

Risk Management in United States Forest Service
National Environmental Policy Act Planning Processes

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ABSTRACT

The United States Forest Service planning processes, which are driven in large part by the requirements of the National Environmental Policy Act (NEPA), are a part of all major (and some minor) land management decisions by the agency. The outcomes of these processes are the result of multiple factors, many related to the manifold smaller incremental decisions made by agency personnel directing the processes. Through qualitative review of 21 NEPA documents and 5 case study processes in which we interviewed decision makers, team leaders, and team members, this study examines those incremental decisions and the factors that drive them. Risk emerged as a dominant lens through which agency personnel weigh and make process-related decisions. We identify the different types of risk perceived by agency actors and the risk management strategies they employ. Our interviews suggest that different actors within the agency tend to assume responsibility for responding to different forms of risk associated with particular tasks. Most time and energy appears to be focused on minimizing process-related risks, especially those caused by external entities in the form of public opposition and threats of appeal/litigation, rather than resource-related threats. We discuss the potential implications of this focus and its associated strategies on organizational and social learning within agency planning processes, on adaptive ecosystem management, and internal agency relationships and morale.

Dedication

To my husband, my parents, my family in Oklahoma and Arkansas, and all my VT Chi Alpha family who laughed, cried, encouraged, and prayed with me over the past two years. Thanks for helping me stay sane and accomplish this endeavor.

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CHAPTER 1

Problem Statement

The National Environmental Policy Act (NEPA), established in 1970, mandates all federal agencies to conduct an environmental analysis to consider and fully disclose likely impacts prior to implementing major actions that may result in a significant impact on the environment (42 USC Sec. 4321-4347). Since its establishment, NEPA has provided the overarching procedures through which planning is executed and influences almost every major land management action on the 193 million acres under the United States Forest Service's (USFS) jurisdiction. NEPA planning has a set of process requirements that generally follows the steps of defining a purpose and need, formulating alternatives, scoping for public comment, analyzing the alternatives, and disclosing the process. These steps are typically followed by a decision for implementation of an action (Stern et al. 2010b). The process is intended to inform decision makers, agencies, and other public stakeholders of possible impacts from the action (Dreyfus and Ingram 1976, Caldwell 1998). In turn, it has also brought increased transparency in analyses done by the agency and increased public scrutiny on agency decision-making, contributing to possible challenges in NEPA processes (Ackerman 1990, Espeland 1994).

The process outlined by NEPA and associated increased external pressures have been the source of many managerial challenges for the agency. These challenges include assuring compliance with NEPA regulations, engaging a pluralistic public audience, conducting complex environmental analyses, apportioning limited staff resources to interdisciplinary teams, disclosing the process to multiple audiences, and handling increased litigation related to NEPA projects (Culhane 1990, Poisner 1996, Malmsheimer et al. 2004, Keele et al. 2006, Stern et al. 2009, Stern et al. 2010b). Researchers have linked these challenges to multiple problems in the agency. They include miscommunications between

decision makers and interdisciplinary team leaders, lower morale within the agency, delays and cost escalation in processes, and an increasingly defensive stance against appeals and litigations (Stern et al. 2010a, Mortimer et al. 2011, Stern and Predmore 2011, Stern and Predmore 2012). This has prompted the agency to initiate efforts to better understand and overcome these challenges by seeking out what influences are contributing to undesirable outcomes in the process (Stern and Predmore 2012).

While conducting a NEPA process, agency personnel make incremental decisions that direct the process (Lindholm 1959). These individuals and their decisions are subject to multiple competing influences (Ebrahim 2005, Christensen and Ebrahim 2006). Some of these include the supervising official, agency-wide mandates, directions from the Forest Plan, issues raised by the public, professional standards, and legal protections (Stern and Mortimer 2009). This research aims to better understand how these factors interact to create the course the NEPA process takes.

Our method of research consisted of a review of 21 NEPA documents and 15 case study interviews from five purposefully selected projects from the document review sample. We sought to inductively identify key factors that interact to influence the incremental decisions throughout the USFS NEPA process. As we examined the multiple processes, risk management emerged as a critical explanatory concept for many of the incremental decisions under study. This led to the development of emergent research questions concerning how risk is identified and managed.

Overarching Research Questions:

- What factors meaningfully influence incremental decisions throughout the NEPA process?
- How do these factors interact during the process?
 - Do certain factors gain influence over others in parts of the process? If so, how and why?

Emergent Risk-Related Research Questions:

- What types of risk are most commonly perceived by agency personnel in Forest Service NEPA processes?
- How are these forms of risk managed?

- When in the process are they managed?
- Who typically manages them?
- What are the implications of agency risk management strategies?

NEPA in the Forest Service

The USFS utilizes interdisciplinary teams, or ID teams, to conduct their NEPA planning. ID teams are typically made up of varying numbers of resource specialists and an interdisciplinary team leader (IDTL) (Cerveny et al. 2011). The resource specialists' work focuses upon analyzing the likely impacts of proposed actions upon resources within their discipline. They are referred to as team members (TM) in this report. IDTLs may function as both team leader and resource specialist. In either case, some of the basic tasks completed by the IDTL are to organize and facilitate the team, synthesize information, coordinate input from the public, and report to a deciding officer (Cerveny et al. 2011). The deciding officers, commonly a District Ranger or Forest Supervisor, have varying levels of engagement during the NEPA process and are tasked with being the final decision maker (DM) in the process by choosing what action to implement (Stern et al. 2010a). The resource specialists, IDTL, and DM make up the core group of USFS employees that conduct the NEPA process.

Risk Theory as it Relates to Forest Service NEPA Processes

Risk has been defined to include the probability of an undesirable event's occurring and significance of that occurrence (Pritchard 1999). As such, risk calculations involve both the probability of occurrence and the severity of the impact on desired outcomes (Pritchard 1999, Ben-David and Raz 2001, Kwan and Leung 2011). While desired outcomes may vary somewhat from case to case, prior research on Forest Service NEPA processes have identified the following outcomes as meaningful to the agency: the achievement of the purpose and need for the project and its alignment with agency mission, the process's impacts on public relations and team morale, the occurrence and outcomes of appeals and litigation, and the efficiency with which the process is completed. These outcomes can be affected by

multiple sources of risk throughout the process. While risks can threaten process outcomes, they can also serve to expose threats so that they can be minimized in the process.

Sources of Risk

Most of the literature on project risk comes from the fields of information technology and business. This literature identifies numerous categories of sources of risk to projects and their outcomes. We briefly summarize below some key concepts on risk sources that most apply to Forest Service NEPA processes.

Programmatic and Structural Risk

We use the term “programmatic risk” to identify risks that emerge as a result of the complexity and/or scale of the initial proposed action (Dey 2001). As the scale and complexity of projects increase, the challenges associated with project management may increase as well. Not only might required analyses and their integration and disclosure become more complex, but larger scale projects may also draw more scrutiny from various publics (Mortimer et al. 2011, Stern et al. 2010a). Programmatic risk is also directly related to “structural risk,” which involves the availability of time, staff, and resources necessary for successful project completion (Datta and Mukherjee 2001, Dey 2001, Hillson 2003). The balance of workloads and competing assignments has been known to present key challenges within Forest Service NEPA processes (Stern and Mortimer 2009, Stern and Predmore 2012).

Technical Risk

Technical risk emerges from challenges related directly to competence and performance. In particular, decisions regarding technology selection, methodology selection, and project design and revision can impact outcomes through enhancing or crippling performance and problems solving (Dey 2001, Pritchard 1999). Within the NEPA context, sources of technical risk refer most directly to selecting appropriate methods and designs for impact analyses and management interventions.

Procedural Risk

One specific form of technical risk is particularly relevant to NEPA processes. We call this risk source, “procedural risk.” Prior research has revealed a diversity of interpretations of procedural requirements within the Forest Service (Stern et al. 2010a, Predmore et al. 2011). Competence (or incompetence) to

effectively comply with required procedures can have meaningful impacts on multiple outcomes, in particular appeals and litigation and public relations.

Relationship Risk

A large part of navigating NEPA processes involves the building and maintenance of relationships between multiple entities. These entities include those external to the agency, including multiple public interest groups, private individuals, and/or other government agencies, as well as those internal to agency (Hillson 2003, O'Faircheallaigh 2010, Predmore et al. 2011). Stern and Predmore (2012), for example, recently uncovered internal collaboration on the ID team to be among the most powerful predictors of outcomes of concern to the agency.

Process-related vs. Resource-related Risk

These risk sources can be conceptualized in various ways when considered within the context of NEPA planning. MacGregor and Seesholtz (2008) organize risks in the context of NEPA into two broad categories: resource risk or process risk . Resource risks involve concerns about negative impacts to the natural resources managed by the agency. Process risks involve concerns that a project will be delayed or not completed based on one or more process-related elements, including, but not limited to, inadequate scientific analyses, non-compliance in procedure, or inadequate relationship management. A single risk source may have the potential to be both resource or process-related. However, as agency personnel make incremental decisions in the process, they determine at each step whether resource or process-related concerns take precedence in risk management. Different foci on either resource or process-related risks may lead to various implications that have ripple effects throughout the process (Podean 2010, Kwan and Leung 2011). We focus on the distinction between resource and process risks during different stages of the NEPA process to better understand the implications of these choices.

Risk Management

While there are multiple specific frameworks in the literature for risk management, all can be boiled down to three generalized steps: risk identification, analysis, and response (Raftery 1994, Pritchard 1999, Ward 1999, Borge 2001, Dey 2001, 2002, Project Management Institute 2004, Kutsch and Hall 2010, Reed and Knight 2010). Identification of risk is the first major step in project risk management. Identification of risk is dependent on detectability of the risk by the ID team and DM (Carbone and Tippett 2004). Once a risk source is identified, risk managers have the options of taking actions to minimize the probability of risk, to minimize the impact of risk, to accept the consequences, or to avoid acknowledging the risk altogether (Pritchard 1999, Kutsch and Hall 2005). This decision may be based, in part, on the degree of controllability of the risk. Controllability refers to the degree to which agency personnel can influence the probability of its occurrence (Fan et al. 2008). If a risk has high controllability, then preemptive risk management strategies can be taken to prevent or minimize the likelihood of risk event occurring. If there is low controllability, the risk manager may accept the consequences of the risk or possibly design strategies to reduce the severity of the damage of its occurrence. Risk managers can also ignore or deny risks. Kutsch and Hall (2005) found that officials might choose to ignore risks to preclude deficiencies in their likely responses from being exposed. Despite the apparent short-term gain, the authors suggest this denial could result not only in ineffective risk management, but also could negatively affect relationships with external stakeholders should the risk surface later in the process (Kutsch and Hall 2005).

The identification and response to a risk depends largely on the expertise and predispositions of the person(s) responsible for risk management in a project (Parker and Mobey 2004). The literature suggests that clear role definitions, which assign clear responsibilities for risk management, generally lead to better outcomes. In this way, risks can be assigned to individuals who are competent and

capable to manage them, and project managers can ultimately be held responsible to ensure activities are completed (Rutgers and Haley 1996, Pritchard 1999, Ward 1999). In the NEPA process context, there is typically not a specific risk manager position, but many times in the process, it may be necessary for the DM and various ID team members to identify and manage different risk sources. We thus examine not only how risk is identified and managed, but also who is managing risks at different points in NEPA processes.

