statements (#s 22, 31, 34). These findings contrast those obtained from individual stakeholder interview responses—a largely cognitive approach—to the question: what is the problem with ATV use in MN public lands? Similarly, although Frame C still views ATV riding as unwanted by anti-ATV stakeholders (#41), this view is less salient than the problem with a few "bad apples" (#39), again contrasting cognitive approaches to problem identification.

Despite finding these frames and prioritized issues contrasting to their initially held positions, disputants indicated, in post-study interviews, that the frames were a fairer reflection of their characterization of the problem. Hence, by combining both cognitive and interactional reframing, via Q methodology, disputants reveal their reflexive, and thence fairer, positions rather than predefined ones (Dryzek and Berejikian, 1993; Maxwell and Brown, 2000). Preconceived notions about the problem are challenged when the drawbacks of adopting either the cognitive or interactional approaches to reframing are minimized. Thus, Q methodology substantively grounds the otherwise transitive (changes depending on circumstances: cognitive or interactional) and predefined viewpoints disputants bring to bear on intractable environmental problems (Brown, 1993).

Another important facet of diagnostic reframing, using Q methodology, is the revelation of consensus areas and the prioritization of issues within these areas. In a problem that is otherwise perceived to be highly intractable, the consensus areas represent common ground for building an agreement—structure presuming the mediation function (Brown, 2002). All frames express the need for natural resources protection, building trust among stakeholders, coordinating factions, improved trail signage, and clarifying permitted trail uses. It is important to find that all disputing parties somewhat agree that trust is an issue in the conflict. This finding fortifies Tomlinson and Lewicki's (2006) argument that distrust can initiate and sustain intractability. Efforts focusing on these issues, such as building trust among disputing parties, and the successful implementation of common ground issues may provide the social–psychological space needed to tackle more contentious areas of the problem, as suggested by others (e.g., Elliot et al., 2003). Thus, by revealing consensus areas, Q methodology renders the problem more tractable to analysis, mediation, and hence more manageable (van Eeten, 2001). But the consensus is about problem identification and definition and does not entail resolution of the conflict. Getting disputants to agree on what the problem is, including how problem issues are prioritized, does not necessarily mean that they will agree on how to address those problems. The issue of how to address the problems agreed upon in the diagnostic frames can be a source of intractability that may also require prognostic framing for which Q methodology is equally applicable (see Asah et al., 2012). Q methodology is used here as a diagnostic tool that usefully combines cognitive and interactional reframing at the stage of problem identification and definition. As a complementary tool, mediators can use these emergent frames as a baseline to better understand how frames shift during outright interactional reframing processes and thereby identify how such deliberations influence problem identification and definition.

The combined cognitive and interactional reframing approach reveals underlying latent issues connected to the problem (Addams and Proops, 2000). In contrast to Frames A and B, Frame C downplays ATV impacts on humans, wildlife, and other natural resources. It claims that there are enough places for non-motorized recreation, and "fanatics" are just trying to keep ATVs away. These underlying beliefs may partially explain the continued negative social–ecological impacts and consequent intractability. If people believe the adverse effects on humans and natural resources are overrated and "fanatics" are just trying to keep ATVs away, they may have little incentive to be cautious and respectful riders. Frame C is somewhat paradoxical, by viewing a few "bad apples" as problematic, yet denying claims of inadequate enforcement and penalties for ATV violations. According to one post-study interviewee, "if all that damage results from only a few bad apples, then those machines can do a lot, a big reason to be more stringent with enforcement and penalties for violations".

That disputants in intractable environmental problems hold contradictory frames is not uncommon (Benford, 1997; Gray, 2003). However, coupled with the fact that Frame C is founded on arguments about the social and economic benefits of ATVs, and claims that "fanatics" just want ATVs out of public lands, the frame marginalizes any critique about problems with ATV use. In interactional reframing scenarios, much time is spent identifying disputants' perspectives, hidden agendas, and contentious arenas (Lewicki et al., 2003). Guiding resolution efforts by delineating areas of disagreement and making obvious latent agendas—manifested as contradictions—is evidence of Q methodology's strength in reframing intractable environmental problems. This is an area where mediators could work with the pro-ATV disputants to further understand why they frame ecological and social impacts as insignificant.