It has been suggested that ineffective risk management can lead to costly delays in implementation; appeals and litigation; harm to public relations and agency credibility; decreased morale and self-efficacy of personnel; and undesirable impacts to the resource and future budgets (Stern et al. 2010a, Mortimer et al. 2011, Stern and Predmore 2011, Stern and Predmore 2012). These are outcomes that the agency would prefer to avoid. A better understanding of risk sources, their management, and their effects may thus have meaningful implications for the agency.

Through reviewing NEPA documents and conducting interviews with DMs, IDTLs, and TMs, this research examines what risk sources are identified by agency personnel in the NEPA process, who manages those risks at different points in the process, how those risks interact, and the perceived impacts of different forms of risk management. The study does not collect data from a statistically representative sample of NEPA processes. Rather, we examine a diverse set of projects to identify a reasonable range of risk sources and strategies and examine their implications for those processes. As such, we hope to develop a working knowledge to illuminate potentially useful risk management strategies and to provide a strong foundation for future research.

CHAPTER 2

Research Approach

This research takes a two-phased approach. The first phase involves a review of documents produced by NEPA planning processes in the USFS. The second phase involves case study interviews with team members (TMs), ID team leaders (IDTLs), and decision makers (DMs) on a subset of cases selected from the document review. The section begins with an overview of the research approach. It then describes case selection and each phase's specific research methods in greater detail.

Phase One: USFS NEPA Document Review

The immediate product of the NEPA process is a document that discloses and compares information about the predicted impacts of different alternative actions. The NEPA document, an Environmental Assessment (EA) or Environmental Impact Statement (EIS)¹, typically also discloses the process itself, describing each phase of the process and justifications for decisions along the way. Our document review was an inductive exercise that examined all observable justifications and decisions recorded in the NEPA documents. As our understanding of the contents of a NEPA document evolved, our questions and theories evolved as well. This led to refinement of our focus as we looked for justifications for decisions within the document. Through these justifications, we identified what we term “steering agents.” We define these as influences that guide or are used to justify the incremental decisions that are made in the NEPA process. Through extensive memoing, a list of steering agents was developed. Interviews were focused on examining these steering agents more thoroughly.

¹ Categorical Exclusions are categories of action that have been determined by an agency to typically not have significant individual or cumulative effects on the human environment. They are third possible final NEPA document. These were not included in this research.

Phase Two: Case Study Interviews

Because of limitations regarding how much a rhetorical document can actually represent reality, we felt it necessary to conduct case study interviews with a subsample of the processes associated with the document review. We set out to interview the decision maker, ID team leader, and one resource specialist on the ID team in five projects. One decision maker was retired and unavailable. A staff officer was interviewed on another project, because he was a liaison to the decision maker and fulfilled some of the roles typical of both the ID team leader and the DM. We conducted 15 interviews in total. Twelve interviews were conducted in-person; three took place over the phone. The interviews were used to specifically explore how decisions were made throughout each NEPA process and how different steering agents competed and affected those decisions. Before the interview, the researcher created question guides specific to every case study. These question guides used project-specific terminology and examples, but each interview covered similar topics. The questions explored possible steering agents in the NEPA process by asking questions about what influences and accountabilities were felt by the respondent in each stage of the NEPA process, how those influences competed, what decisions were made, and who made them. During the interviews and their analyses, risks emerged as a dominate focus in the NEPA processes, which led to additional literature review and further coding and analysis of the interviews and documents through this lens.

Case Selection

Document selection

Our aim in selecting cases for each phase of the research was not to develop a representative sample of all NEPA processes in the USFS. Rather, we aimed to observe a wide range of possible influences and perceived accountabilities (steering agents) within each selected process. We selected cases for the document review based upon responses of ID team leaders of a representative sample of

USFS NEPA processes to a survey conducted in spring 2010 (Stern and Predmore 2011). We aimed to select documents with strong potential to reflect a wide array of influences and possibly competing accountabilities. To do so, we first limited the sample of 489 responses to projects in which the ID team leader reported at least a moderate degree of public controversy, assuming that greater public interest in a project may indicate a greater array of pressures on the ID team throughout the NEPA process. Prior research has confirmed that projects with limited public interest are inherently different than others (Stern and Predmore 2012). This limited the sample frame to 397 processes.

We further limited the sample by selecting specific project types for the study. We eliminated from the sample special use permits and infrastructure projects, because our prior research suggests that these projects are typically of a limited scope and contain fewer alternatives. As such, they provide lesser chance of observing the key phenomena of interest (multiple influences affecting the process). This left 263 projects within the sampling frame. We then selected the six most common project types for the study to best represent the most common types of projects within the USFS. The remaining projects ($n = 225$) are summarized in Table 1.

Table 1. Sample Frame by Project Type

Project Type	Project Type Abbreviation	Number of Projects in Project Type
Fuels Reduction	Fuels	36
Grazing Allotments	Grazing	33
Integrated Uses with a Forest Product	Int-timber	76
Recreation	Rec	34
Timber Management	TM	22
Vegetation Management	VM	24
Total:		225

We specifically selected documents for review within this sampling frame based on four criteria: the document type (EA vs. EIS), ID team leaders' reported opinions of the amount of uncertainty

associated with the project, their opinions of the quality of the science conducted throughout the project, and whether the preferred alternative became apparent early or late in the process (Table 2).

Table 2. Characteristics of Documents Reviewed.

	Early Preferred Alternative Before Scoping		Late Preferred Alternative After Scoping		Proportion of EIS documents
	EA	EIS**	EA	EIS	
Best Science and Uncertain	2	0	1	2	2/5
Best Science and Not Uncertain	2	0	1	2	2/5
Not Best Science and Uncertain	2	1	2	1	2/6
Not Best Science and Not Uncertain	1	1	2	1	2/5
Totals:	7	2	6	6	

** There were only two EIS in the Early Preferred Alternative group in the entire sampling frame.

We aimed to vary document types to observe differences between two pathways of the NEPA process. EAs are done to determine if an action is likely to cause significant impact. If significant impacts are anticipated, the agency must write an EIS. If no significant impact is found in the EA, a “Finding of No Significant Impact” (FONSI) is written. As such, one might expect the need for greater justifications for decisions in an EA that show no significant impact is likely, avoiding the need for an EIS. On the other hand, EISs tend to be completed for projects of larger scope and greater complexity, indicating that the opposite might be a plausible explanation as well (Mortimer et al. 2011).

Uncertainty and the quality of science were each deemed important due to the emphasis in NEPA guidelines on the use of high quality information (40 CFR §1500.1 (b)) and the elevated status of science within rational planning and the USFS in general (Predmore et al. 2008). We wanted specifically to understand how different influences could affect the use of science. Science is used in NEPA processes to limit the uncertainty associated with the likely effects of proposed actions. As such, we

aimed to observe how different influences play into processes in which the practice of the science involved may be more or less challenging and/or centrally relevant to decision-making. We thus sought to maximize variability in each of these factors.

IDTLs were asked in the survey to characterize the degree of uncertainty of the likely effects of the proposed action at the outset of the process. They rated this on a three-point scale ranging from low to high. Most of the responses were low. Those that received a low rating were put in the “not uncertain” category; those that received a moderate to high uncertainty rating were put in the “uncertain” project category. We aimed to select projects within each category.

IDTLs were asked if the process employed best available biophysical and social science (each form of science separately) on a five point scale (strongly disagree to strongly agree). These ratings were highly correlated ($r = 0.486$, $p < 0.001$), so an index was created by averaging them together. Those with a score of 4 or higher were grouped into the Best Science Category (the mean score was 3.9). Otherwise, they were placed in the Not Best Science Category. We aimed to select cases in each category.

We also believed the timing of the recognition of the preferred alternative would influence the nature of different influences on the process. Prior research suggests that the outcomes of USFS planning processes may often be pre-determined (Stern and Predmore 2011), narrowing the range of potential influences in a process. We aimed to examine a range of projects in which decisions were made at varying points. IDTLs were asked on the survey when the preferred alternative for the proposed action became apparent. We categorized projects into those in which the preferred alternative became clear prior to the scoping phase and those in which the preferred alternative was determined during or after scoping. The scoping phase is where comments on the proposed action are solicited from the public and issues are identified. If the preferred alternative was apparent before scoping, this could diminish subsequent influences. We aimed to include cases within each category.

Case Study Selection

The document review allowed the researchers to identify certain influences, or steering agents, revealed in each NEPA document. This emphasis helped to frame criteria for selection for follow-up case study interviews. The documents also supported our general impression that documents within the category “the preferred alternative became clear prior to scoping” contained less variety in observable influences. We thus removed these from case study selection, leaving twelve potential projects for selection for further interviews.

Within the remaining twelve projects, we selected cases based on two criteria. First, we selected the two processes that were retrospectively evaluated by the team leaders in the survey with the best outcomes and the worst outcomes. We speculated that this could provide insight on different influences and the consequences of their presence. We used two survey items to do so. The survey asked respondents the extent to which they agreed with the following statement, “The process achieved an excellent outcome,” on a five-point scale. One project received a score of two on this scale (the worst outcome). Because two projects were scored as a five on this scale, we also considered the respondents’ level of agreement to a survey item about the comparative efficiency of the process. Only one process was scored as a five on both the first survey item and this one “Compared to other NEPA processes I have been involved in, this process was more efficient.” We selected this process as the one representing the best perceived outcomes. Second, we wanted to select projects that seemingly stressed certain steering agents based on observations from the document review. Three processes in particular distinctly reflected three different emphases in the document review. These included reliance on the Forest Plan, emphasis on science, and emphasis on stakeholder input. Through examining these five NEPA processes (Table 3), we hoped to be able to explore a wide range of influences entering and affecting each process. The case study sample reflects four different project types (Recreation, Fuels

Reduction, Timber Management, and Timber Management with Integrated Uses, which has multiple resource focuses within timber management) and a balance of document types (2 EAs and 3 EISs).

Table 3. Selected Projects for Case Study Interviews

***The names of the projects have been altered to reflect the actions entailed in the project.*

Project Name**	EIS or EA	Reason Included in Case Study	Description	Excellent Outcome Score from Survey	Project Perceived as Being More Efficient	High or Low Best Science	High or Low Uncertainty
Mountain Pine Beetle Salvage	EA	<i>Best Perceived Outcomes:</i> This process had the most positive outcomes and efficiency scores according to the perception of the IDTL.	This project occurred after the discovery of mountain pine beetle outbreak. It proposed salvage treatment on approximately 1,300 acres to capture economic value of dead and dying trees. Public comment was used to create issues and additional alternatives. The methods, data origins, and assumptions for analysis are clearly stated for every resource studied, and the document repeatedly expresses compliance with the Forest Plan and other legislation.	5	5	High	Low
Vegetation	EA	<i>Worst Perceived Outcomes:</i>	This process proposed around 1,600 acres of				

Management		This process was perceived to have had the worst outcomes from the survey.	hazardous fuel reduction treatments to decrease the possibility of high severity fire in the project area. Written as a concise EA, it barely mentions the Forest Plan. All supporting literatures and justifications for analysis are cited to the resource specialist reports, and though scoping was conducted, the use of public input is not specified in the document.	2	2	Low	High
National Forest Motorized Travel	EIS	<i>Forest Plan Emphasis:</i> Compliance with the Forest Plan is highly emphasized. Verbatim goals from the Forest Plan are included in the text.	This project fulfilled the requirements of the Travel Management Rule by designating a Forest-wide sustainable system of roads, motorized trails, and areas open for public motor vehicle use.	4	4	High	Low
Forest	EIS	<i>Stakeholder Input Emphasis:</i>	The project area resides on a municipal watershed. It				

Resiliency Plan		This process had a high degree of public comment. It also had a community proposed alternative, which was selected over other alternatives.	proposed over 7,000 acres of various vegetation treatments to reduce hazardous fuels and promote forest resiliency, including protecting old growth forests and a domestic water supply.	5	4	High	High
Fire Recovery	EIS	<i>Science Emphasis:</i> All the processes use science, but some documents were far more expressive of that use. In this document, science was not only used to explain the analysis, but it is also used to respond to public comment and to support the desired conditions in the Forest Plan.	This project occurred after an approximately 39,000 acre fire that occurred outside the designated wildland fire use area of the Forest. It proposed treatments to recover economic value, reestablished burned conifer stands, and reduce fuel continuity on approximately 9,000 acres.	3	2	Low	High

Methods: Document Review

In the document review, the lead researcher carefully read each of the documents looking for apparent influences on the NEPA processes and justifications for decisions. A research assistant also read a subset of these documents. Determining what references indicated an “influence” was an iterative process, in which more forms of influences emerged as we conducted our inductive search of the documents. We came to broadly define an influence in three ways: (1) as an agent that seemingly affected an incremental decision made in the NEPA process, (2) as an agent that appeared to be utilized as a tool of justification for an incremental decision, or (3) as an agent that served as a possible indicator of a latent accountability felt by an actor in the process. Some of the typical examples found in the document review were references to the Forest Plan Standards or scientific literature. Others were references to public stakeholders and other government agencies. We term these influences “steering agents,” because they appeared to steer the incremental decisions of the NEPA process.

The methods of recording observations were refined in the early stages of the document review. The researchers settled on a system of note taking and memoing similar to field notes, which is an accepted mode of qualitative data research (Eisenhardt 1989, Babbie 2010). References that fit our definition of “influences” were either summarized or cut and pasted verbatim into a word document. The researcher would also include notes about what particular steering agent the reference reflected. Throughout the memoing process, the researcher recorded and summarized thoughts and interpretations that arose in the process. In particular, memos focused on topics such as emerging influences, when influences seemed to be prominent in the document, if influences seemed to be competing, and when influences clearly affected decisions. Once a system of memoing was established, a second researcher was brought in to read the documents along with the primary researcher. This was an exercise to see what influences the primary researcher may have missed and to provide a second

opinion on possible influences and their effects. The second researcher read nine of the documents, while the primary researcher read all twenty-one documents.

While the repeated emergence of certain influences across multiple documents suggests their potential importance, examining only the documents has its limitations. Prior research suggests other factors influence NEPA processes that were not frequently discussed in the documents (Stern et al. 2010a, Stern and Predmore 2012). There are also limitations in speculating on the prominence of a particular influence from the documents. The presence of certain influences may seem to be frequently apparent in parts of the documents; however, the extensiveness of their influence is impossible to determine with any certainty. The document could have been written by personnel to express that certain influences were present and important when in actuality they played a minor role or vice versa. Recognizing these limitations, we pursued interviews in the second phase of the research.

Methods: Case Study Interviews

An email was sent to the decision makers and ID team leaders on selected cases to request their participation in an interview about the specific case study NEPA process. All agreed to participate except for one retired decision maker, who was inaccessible by email. A second email was sent to the ID team leaders to request the name of one team member that they felt played an essential role in the particular NEPA process. The team members were also sent an email soliciting their participation in an interview regarding the process. All agreed to participate.

Interview guides were designed specifically for each case study, instead of using the same questions for every interview. The researcher created a general question outline, which followed the general stages of NEPA outlined in a typical NEPA document and centered on influences and accountabilities that the decision maker, ID team leader, and resource specialist perceived affected their

decisions in the NEPA process. Some basic examples of questions include: how were decisions made in different NEPA stages, who made the decisions, and who or what influenced the decisions? The general question outline was tailored for each case by incorporating specific terminology and examples from the case study.

Questions typically were not read verbatim. Instead, the interviews were more of a conversation guided by the interviewer's probes. While the interviews focused primarily on the process under review, the interviewees were invited to talk about other NEPA processes if they were applicable to answering the question. Twelve interviews took place in-person, and three took place over the phone. After the first person on a project was interviewed, the researcher would take the opportunity when possible to refine the question guide for the subsequent interviews on that project to better follow up on topics relevant to the research. This adjustment in the field gave the researcher the flexibility to explore topics as they emerged in the interviews and to probe these topics more deeply.

All the interviews were audio recorded with the interviewee's consent. After the interviews, the audio recording was transcribed verbatim. Nine of the interviews were transcribed by the primary researcher. The rest were done by a hired transcriptionist. The transcriptions were uploaded into Nvivo, a qualitative data analysis program, in which text can be coded by the researcher based on common topics. The researcher read the fifteen interviews multiple times, iteratively coding for potential answers to the key research questions posed above. Through this analysis, the concepts of risk and risk management emerged as primary determinants of decision-making in all interviews. This spurred a re-examination of both the interview transcripts and the documents. It also spurred an examination of the literature associated with project risk to compare and contrast key themes in the data with those present in other theory and research (as described by Eisenhardt 1989).

CHAPTER 3

Section I: Steering Agents and Decision Components of NEPA

We used both the document review and case study interviews to identify what we refer to as “steering agents” of the NEPA process. These influences were termed as steering agents because they guide, affect, or are used to justify the incremental decisions that were made in the NEPA process. In effect, they appeared to help steer the decisions and directions of the NEPA process. We first created a list of steering agents that were repeatedly observed in the documents we reviewed (Table 4).

Table 4. Steering Agents Observed in Document Review

Steering agents	Description and Examples
Resource Specialist	<p>Multiple USFS employees with various backgrounds of training in planning and the sciences come together as an interdisciplinary team to conduct the NEPA process for a project. These people are the specialists charged with creating the project design and then analyzing its impacts. Some examples are: archeologist, botanist, civil engineer, hydrologist, forester, wildlife biologist, etc. Typically, the resource specialists form the content of the project’s design and document. We also identify instances of specialists’ professional opinion or past experience as steering agents in a number of projects.</p> <p>For example, in a sample document: “Professional judgment was used to evaluate changes in the amount and composition of coarse woody debris and surface organic matter. These analyses also considered the effectiveness and probable success of implementing the soil mitigation and resource protection measures which are designed to avoid, minimize or reduce potentially adverse impacts to soil productivity.”</p>
Forest Plan	<p>The Forest Plan is programmatic and contains the overall goals and standards that guide land and resource management for a particular Forest. It specifically designates forest-wide goals, objectives, standards, and guidelines. It also directs the management of certain areas by determining suitability. The Forest Plan can also specify desired future conditions for a management area or resource. Forest Plans were frequently cited to justify decisions in case NEPA documents.</p>

Agency Standards	Agency standards are designed to lessen negative impacts on resources by establishing limits on possible actions. They typically come from the Forest Service Handbook (FSH), the Forest Service Manual (FSM), and regionally accepted standards in the USFS. Outside sources such as the state water quality standards can also be adopted as agency standards.
Other Regulations	Certain policies and laws provide compliance requirements and thus also serve as steering agents within a NEPA process. These acts include: Endangered Species Act, Clean Air Act, Clean Water Act, and National Historic Preservation Act, etc.
Other Governments and Government Agencies	As part of the NEPA process, the USFS is directed to coordinate its planning with other governments and government agencies. Some examples are: the Local and State Levels of Governments, Tribal Governments, United States Fish and Wildlife Service, State Wildlife Agencies, national and state historic registers, and other federal land agencies. Concerns of these agents were expressed in multiple documents.
The Public	Public feedback is incorporated into NEPA documentation in multiple ways and to multiple degrees, ranging from merely mentioning that public input was considered to a detailed explanation of how public input influenced decision-making. Public input is used to formulate the issues in projects, which are used to adjust or create the mitigations, alternatives, and analysis that are in the documents.
Science	The sources and uses of science are highly variable. In many cases, scientific information is used to establish acceptable thresholds for resource impacts. In other cases, science provides background information or forms the basis for the planning team to extrapolate the likely impacts of alternatives. The amount of scientific information varies considerably from project to project.

The format of a NEPA document normally parallels the general steps of the NEPA process and can indicate the timing of when different steering agents influence the process. The sections of the document are summarized in Table 5. Through the document review, we took note of when different steering agents appeared to enter the process and what decisions or project activities they appeared to influence.

Table 5. Typical Parts and Contents of NEPA Final Document

Typical Parts of the Document	Typical Contents
Introduction and Background Information	Background on the project area including historical or current problems in management
Purpose and Need	The purpose for the action, which typically answers a need placed on the agency
The Proposed Action	The explanation of the initial proposed action identified to address the purpose and need
Management Direction/Decision Framework	The legislation and agency direction that supports the need for an action and the process that will be taken to make a decision
Scoping/Public Involvement	Outlines the steps taken to elicit public involvement and comments
Issues	The formulation of statements that describe elements that are important to consider with regard to the proposed action
Alternatives Considered	The development of a full range of alternatives that address the purpose and need as well as the issues raised
Comparison of Alternatives	A comparison of how well the different alternatives address the purpose and need and issues
Environmental Analysis of the Alternatives	The disclosure of likely impacts that the alternatives could have on specific resources

Certain steering agents most commonly appeared in specific sections of the documents. We created a simple outline of where these influences entered the documents based on references in the text and the expression of events captured by the documents we reviewed. The document review provided a plausible list of steering agents and a glimpse of how these steering agents could possibly enter and adjust the process (See Table 6).

Table 6. Overt Observations of Steering Agents in Reviewed NEPA Documents

Typical Parts of the Document	Typical Steering Agents						
	Resource Specialist	Forest Plans	Agency Standards	Other Legislation	Other Governments and Agencies	The Public	Science
Introduction and Background Information	X						X
Purpose and Need	X	X	X	X			
The Proposed Action	X	X	X	X			X
Management Direction/Decision Framework		X	X	X	X		
Scoping/Public Involvement			X	X	X	X	
Issues	X	X	X	X	X	X	X
Alternatives Considered	X	X	X	X	X	X	X
Comparison of Alternatives	X	X	X	X			
Environmental Analysis of the Alternatives	X	X	X	X	X	X	X

Examining only documents, however, has its limitations. Though the presence of certain influences may seem to be frequently apparent in parts of the documents, the extensiveness of their influence and the timing of their entrance cannot be determined with certainty. Other steering agents emerged in the literature review and interviews that were not widely discussed in the documents. The researchers regrouped the steering agents into four over-arching categories based on case study interviews (See Table 7). Each of these can interact with one another.