5. Conclusion

Environmental problems are becoming increasingly contentious and managers are in search of tools to help them better understand and manage these problems. Sometimes environmental problems are intractable because we focus more on solving the problem than on carefully identifying and defining the problem. At other times, efforts to reframe problems are confusing and problematic because the approaches used are either only cognitive or only interactional. Both of these approaches have some disadvantages such as the potential biases of excluding other disputants' views, confusion, frustration, and strategic framing and issue manipulation (Benford and Snow, 2000; Dewulf et al., 2009). These disadvantages are

undesirable especially when the purpose of reframing is diagnostic. We used Q methodology in a way that combines both cognitive and interactional approaches to diagnostically shape, focus, and organize the problem with ATV use in Minnesota state forest lands. Disputants cognitively reframed the problem while deliberating with other disputants' perspectives without necessitating the physical presence of those disputants. As a result, Q methodology is also interactional as disputants gave full consideration and reacted to other disputants' frames. This approach minimizes the biases of non-inclusion of other views, and minimizes problems with confusion, frustration, and strategic framing and issue manipulation that typify face-to-face negotiations about contentious environmental issues. The results outlined areas and levels of consensus and disagreement as well as the level of frame clashes, and the relative flexibility of disputing parties, which provide structure and facilitate tractability to analysis (Brown, 1980; Stephenson, 1953). Such tractability is necessary for effective mediation and potential resolution of difficult environmental problems.

There was minimal intrusion from us as mediators; the statements came from, and thus belong to, disputants, and the frames emerged from them as authentic operational articulation of their subjective definition of the problem. Additionally, those statements were "equi-possible"—given the same weight and significance—until proven otherwise via collective reframing (Brown, 1993). Enabling disputants to select, define, and prioritize a-priori "equi-possible" issues is particularly important as current public involvement in natural resources management demands that everyone's viewpoint, not only be heard but, be considered in decision making. Some stakeholders thought the exercise was time consuming, but interesting and stimulated their thinking. They felt the reframing process was introspective, enabling them to reflect on multiple ways of framing the problem. Most importantly, participating disputants confirmed our goal of enabling them to perceive the exercise as a negotiation with other disputants in absentia.

Ninety percent of problem solving is spent, among other things, solving the wrong problem (Interaction Associates, 1986). "Whether a problem is solved or not, and how long the solution will take, depends a great deal upon the initial representation" (Posner, 1973); that is, the initial problem identification. Yet, solution-mindedness—the tendency to focus more on solutions than on patiently and accurately identifying and defining the problem is prevalent in environmental conflicts and partially explains why they resist resolution (Bardwell, 1991). We illustrate an approach that pays thorough attention to properly diagnosing, by reframing, an intractable multiparty environmental problem.

The results of this study, as in all Q studies, are about the study participants, although emergent frames are highly unlikely to change with inclusion of more disputants (Brown, 1980). We made considerable efforts to ensure that those who participated in the study were well versed in, and had deep and prolonged involvement with, the issues, and were selected from "ATV hot-spots" across the state. Thus, although the findings cannot be extrapolated to the general public, they represent in-depth, well-informed, and methodologically replicable frames of the problem for this case study. It minimizes issues with representation given that as many stakeholders as possible can easily participate in the reframing process, unlike with interactional problem diagnosis processes. Additionally, the resultant frames can be used as a basis for a more elaborate interactive diagnostic reframing process. Mediators and disputants can more systematically identify how frames shift and what elements of those frames shift as a result of social interactive reframing processes. But, Q methodology has practical limitations. Because the method is unfamiliar to most disputants and mediators, understanding a Q sort may be difficult and time-consuming. The potential for inaccurate completion and high error rates exists if the method is not carefully explained. Additionally, disputants' sorts are restricted to the pre-determined frame statements, which could limit the views that can be expressed if researchers are not thorough in identifying the universe of frame statements and those subsequently selected for sorting.

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