Table 7. Regrouped Steering Agents

Steering Agent Categories	Description	Examples
Implementers and Decision Makers (DMs)	They are the core USFS employees that conduct and steer the recommendations and activities of the NEPA process. There may be exceptions to this, but, generally, they bear the responsibility of decision-making throughout the process.	IDTLs, TMs, and DMs.
Advisory Personnel	People internal to the agency give input that may contribute to directing the process, but their access to NEPA decision is controlled by the implementers and DMs.	Internal: NEPA coordinators, the Regional Officials (other upper USFS management)
External Entities	The input of this group may support or oppose certain projects or actions. These comments affect the decisions that are made in the NEPA process based on how implementers and DMs respond to the public.	External : public entities, interest groups, other government agencies, and other levels of government
Standards and Science	Generally, standards and science can be used by other steering agents to establish a baseline of compliance to meet or to defend/justify decisions.	Forest Plan, agency standards, USFS handbooks, other legislation or state regulations, scientific literature, scientific monitoring, etc.

The document review helped to establish the context in which NEPA decisions are made, as well as the nature of some of those decisions and some of their drivers. We first and foremost used the document review to identify these drivers and apparent decision-making points in the process and to provide sufficient understanding for pursuing more in-depth interviews. While each of the steering agents influenced these decisions, implementers and DMs held the primary control over incremental decisions throughout the processes. As such, they were the focus of interviews and provide the

viewpoints through which we examine incremental decisions within NEPA processes. We re-visited the documents to more thoroughly examine disclosure after connections were formed in the interviews. We discuss these connections further in the Disclosure section of the results.

Incremental Decisions

The NEPA process can be considered the result of many incremental decisions that direct the way planning and project activities proceed, leading to the final decision that determines the alternative to implement. In our sample, the locus of control to make incremental decisions fluctuated between the implementers and DMs. While the DMs made the final decision, they did not have the time to be part of every detail of a project. They were engaged and directed the processes if and when they deemed it necessary, but they largely depended on the competence and labor of the ID team to accomplish the tasks of the NEPA process. A DM explained it this way.

Well a lot of that work (the details of the project) gets done in the interdisciplinary team. I wouldn't want you to think that I as the decision maker am involved in all those details. That's not a reality. Not even a District Ranger would necessarily be involved in those things. We depend on our professional resource specialists to figure out what needs to be addressed and what the options are. What would they recommend on how to do it? And a lot of those details kind of just get pulled together and come forward. Then there are lots of arguments and discussions around who's really making the decisions. I sign a decision at the bottom of the big long environmental impact statement, but hundreds of decisions really get addressed as the ID team talks about how they want to go forward with this or that.

DMs in the study would check-in with the ID team at similar points in the process. This DM described why and how he checks-in.

The approach that I take is that... nobody really needs or is looking for a boss. Nobody needs or is looking for somebody to be constantly looking over their shoulder. I hired you because you're the best person at your job, so I need to let you do your job. With that said, occasionally I need to check-

in just to make sure how's it going.... And so typically what I do is at the beginning we check-in... in terms of defining the proposed action and purpose and need... And then at the end of scoping as the ID team comes back and says, ok we scoped. Here's what we think we heard, hence, here are the environmental issues that we think we're going to go forward with. So then at the end scoping and the formulation of the environmental issues that's another milepost if you will, a check-in point. And then alternatives, these are the alternatives that the ID team is proposing that will respond to those issues. That's another check point. And then periodically as they're conducting the environmental analysis looking at the environmental consequences of each of those alternatives, just checking in and then of course at the end, when we're ready to start crafting the draft environmental impact statement or the environmental assessment or the decision...

Check-in points with the DM, in which teams were given the go ahead and/or places to modify the process, were referenced in each of the five case studies. Typical check-in points occurred during the following stages: purpose and need, formulation of issues, formulation of project design features, formulations of alternatives, intermittently in analysis, and the final decision.

The ID team made decisions between these check-in points, which served as access points for the DM to ask questions, give suggestions, and draw attention to any places in which he or she was concerned that a source of risk may be surfacing. For example, to compensate for a risk, a DM may have asked for the development of a specific alternative addressing a public concern, more conservative mitigations, more scientific references, or more disclosure of analyses for certain resources. These are examples of explicit or implicit risk management strategies that are discussed in greater detail in Section II.

Decision Components of the Process

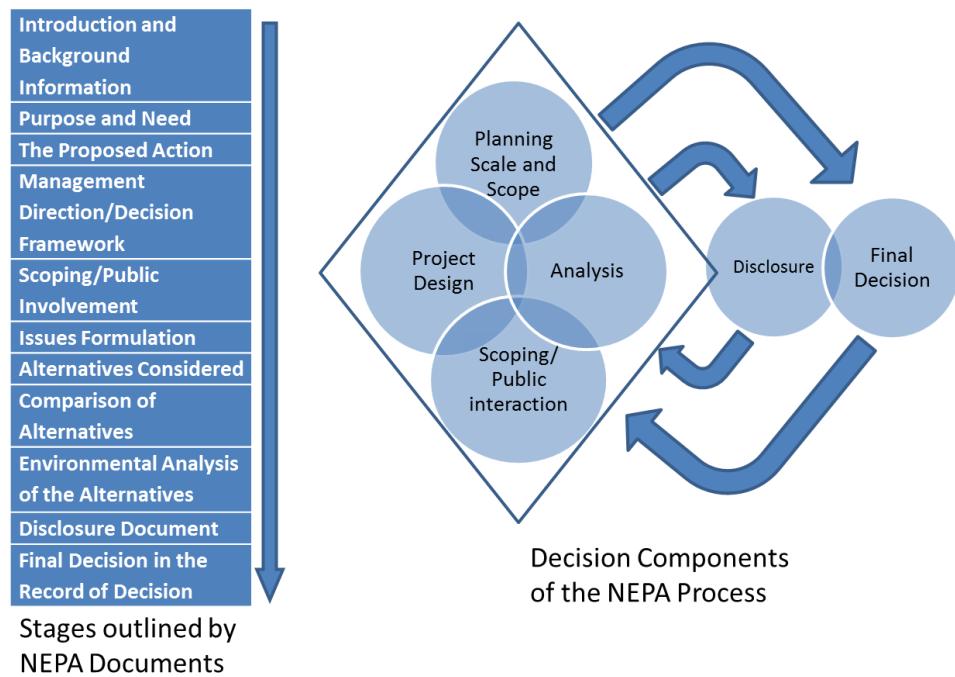
The stages of the NEPA process are not always executed in a clear linear fashion from one stage to the next. Stages may overlap or be iterative as incremental decisions are reassessed and sometimes changed. Instead of using the term "stage" to define when activities or decisions occur in the process,

we refer to project activities within stages. We combine these project activities into broad component categories that encompass similar actions and their corresponding decisions. These components include:

- *Project scope and scale decisions*: scale, location, purpose and need, objectives of project, allocation of resources to the team
- *Project design decisions*: proposed action treatments, alternative treatment methods, mitigations/design criteria
- *Scoping/public interaction decisions*: what public entities to involve more or less, the methods or levels of involvement, relationship-building with public
- *Analysis decisions*: resources to analyze, level of detail in analyses, analytical methods
- *Disclosure decisions*: what information to disclose, level of detail in disclosure, formatting of document
- *Final decision*: last modifications to chosen action, negotiations with external groups, writing the decision document

Figure 1 shows the typical stages as reported in the NEPA document and the relationships of the decision components that emerged in the interviews. Planning Scale, Project Design, Analysis, and Scoping/Interaction all interrelate closely. The decision components within the diamond affect changes in disclosure. Once these first five components are complete or are reaching completion, the final decision project activities can typically begin. These activities may or may not cause changes to the first five components.

Figure 1. Stages Outlined in NEPA Documents and Interrelation of Components of NEPA



The interactions of steering agents, decision components of the process, and fluctuation of decision-making responsibility among the implementers and DMs paint the backdrop of the incremental decisions of the NEPA process. In exploring these interactions, the presence of risks and explicit risk management decisions during processes surfaced in every interview. This next section explores these explicit decisions. The roles of different steering agents are examined through specific examples. Emphases in interviews were commonly placed on implementers, DMs, TMs, interest groups, USFS regional oversight, and procedural compliance with NEPA standards.

Section II: Risk Management in USFS NEPA

In this section, we discuss reported risk sources and risk management decisions made by interviewed personnel. We will first give an overview to highlight key aspects of reported risk sources, threats and outcomes associated with those risks, and risk management decisions utilized to diminish risks or their effects.

Risk sources emerged from various entities and situations in the NEPA process. We group observed risks as being programmatic, structural, technical, procedural, or relationship-based (within the planning team or with external entities). We examine if risk sources are more resource-related or process-related and examine decisions about balancing the two. Prior research suggests that an over-emphasis on process-related risk may dilute focus on resource-related risk (Stern et al. 2010a, MacGregor and Seesholtz 2008).

Unwanted outcomes associated with different risk sources may include project delays, poor public relations outcomes, lowered team morale, and resource management perceived to be sub-optimal by agency personnel. In some cases, projects may fail entirely to reach implementation (Stern et al. 2010a, 2010b, Mortimer et al. 2011). These outcomes may emerge through immediate threats caused by certain risks, such as poor internal or external communications, inadequate analyses, or failed procedural compliance. Each of these threats may have ripple effects on each other and cause meaningful consequences for project outcomes. These risk sources and immediate threats can impact the outcome of the proposed action by determining if the project is implemented or appealed/litigated. They can also influence the project's broader ecological impacts, affecting the project's environmental and social outcomes. Interviewees expressed desires to avoid outcomes that harm the natural resources under their care or harm relationships with advisory personnel or external entities. Risk-driven threats

may also affect the larger organization with regards to process costs, staff morale, credibility, public relations, and the ability to pursue the agency's mission in future projects.

Moreover, threats that are either more process or resource-related risks can focus organizational learning in the agency differently. For example, if process risk is emphasized over resource risk, the agency may expend less energy learning about better resource management and focus more on learning how to complete the NEPA process with fewer problems and hindrances. In some parts of the NEPA process, this can be beneficial for completing the process and managing the resource, but it also can involve trade-offs. In this way, risk management decisions to diminish risk can have meaningful effects on both the organization as a whole and the 193 million acres under its supervision.

Many risk management strategies were observed in the cases. For risk management to begin, risk sources must first be detectable by the implementers and DMs. In other words, a person or group must be responsible for identifying the risk source. The person or group, then, determines if the risk is controllable and if it is desirable to control the risk. If it is desirable and controllable, a decision is made to respond to the risk, decreasing the risk's likelihood or severity of impact. Some of the responses used in the sample processes include: choices about scope and scale of the project; choices about what alternatives or mitigations to include; strategies for responding to public comment; more analyses to support the agency's choice; more or less disclosure of different elements of the process; and different actors taking responsibility for different risks. We discuss which actors used these different risk management approaches in the cases under study by looking at incremental decisions made in each decision component of NEPA.

The rest of this section examines NEPA risk sources and the risk management decisions made to reduce their perceived threat within the different decision components of the NEPA cases. We start

each component with a Component Table that describes the observed project activities or decisions within the component, the risk sources, and the individuals who employed risk management strategies. We then follow the table with examples within that component. Each section ends with a summary highlighting if the focus seemed to be predominately resource or process-related.

Table 8. Planning Scale and Scope Component Table

Project Activities		Determining Scale, Scope, and Location	Determining Purpose and Need
Risk Sources		<ul style="list-style-type: none"> • Programmatic/Structural • External Relationship • Technical • Procedural 	<ul style="list-style-type: none"> • Programmatic/Structural • External Relationship • Technical • Procedural • Internal Relationship
Risk Management Actions initiated by:	DM:	The DMs adjusted the scale, scope, or resource allocations of a project based on prior experience with the public or the perceived complications a larger scale, location, or more complex project was anticipated to bring. These efforts aimed to minimize potential programmatic and structural risks. They were also thought to contribute to decreasing potential procedural, technical, and external relationship risks later in the process.	<p>The DMs adjusted the purpose and need based on prior external relationships or the need to ensure technical and procedural compliance.</p> <p>When creating the purpose and need, the DMs decided how to balance competing risks, namely external relationship process risks and technical resource risk.</p> <p>DMs may be advised by the Regional Office or NEPA coordinators, but they ultimately choose whether to follow that advice concerning the purpose and need.</p>
	IDTL:	IDTLs were not influential in this activity.	IDTLs were sometimes involved in writing or adjusting the purpose and need based on the public relationships or technical/procedural competence they possess.
	TM:	TM	Ms were not involved in this component's activities or decisions.

Planning Scale and Scope

Table 8 describes how risk management decisions were divided in our sample. In general, the DMs had authority over decisions concerning the scale, location, and scope. However, the DM would sometimes share responsibility with the IDTL when writing the purpose and need of a project. These decisions were typically made early in the process and changed the parameters that would direct and constrain the overall project. One IDTL explained,

So, the decision maker's role is to: one, provide overall direction to the project, two, to set the boundaries on the decision space that each person is willing to consider.

Early in the process, the project boundaries were set, and the decision space, containing the options that the DM was willing or able to choose from, was established. These decisions were some of the initial places in the NEPA process (and perhaps even before the NEPA process had begun) in which risks were detected and risk management strategies employed. For the most part, these risk assessments were based on previous experience with NEPA projects in the area. Their detection could be the responsibility of multiple people, such as the DMs, their staff, the upper management within the agency, or IDTL. However, the predominant actor in our cases was the DM.

Scope, Scale, and Location

Early in the process, risk management decisions about scope, scale, and locations related to efforts to avoid and minimize technical and external relational risks that could emerge later in the process. Interviewees explained how some areas in National Forests are considered more highly valued due to legal protection, public concern, or important services provided by the area. Some examples given were municipal watersheds, old growth reserves, critical habitat for endangered species, and Roadless Areas. The involvement of one of these highly valued areas within the scope of a project could heighten the degree of risk sources and complexity. In one project, interviewees discussed how they

dropped a potential Inventoried Roadless Area² from being within the scope of a project. The IDTL discussed how this lowered both technical and process risks by decreasing the likelihood of project complexity and appeals.

[W]e knew that some of the things we were going to have to talk about... If we would have gone ahead with those timber harvest operations down in that Roadless Area, this probably would have been a very different document. [We] probably would have spent a lot more time talking about old growth effects, and we probably would have spent a lot more time talking about roading impacts and spruce fir regeneration... [W]e probably could have seriously thought about facing an appeal or lawsuit from the environmental groups by putting timber harvests in their Roadless Areas.

The DM and ID team members believed that if they had included the potential Roadless Area in the process, it would have required more analysis, disclosure, and public interaction with certain environmental groups. This decision avoided placing treatments in a controversial area and was thought to avoid the threat of public opposition that could have led to appeal or at least delay in the process.

This dropped area had been treated years before and according to the agency foresters in the district was in need of treatment again. Since past treatment, court decisions and inventory practices had changed the Roadless designation multiple times. The DM explained that the supervising Regional Forester's permission would be needed to apply treatment in the area. The decision was made to avoid the extra procedural requirements and the probable public opposition to help ensure that a portion of the initial project would be implemented. Multiple process risks appeared to have influenced the decision instead of the resource treatment needs perceived by the agency personnel.

² In the Forest Plan, this area is designated Potential Roadless Area. It has some Roadless characteristics, yet they were going to allow active timber management in the area. During the process, a court decision changed it so that the area was designated as actual Roadless Area.

Another source of programmatic risk expressed in interviews was location. The resiliency project occurred close to a population center with public entities that were typically interested in USFS actions. It was generally described that the location and scope of this project necessitated more public involvement and more intensive detailed analysis and disclosure in the process. This extra involvement and detail delayed the project due to allowances for the community to produce their own alternative and increased cost through more in-depth analyses. This approach was also perceived to make the process and document more informative for the public and to engender public support. If the agency had not taken these extra measures to decrease these process risks, it was thought that there would have been more public opposition and a higher chance for appeals and litigation. As it was, the project did receive an appeal, but the appellant was not asking for an injunction. The interviewees expressed general confidence that their analyses would be defendable in court.

The contrasting example is the vegetation management project. This project was described by the interviewees as occurring on a National Forest that was not near any engaged population centers. It was described as being “under the radar” and receiving less public scrutiny than other Forests in the surrounding region. The Forest was also described as generally receiving less appeals and litigation, which made the personnel more comfortable in providing less detailed information. Thus, the interviewees felt less analysis and disclosure was adequate. The few project objections that were made were from adjacent landowners who were concerned about opening up access to their land due to proposed treatments. They were not concerned about the level of analysis or disclosure detail, so this example supported the agency personnel’s belief that on this Forest less detail was generally sufficient on NEPA projects. Location and proximity to interested publics thus stood out as an element of determining process risk based on the implementer’s and DM’s expectations of public response.

Purpose and Need

The purpose and need establishes the objective or intent of a project. Many factors influence what those objectives include. In our sample, the formulating and writing responsibility of the purpose and need varied predominantly between the DM and IDTL. In some cases, the IDTL was given wide discretion in writing the purpose and need, or the IDTL wrote the purpose and need to fulfill explicit guidance given by the DM. In other cases, the DM wrote the purpose and need for the ID team. Regardless of who actually completed the writing task, the DM was ultimately in charge deciding the purpose and need.

In our cases, other influences, such as advisory personnel and other external entities, had very limited access to the purpose and need. Examples in our cases indicate that this exclusion could be a source of internal or external relationship risk later in the process. In the fire recovery project, the Region expressed to the ID team that it did not agree conceptually with the purpose and need for the project. This is how the IDTL responded.

...[T]he purpose and need is already set... If the decision maker wishes to step back and change the purpose and need, that's his prerogative. It's not mine. It doesn't belong to other agency personnel. It's the line officer's decision.

In this decision, the Region's input was not a high concern for the ID team because they reported to the DM and saw the purpose and need as his decision. In other decisions in this project, such as how to disclose forest management treatments, the Region's guidance received more attention from TMs. If the process was appealed by the public and disclosure went against what the Region advised, the Region would most likely not support the appeal and the project would be remanded. These decisions were ultimately up to the implementers and DMs. Still, interviewees reported that going against the guidance of the Region may bring increased risk of an appeal being upheld. The decision to retain the purpose and

need was also a source of discontent. The Region raised this criticism at every review of the project. While this indicates a possible source of internal relationship risk, it appeared to have inflicted little to no harm on completing this particular process.

In the fire recovery project, the purpose and need established project objectives that were also contested by certain external entities. The ID team, however, relied on the Forest Plan and directions given by the DM and his staff and did not change the purpose and need. This decision was based on what the implementer and DM deemed as the appropriate resource management decision. Despite the costs to external relationships in this case, the agency decided to take on more public relations process risks so that they could have the chance to diminish more resource risks with more extensive treatments. The project required greater time, costs, and energy as a result.

Process and Resource Risk Summary

There can be many risk sources in the decisions associated with determining the purpose and need, scale, and scope. These risks can be more process or resource-related. In our examples, some cases favored process risk while another favored resource risk. Deciding to favor one over the other had trade-offs in the processes. In one case, process risks were deemed high because of a controversial resource area, so the area was removed from treatment. This left more of the resource untreated and increased risks to the resource, according to agency personnel. However, choosing to focus on process risk through dropping the controversial resource area also had the result of decreasing some anticipated public opposition. In turn, in a case that favored resource risks by including more resource treatments in the project, there was increased public opposition and other process risks that were dealt with throughout the process. This meant more energy and time spent defending against public opposition and preparing detailed analyses and disclosure to stand-up in appeals and litigation. This indicates that

in some cases, resource concerns may be great enough to validate taking on more process risk, but it comes at a cost.

Table 9. Project Design Component Table

Project Activities		Formulating Proposed Action	Formulating Treatment Alternatives	Formulating Mitigation Methods/Design Criteria
Risk Sources		<ul style="list-style-type: none"> • Technical • Procedural • External Relationship • Internal Relationship 	<ul style="list-style-type: none"> • Technical • Procedural • External Relationship • Internal Relationship 	<ul style="list-style-type: none"> • Technical • Procedural • External Relationship • Internal Relationship
Risk Management Actions by:	DM:	The DMs guided the proposed action through the purpose and need decisions.	The DMs sometimes suggested or required the ID team to create certain alternatives that responded to public issues because issues were thought to be external relationship risks. These alternatives gave the DM decision space to balance between resource and process-related risks.	The DMs sometime suggested or required more conservative mitigations to be made. These changes were typically made to minimize possible external relationship risk by being more conservative in the treatments to the resource.
	IDTL:	<p>With check-in points, the DMs had the opportunity to direct procedural compliance if they had that skill set and training.</p>		
		<p>The IDTLs maintained contact and communication between the DMs and TMs during these project activities, which could contribute to increasing or decreasing internal relationship risks.</p> <p>They also facilitated communications among the TMs to enhance the treatment and/or protection of various resources, which could contribute to reducing technical and internal relationship risks.</p> <p>The IDTLs influenced the technical resource decisions made by the TMs in these project activities if they were competent in a specific resource.</p> <p>The IDTLs typically had the daily role of assuring that procedural compliance with NEPA was met.</p>		

	TM:	The TMs designed the proposed action to fulfill the purpose and need and to maintain resource protection and compliance with resource standards.	TMs made alternatives in response to the purpose and need, the DM's wishes, and the issues raised by the public. Alternatives were made to provide decision space for the DMs to balance between technical and external relationship risks.	The TMs worked together to build a suite of mitigations that provided the needed compliance with resource standards and protection. They also communicated to balance between the resources so that mitigations for one resource did not adversely affect another resource. This was thought to minimize technical and internal relationship risks.
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Project Design

Proposed Action, Mitigations, and Alternatives

Project design encompasses the formulation of the proposed action, alternatives, and mitigations (see Table 9). In the early stages of this formulation, the resource specialists, led and facilitated by the IDTL, begun their own assessment to detect and identify risk sources within the project scale and scope established by the DM. The TMs pulled from their own experience and expertise to detect and identify risks concerning their resources.

[A]t that next staff meeting, it [the NEPA project] was brought up, and it just goes around this very table, and where a specialist is there [around the table]...Can you think of any issues that may [occur]? And, without even knowing anything about a project, just saying where it is on a map. Here's what the issue is. Here's what the driver is... What's your issue? And, our Wildlife Biologist may say, 'Hey, that's in a grizzly bear corridor,' and it kind of goes around. And issues develop more as specialists spend time on the project. Things become apparent and that's just kind of the internal issues.

These internal assessments sought to detect the technical resource concerns that the TMs had about their resource. TMs also identified external relationship risks by discussing public issues that they anticipated due to proposed project treatments. In this way, the ID team could be proactive in addressing public issues and possible public opposition by making alternatives or mitigations that minimized those concerns.

The TMs worked together to use their training and expertise to design the alternatives with a suite of mitigations that balanced between the different natural resources present in the project so that no one resource was disproportionately impacted. This practice was said to require intra-team communication. This communication could serve to minimize technical risk by helping to ensure that mitigations balance impacts. If this intra-team communication broke down or TMs disagree about what

was necessary protection, there could be conflict in the team. While a lack of communication and trust could contribute to emerging internal relationship risk and lower team morale (see Stern and Predmore 2012), in our sample processes, the ID team members reported positive team relationships.

IDTLs, and occasionally the DM, facilitated this communication formally and/or the TMs did it informally. An example of informal communication changing the project was given by a TM.

[I]t tends to be, at least in my perspective, has been more of an informal analysis or pre-analysis where folks are looking and just saying do you know this?... Whether it be the archeologist coming up and saying you have an arch site in there. You say, 'Oh, okay well we will just drop that out [of the project].' I mean that's the type of changes that we make to basically take it from something that is either going to be significant [in impact] or maybe push a guideline.

Whether formal or informal, the TMs generally had the responsibility for recommending management strategies to minimize possible technical risks to the resource and procedural risks associated with resource guidelines and standards.

DMs and IDTLs spoke of their confidence in and expectations of resource specialists to know what treatments and mitigations were appropriate for protecting their resource and to know what was necessary to withstand the challenges of appeals and litigation if it becomes necessary. One DM explained,

I don't spend a lot of time looking at our handbooks, but we do have Forest Service handbooks. We have NEPA handbooks that talk about an awful lot of things. And, our resource specialists are familiar with those, and between that and between the experience that they have from project to project, they quickly figure out what has to be addressed and how it is addressed to be successful and withstand a challenge.

The technical competence and experience of the TM was seen as a necessary agent to minimize the threats of non-compliance that could occur in a process, resulting in obvious appeals points. It is also the

TM's responsibility to be aware of Forest standards or even standards of other Forests to promote consistency within the agency. Inconsistency may also lead to appeals. One TM, who is presently a District Ranger, noted on the travel plan project:

The standards are actually part of what a specialist [TM] is paid... to look at.., and they also need to look at what previous travel plans that have set precedence... They're also looking to see what have other Forests done so that they're consistent because otherwise that's something you could lose in an appeal on as well...

TMs were expected to be competent about guidance and standards concerning their specific resource. If they expected that an alternative or mitigation was not going to meet a standard, then they needed to support why they were still proposing it in the project. If it was not sufficiently explained, it could become a source of technical or procedural risk and a possible appeal point for non-compliance with the standard.

These expectations put responsibilities on the TM to minimize risks to the resource, but the emphasis in these references repeatedly went back to avoiding appeals and litigation by complying with the standards. By avoiding or getting through an appeal/court, implementation and increased resource protection treatments would most likely occur. Thus, complying with standards was perceived by interviewees to ensure better resource protection. However, the interviewees in their language clearly and repeatedly emphasized process risk over resource risk.

All implementers and DMs attempted to detect and minimize external relationship risk through risk management in project design. Prior experiences and current interactions with the public played a big role. One IDTL stated,

A lot of times we (the ID team) see the issues ahead of time as a team, and then, they are also brought up by the public during the scoping. But, a lot of times too, the decision maker knows ahead

of time actually where's he going to go with his alternatives, and that's cause they have the experience. And they know what they think they can mitigate for and what they think is going to be significant to drive the alternatives.

The experience and relationships the DM had with the public may have caused him or her to ask for an alternative that addressed a certain expected or common public concern, or the DM and his staff may have requested that more conservative mitigations were included to show the public that the USFS was going the extra mile to protect the resource. One IDTL explained how the ID team attached an extra protection mitigation,

We haven't started yet, but we are going to de-compact some of the more heavily used skid trails. Folks on the district don't really think that is necessary... but at the time, we were looking to demonstrate that we were going to go the extra mile to protect the resource...

In these examples, interviewees did not describe adding alternatives and mitigations necessarily as promoting better resource protection. They were tactics to appease the public and demonstrate that their concerns had been considered. The agency was willing to go beyond what they believed was necessary for resource protection to help avoid public opposition and appeals and litigation that would impede the process.

Additional alternatives and mitigations or adjustments seemed to be an interactive work between the IDTL, TMs, and DM, but the DM had the ultimate say in the proposal of actions presented to the public. The interworking of the ID team and involvement of the DM during project design were potential sources of internal relationship risk, which could negatively affect project outcomes. Interviewees expressed that the working relationships and personalities on the team affect NEPA processes, both positively and negatively. In our sample, the ID teams seemed to have had satisfactory working relationships. Some IDTLs even expressed that these teams worked better than others they had led.

The elements of project design also posed numerous procedural risks. The IDTL was generally expected to be responsible for procedural compliance. DMs and TMs typically had some training in NEPA procedures, but generally, both DMs and TMs expressed that they did not hold the expertise to interpret NEPA compliance. Common comments included:

I'm not a NEPA guy.

Although I've been involved in the NEPA, I'm not a NEPA coordinator. So anything that's specifically tied to how we have to do NEPA, then I'd refer you back with, probably with (the IDTL, who happened to also be a NEPA coordinator).

Procedural compliance was seen as an absolute requirement to avoid unwanted delays and opposition to the process. One TM explained that when it came to developing alternatives, he has seen two primary requirements.

I've seen alternatives developed for the sake of alternatives because [of the] people who are providing that expertise on NEPA... There are a lot of interpretations of NEPA, so they're hard and fast. You got to have a range of alternatives, because that is a procedural thing. And we get multiple appeals on that or comments on it. You have to have a full range of alternatives.

The NEPA experts (NEPA coordinators, DM , IDTLs, or other qualified NEPA personnel) guided the ID team to establish a full range of alternatives to compliant with NEPA regulations. Furthermore, the TM said that in his experience DMs specifically wanted a range of alternatives that addressed the issues the public raised and established broad decision space so that he or she could choose an action that would balance the risks of social-political and environmental impacts. In these cases, when alternatives were made to fulfill procedural requirements or address public issues, they were made to address process-related risks. The actors were adjusting the process to minimize the likelihood or severity of public opposition or appeals.

Process and Resource Risk Summary

Compliance with established resource standards and procedural compliance was the baseline requirement to help ensure resource protection and avoid obvious appeal points. Past that baseline, the implementers and DMs were working to create a project design that included or considered the public's anticipated issues. Additional alternatives and mitigations created decision space, increased protections, and added analyses that were thought to appease or defend against public opposition and appeals. At the core, resource protection was still the foundation of project design, but to get projects implemented and past public opposition, process risks became emphasized.

Table 10. Scoping /Public Interaction Component Table

Project Activities		Responding to public entities that desire to be involved	Methods or level of public involvement to allow	Building Relationships that Assist Risk Management
Risk Sources		<ul style="list-style-type: none"> • Procedural • External Relationship • Technical 	<ul style="list-style-type: none"> • Procedural • External Relationship 	<ul style="list-style-type: none"> • Procedural • External Relationship • Structural
Risk Management Actions by:	DM:	DMs, IDTLs, and TMs seemed to all participate in discussing which publics to anticipate interest from and what their issue(s) would mostly likely be.	<p>DM: Generally, if interest groups or political leaders were involved, DMs suggested using their issues to instigate new alternatives.</p> <p>DMs, IDTLs, and TMs: shared these decisions. In some projects, public interest and controversy was expected to be high, but the public was expected to cooperate with constructive input. In these cases, extra efforts were made by the DM and ID team to incorporate the public's input. The reported motives were to make better resource management options, to build public trust, and to diminish process risks.</p> <p>In one project, the public interest and controversy were expected to be high, and the public was NOT expected to cooperate. There was opposition to the resource protection methods in the purpose and need. In this case, the public interaction was kept very formal by following procedure and not allowing extra forms of contact with the public. They sought to build a project that was defensible against public opposition and in court. This was a common motive found in all cases.</p>	<p>DM: The relationships the DM built with the public were described as being important in defusing and detecting external relationship risk sources.</p> <p>DMs worked with all the public entities, but they seemed to have a specific responsibility to be the spokesperson with political leaders and larger interest groups.</p>
	IDTL:			ID team: The team may build relationships with many different public entities, but they seemed most responsible to handle external relationship risks when they came from other agencies and local community members not specifically associated with broader interest groups.
	TM:			

Scoping and Public Interaction

Anticipating Public Entity Participation

In the scoping and public interaction component (see Table 10), the ID team and DM deliberated about what public entities were anticipated to be interested and engaged in a project and if their influence was perceived to be constructive and helpful in planning or obstructive to the project. The typical entities that were identified in the interviews were local community members, interest groups with broader issues, political leaders, and other state and federal agencies.³ Prior interaction with specific public entities allowed the agency personnel to gauge external relationship risk. Different strategies were generally undertaken based on the publics expected to show greatest interest.

In our sample, the responsibility to interact with or respond to the public depended on the source of public interest, depending on if it was from the local community or from a wider interest group with an agenda. Local community members may have local concerns and also be part of broader interest groups, but in our sample, we specifically separate out the local community concerns from other public input. We define local concerns as concerns that are specific to the project and are unaffiliated with broader opposition agendas, such as being generally against all forms of tree removal treatments. Interviewees reported that these concerns typically came from local community members and that they were primarily handled by the ID team through personal interaction and adjustments in the proposed action and mitigations. Interest groups and political leaders were typically connected to broader opposition for an action. These external entities were described as representing a larger group of people that frequently had an underlying agenda. They were also seen as bringing a higher likelihood

³ There are of course many other public groups and individuals that could be seeking involvement, such as tribal governments or possibly opposing interest groups that could be broken out and explored. However, we are addressing the ones that specifically emerged in the projects sampled in this study.

and degree of public opposition as well as threats to the process due to their widespread influence. The general response in these cases was greater involvement from the DMs.

The vegetation management project generally did not have high public interest from environmentalist groups, because it did not include the typical interest group issues on that Forest, involving the protection of wilderness or roadless areas. Instead, an unanticipated local group of land owners had concerns against the action and were threatening opposition and litigation if their concerns were not answered. The ID team handled these concerns by adding gates to roads, changing the shape of treatment areas, and dropping a treatment area from the project. The DM on this project, who was a District Ranger, was involved with the public occasionally. However, because of the DM having other priorities and the lack of attention from broader interest groups or political leaders in regards to the project, the ID team handled the adjustments. In this case, by having specific local concerns, the ID team was able to make management changes in the plan to minimize the occurrence of the risks without much involvement from the DM.

Interest groups and political leaders had more involvement in the other sampled projects. In these, the DMs would not only take on the responsibility of being the spokesperson and negotiator with these groups, but also became more closely involved with other incremental decisions during the process. In this way, there would be primarily one voice representing the stance of the agency. Also, though there were examples of the issues from political leaders and interest groups leading to less intensive modifications in the process, these issues typically prompted more comprehensive changes than local concerns. For example, these more extensive changes in the NEPA process included adding a whole new alternative to consider or increasing the detail of analysis and disclosure, both of which largely increase the time and energy spent on a project. Whether simple or extensive changes were made, the process risks associated with the possible opposition of these external entities were

frequently the center of the agency's focus during these projects. The implementers and DMs put their time and energy into listening to and responding to the public in such a way as to diminish the risk of these entities opposing or impeding the process through appeals and litigation.

Building Relationships that Contribute to Risk Management

The DMs and ID teams interacted with different public entities through different forms of meetings and comment periods, building relationships from one process to the next. Though the IDTLs and TMs had roles in this interaction, the implementers described the relationships that line officers built with the public as having greater importance. One DM explained that he felt the DM and ID team shared the role of public interaction in public meetings and open houses, but it was also explicitly important that he was there.

...[T]he public meetings, I kicked them off and then turned it over to the ID team leader or some of the resource specialists... They started getting into the detailed aspects. You know, I'll let the team members handle that, but in terms of setting the stage, being visible, I was there. That was my role... I was the decision maker so people needed to see who made the decision, they needed to see and hear from and speak to, speak with the decision maker. I needed to be visible.

The DM emphasized that he believed that the public wanted to be able to see and talk to the DM. His reference implies that the public knows the DM had the final decision-making power, and they could sometimes desire to see and talk with him over the rest of the ID team.

These relationships and the other various roles a DM was reported to fill, such as overseeing the budget of their office or being in closer contact with upper management, were described as giving the DM a broader view of how a project interacted with other projects on the District or Forest. One District Ranger explained that he sees three aspects of a project: economic, social-political involvement, and ecological. He also noted that the ID team may not always see these three aspects as fully or clearly.

...[T]he piece that they [the ID team] don't really have a good picture of is the social-political, probably not the same picture that I have. Not that's it's right or wrong. They just have a different picture, so they're going to come more from the ecology of things ... They know some of the social-political side and maybe more from the state agencies that we work with, the county commissioners, although probably county commissioners is my bailiwick.... When it comes time to make a decision, I'm going to say what do you want me to do? And then I'm going to fit it in here [the three aspects]... And, if there is some social-political things I have to try to work through, then... maybe it takes me a little longer to get that decision made because I have to smooth some wrinkles out and that kind of stuff because I'm going down a road that some may not be happy with. And the idea would be that I would spend a little time smoothing feathers and all that kind of stuff so that when I make a decision everybody is fine with it.

This division of labor and perspectives resonated throughout the multiple cases. In general, the IDTL, and especially the TMs, focused on ecological and technical concerns over the broader social-political concerns that typically involve politicians or broader interest groups. The ID team may have made process adjustments based on specific comments from the local community, but they predominantly saw their role as promoting resource protection and offering project design options that gave decision space to the DM. The DM was, in turn, expected by the ID team to make a choice that balanced between the ecological and social-political risks through considering the impacts to resources and public relationships. In our sample, though these decisions never seemed to overtly harm the resource, there were examples in which the DM decreased the size or intensity of treatment to appease a broader interest group or government official even if, to the agency personnel, the treatment would have brought greater resource protection.

Public Involvement Techniques

In some sampled cases that seemed to have high expected public interest or controversy because of scale or scope, various efforts were made by the DMs and ID teams to interact and

incorporate public involvement. In the travel management project, the ID team held open houses to invite the public to submit their favorite routes and give a rationale as to why they should be included in the new travel plan. The resiliency project was under the Healthy Forest Restoration Act, which allows communities, under certain stipulations, to submit their own alternative in the process. With the USFS's assistance, the community exercised this right. The alternative was modified slightly by the USFS and eventually selected to be implemented. Interviewees felt that these extra allowances were needed not only to make a better product but also to engender public support. The DM of the resiliency project expressed this about the community involvement.

[It produced] a better project, and in the end, it engendered wide support for the project. So, if we had just kind of done our own thing, produced a document, asked for comments, and didn't really engage with the community when they wanted to engage, then they're going to be suspicious and not trust what we're doing out there and probably would have ended up with lots of lawsuits... We still got a lawsuit on this, but it's somewhere in the legal process. But, they didn't ask for an injunction.

In a controversial situation riddled with process risks, the lack of an injunction was seen as a victory for the USFS because implementation could still occur.

Different forms of public involvement can be associated with various outcomes in different contexts. Moreover, the perspectives of agency personnel toward public involvement can vary greatly, including instrumental, normative, and substantive motivations for conducting public involvement (Hoover 2012, Stern and Predmore 2012). Substantive motivations involve soliciting comments that explicitly improve the resource management decision. Normative motivations involve agency actors attempting to incorporate the values or participating publics into decision-making. Instrumental motivations are those most directly related to managing process risks and involve agency actors using public involvement to remove barriers to implementation of agency projects (Hoover 2012). Each of

these motivations was apparent within this study to some degree. However, the common theme expressed by all study participants lay within the instrumental motivation. While most interviewees in this study recognized the participating publics' rights to be heard, and public comments occasionally reportedly improve project design, interviewees tended to stress risk management aspects of public involvement.

In the travel plan and resiliency projects, public involvement reportedly served not only to diminish the external relationship risks of public opposition and litigation in the process, but also to produce better resource management options and engender broader public support. Interviewees in the vegetation project also reported that public entities involved in the project had very specific concerns that were easily addressed. These changes were also said to have improved mitigations and external relationships and decreased risk of opposition. However, in the fire recovery and salvage projects, interviewees more heavily emphasized making decisions solely to minimize external relationship risks. For the fire recovery project, the DM and ID team decided to keep public interaction very formal, and in many ways limited, through only having the required formal meetings and only exchanging information with the public through writing. The co-IDTL described the situation this way:

IDTL: It was clear that some people felt so strongly about this that there wasn't anything we were going to say or do short of no action that they weren't going to appeal and litigate this. So why go through all that? So we restricted it to a pretty formal process. We had a couple meetings early, public field trips and public meetings or two, and then after that, it was just exchanging paper, which is a little unfortunate. But it was just the way we thought we needed to proceed here.

Interviewer: ...It just seemed like they weren't going to cooperate?

IDTL: Yeah and we weren't going to cooperate either [laughing]. I mean it is a two-sided dilemma.

This external relationship risk was identified as having low controllability in that they did not think they could diminish the likelihood of opposition. They also thought the changes wanted by portions of the public would prevent them from meeting the established goals of the purpose and need. So, instead, the ID team and DM opted to use risk management techniques other than public involvement, such as extra mitigations, more thorough analysis, and increased disclosure. These were done to make the process and document more likely to withstand potential appeals and litigation, diminishing the damage of a process risk. The process was appealed, but the appeals generally did not include the treatments and resources that the ID team had anticipated as major public issues and had intensively prepared for in analysis and disclosure. The Co-IDTL explained,

I was really thinking we were going to get sued on soil and watershed cumulative effects... But I think we did such a good job on it that there wasn't a whole bunch for them to work on there. And so they picked on initially an invasion of noxious weeds, affects to a rather obscure bat, and... an apparent inconsistency in the consultation with the Fish and Wildlife Service.

The IDTL generally felt that the ID team had adequately prepared for the major anticipated controversies. In the end, they had to address a few more unanticipated concerns, but they felt those were minor compared to the opposition that their risk management actions diminished in the process.

In the fire recovery and salvage projects, interviewees explained that public input was primarily used to direct modifications that could appease public opposition or to direct which issues to analyze and disclose more about, preparing for appeals and litigation. These modifications were viewed as unnecessary to improve resource management. Public involvement was seen as a burden and potential impediment to getting projects implemented. An IDTL explained,

We are always fighting to get anything done. A lot of people [in the public] just don't want us to get anything done. And, I guess, I'm kind of opinionated about it, because like I said, I think the Forest needs some treatment, and a lot of other things could be done out there. We don't get a lot of it

done. I mean, we get some of it done, but the more we could treat, the better... People are definitely against us. [The Region] is heavily litigated...

Process and Resource Risk Summary

While philosophies of public involvement varied across participants, all interviewees across all projects in the study placed a shared emphasis on using public input to make adjustments so that their processes would be completed and public opposition dampened. In some cases, but not all, interviewees felt that public participants were also able to make meaningful contributions to better resource management decisions, but in all the cases, interviewee described the management of process-related risks as a critical focus of public involvement in their NEPA processes. These risks were primarily discussed in terms of avoiding (or surviving) appeals and litigation. As such, managing process-related risks associated with external relationships was a means to minimizing resource-related risk to some degree, as agency actors worked to enhance the survivability of their projects. However, in two cases, what agency actors perceived as sub-optimal resource management outcomes were accepted for the sake of managing process risk.

Table 11. Analysis Component Table

Project Activities		Deciding which resources to analyze and level of detail	Deciding on analytical methods
Risk Sources		<ul style="list-style-type: none"> • Technical • Procedural • External Relationship • Internal Relationship • Structural 	<ul style="list-style-type: none"> • Technical • Procedural • External Relationship • Internal Relationship
Risk Management Actions by:	DM:	<p>DM and IDTL: These roles seemed to interrelate in requiring or guiding what resources to include in analysis. Some basic resources were analyzed by default to minimize technical and procedural risks. However, some resources were either added to analyses or have increased detail in analyses because they were perceived as an external relationship risk source based on public interest for that resource.</p> <p>The IDTL may have been aware of this public concern, but it seemed the DM made the final decision to make an addition or modification to analysis.</p>	<p>DM and IDTL: Generally, the TMs were given discretion. However, there were examples in which TMs were perceived to have limited technical or procedural competence or limited knowledge of possible external opposition. In these situations, the DM and/or IDTL may have directed changes concerning analytic methods or level of detail.</p> <p>Because of lost court decisions, the DM or IDTL may have directed changes to analytic methods to minimize possible procedural or external relationship risks, relating to these changes.</p>
	IDTL:	<p>TMs may also have been aware of public concern, but again, it appears the DM would make the final decision to make an addition or modification to analysis.</p> <p>TMs appear to have worked together to compromise on the level of detail in analysis so that there was enough time and money to analyze everything that was needed. This</p>	<p>TMs seemed to have the primary role in choosing the analytic methods, because generally they were perceived to have the technical competence to fulfill this role. However, there were cases where limits of technical and NEPA procedural competence seemed to have caused intervention by the IDTL or DM.</p>

	<p>intra-team communication seemed to minimize internal relationship and perhaps structural risk sources.</p> <p>TMs conducted analyses. If concerns emerged that the actions or mitigations would cause significant impacts or be outside established resource standards and regulations, the TMs seemed to be held responsible to surface these concerns and have the technical competence to make changes to project design if necessary.</p>	<p>TMs were sometimes asked to change analytic methods, or they changed it themselves due to losses in court concerning previously used methods.</p> <p>TMs generally worked together and agreed to use consistent methods if their resources overlapped in some way. In some situations, this could increase possible technical and internal relationship risk, but in our cases, these efforts were said to minimize these risk sources.</p>
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Analysis

Resources to Analyze and the Level of Detail in Analysis

Table 11 describes the decisions of which resource to analyze and the level of detail in analysis.

The influences of technical, procedural, or external relationship risks on these decisions fluctuated with each receiving prominence in certain cases. In some interviews, the resources analyzed were referred to as routine or standard resources. They were almost seen as required. Going through this routine was thought to minimize technical risks to the standardly analyzed resources. Other projects that were discussed in interviews, but were outside the sample cases, revealed that resources were analyzed because of professional standards and/or a desire to protect the resources, even when they were not public interest issues. One DM explained,

I have a district that's not affected by this project, but it's a district that not a lot of folks are interested in... [T]he District Ranger just approved a decision recently that had virtually no comment in the entire project. Now, our resource specialist went out there and looked. While there weren't necessarily issues brought up about erosion or wildlife impacts or whatever it is, we still dealt with those because there are certain professional standards that we just apply. It's guidance from the Forest Plan. It's professional knowledge. What we need to be doing out there on the land....

In our five sample projects, increased public interest and public issues about specific resources or management treatments were prevalent reasons why a resource would be included or receive more detailed analysis. One DM gave these two comments:

You organize around [public] issues, so you can start to focus in on what you need to analyze, what you need to document. It helps provide some organization to the analysis [and] the document for the public to review it.

If you think that a project is going to be generally supported and not opposed [by the public], you're probably going to do a little... less detailed work, but you still want to do it well enough... but on a

project like this, we knew we'd have a lot of interest. There was a lot of work put into this project, a lot of work, very detailed. And so, I think that's what helped make it successful.

Doing detailed work to respond and analyze anticipated public issues was thought to be a strategy to diminish public opposition and bring success, which was expressed as being "an implemented project."

The resource specialist typically completed resource analyses, although the DM and IDTL may make specific requests. Under the guidance of the DM and facilitation of the IDTL, the TMs worked together to determine how to allocate time and other budgeted resources they share to complete the needed analyses on time. Trade-offs were common to manage structural and internal relationship risks, as expressed by a TM.

I think some of our, some of the younger, the folks that haven't done this very much, start looking at a much bigger scale, and they do need guidance to say well when you look at this are you going to see an effect? And is it significant? Is it worth spending your time running this model when you're going to run this model too?

(Later on in the same conversation): I guess we [experienced ID team members] have all come to the understanding that ... we don't have a whole lot of money on this Forest... We can't waste it. And, if you spend all your time doing this analysis, that means I'm not hiring x seasonal, or I can't do this or that. And if I'm doing this analysis for... that means you can't [do another analysis], so we are all very-It's very conscious on what we can and cannot do and try to be as efficient as possible.

Elements of efficiency and compromise could minimize or increase internal relationship and structural risks. One method of minimizing this risk appeared to be effective communication among team members, the IDTL, and sometimes the DM to avoid analyses that were considered excessive and to share data that overlaps between resources.

Communication between the implementers and DM was not always perfect. It can break down, or compromises made may not be fulfilled because of other constraints. For example, the wildlife

biologist quit quite suddenly during one project. The data collected by the person and the details of previous conversations with the USFWS Biologist were not made available to the new wildlife biologist on the team, making the new specialist scramble for this needed information. Even without turnover, the IDTL on this project said TMs did not always freely share data. In this case, internal relationship problems created technical risk.

The fuels person also left on the same project. This situation was different, because the team had prior notice from the leaving TM. However, the first fuel person had intended to finish his/her analysis before leaving. This was not possible, and the new person had to come in at the middle of analysis. The IDTL described this as a hard transition, because the new fuels person may or may not agree with the prior person's approach. Changes were not as easy to make further along in the process.

The DMs, IDTLs, and TMs all played a part facilitating risk management strategies involving analysis, but communication and collaboration among the TMs appeared especially crucial to minimize internal relationship and technical risk sources. These could be both process and resource-related.

Analytic Methods

Interviewees typically described the resource specialists as managing the technical risk sources associated with choosing what methods were appropriate. When asking an IDTL if the TMs had discretion to choose the measurement methods for their analyses, she answered,

Oh most definitely. I mean, they're the experts.

She continued to explain that she would ask the TMs what analyses they felt were necessary and that the TMs had great flexibility in choosing and even changing methods.

Okay how are you going to analyze this [a particular issue]? And basically they told me how they were going to do it. And so we put that in the document, and I said, 'You know this is not written in

stone. So if you come up with a better way or you find out it is harder to do, just change it and let me know and we'll change it.' So they had the freedom to do that once they got out in the field, and they said, 'okay, this will work better than that or whatever.' So as long as they were consistent, and they had a way of measuring it. And they had a way of justifying the type of measurement.

Changes in methods or project design were reportedly needed for various reasons. It was generally the TMs' responsibility to bring those changes to light. Sometimes unanticipated possible resource impacts surfaced. This occurred when the established mitigations were not expected to be enough to offset the impacts or if actions were not expected to comply with a particular required resource standard. This could mean changes to the project design, which could have positive or negative ripple effects on other risks associated with the project. Once a concern like this was discovered in the analysis, the implementers and DMs seemed confident that the changes made in project design would minimize the sources of risk or at least not exacerbate them. This again pointed out the trust that IDTLs and DMs had in the TMs' technical competence. They depended on the TMs as a team to have all the necessary expertise. A DM stated,

We do depend very heavily on the individual interdisciplinary team members to surface concerns, be it around methodology they use or during certain circumstances that they encounter if that's the case. It's not a cookbook approach at all... When you think about the wide array of information and analysis down here among the ID team..., it's up to that eventual decision maker approving. I mean there's... I don't begin to know all of what went on in that analysis. I can read what was written. But you can't absorb all of that.

Although TMs were expected to have the competence to make analysis decisions, there were some exceptions where the TMs sought out, or were given, direction on what analytic methods to use. One IDTL described a hydrology handbook, containing the methods that the Forest wanted the hydrologist to use to maintain NEPA compliance and consistency among the Districts. This constrained

the analytic methods and models the specialist could use. One IDTL explained how this was done to avoid public scrutiny and appeals:

They have discretion for the models, I guess, in answering that part of the question... But we also for hydrology, for example, we have a hydrology NEPA guide that the Forest has developed that we want our hydrologist to use, because it differs from District to District on how the analysis is done, and we don't want it to be that way. We want it to be consistent. Because credibility-wise across the Forest, if you publish a document on [another] District and the hydrologist has done an analysis this way, and you publish a document here, and the hydrologist has done it a certain way here, and it is not consistent. We just don't think that is good for credibility, because the appellants zoom into that. We just think for credibility; we just need to do it better. So, we actually have some guides that we use, but a lot of the times specialists are able to use the models they want to use.

This example came up in the interview because the IDTL and DM had doubts about the work of a particular hydrologist on a project, feeling it was insufficient. The IDTL explained that the DM almost always examined the analyses and determinations from every resource specialist and evaluated whether he thought it was a correct determination and if it would be sufficient to stand up in court if needed. With this District Ranger, the TMs were afforded the discretion to choose their analysis tools and make their determinations, but once they were done, they knew it would be checked by the District Ranger. In these situations, it seemed that the TMs may seek out the DM's desired methods to help ensure that their analyses and determinations would pass the DM's inspection. In this case, this inspection was seen as a way to minimize public opposition and possible appeal points.

In general, analysis in projects seemed to be first and foremost based on an agency-wide desire to protect the resource by considering impacts and ways to minimize those impacts. For some resources, the methods of analysis were described as generally common and accepted among resource specialists in the field. Certain methods were performed regularly on all projects. However, methods that were once determined to be adequate may be deemed insufficient by scientific findings or by

monitoring the effects of treatment on a resource. Analytic changes also occurred because the previous methods were deemed insufficient by the courts. One IDTL explained,

Usually wildlife is where analysis starts changing,.. It seems whether it's the lynx or the bear or you know studies that have been completed that want us to look at, determine if we are going to look at things differently. So, I think the analysis does change for sure. I think it is dynamic. It's not always going to stay the same. I think for a lot of resources like for soils, for instance, you aren't going to change your analysis with soils unless you go to court, and you lose in court, and then somebody tells you that you are going to start analyzing in a different way.

In deciding what analysis method to use, TMs stayed with the method that had generally been accepted through proven use and/or had been able to survive to implementation or through appeals and court. They changed methods when it was perceived necessary based on court decisions. In our cases, we were given explicit examples of analytic changes not because of scientific findings or resource impact but because of court decisions.

One example of an analytic change due to a court case came from a sample case in which an USFS Enterprise TEAM⁴ of specialists was brought on to a project. This created a situation in which the ID Team members were predominantly from outside the Region and lacked knowledge about some of the Region's commonly accepted procedures and directives. Toward the beginning of the project, the ID team asked the Regional Office whether they could utilize a watershed model that was commonly used elsewhere in the country. At first, the Region asked them to avoid using the model because it had not been utilized on the Forest and they did not want to set a new precedent. This was how the IDTL recounted the rest of story.

⁴ The Enterprise TEAM program provides either individuals or teams of USFS specialists that can be temporarily hired by a National Forest that does not have the natural resource specialties or personnel resources to complete NEPA planning projects.

After the initial report was submitted [to the Region] for review, it was like [from the Region], ‘Hey, you need to run some models because there was this court decision, and it was up-held because they had model information, so you got to run the model for this [laughing].’ It was kind of like, okay that’s a 180 from what you told us initially... And then after the model was run and we sent the document out, [the Region came back and said], ‘Oh gees, maybe you shouldn’t have run the model because... the court case was reversed [laughing].’ And I was like, you can’t have it both ways.

At first, the Region was trying to avoid public scrutiny and possible technical and external relationship risk by not setting a new precedent; however, the up-holding of a court case changed the Region’s interpreted needs to comply with NEPA. These reversals of direction by the Region were irritating to the ID team as the IDTL explained later in the conversation.

So the flip-flopping of the model thing, its irritating cause... the specialist, they’re given, here’s today’s expectation, meet this. [Then] oh nope, we are going to give you another one [new expectation] after you have met these [the old ones] [laughing]. And then in the end, we’re going to like insult you because you failed at what we told you to do. But it’s... [laugh] an internal challenge that we pose upon ourselves that is not necessarily constructive.

The ID team wanted to comply with the directions of the Region, but when the Region did not keep expectations consistent, it became irritating and frustrating for the ID team. This was not conducive for good relationships with the Region. Moreover, it could affect team morale if they feel like their work never meets expectations.

Another example of doing a newer, more detailed method of analysis was instigated because the method used in an earlier project in the area was not deemed by the court as sufficient. In this case, the Pacific Fisher was described as an up-and-coming sensitive or concern species that was receiving increasing attention from broader interest groups. The loss of a case concerning this species propelled the wildlife biologist TM to search for literature and other expertise to devise a more comprehensive and conservative method of habitat protection for the species. This new method of analysis and habitat

protection was intended to minimize multiple risks. Using this new method, technical risk sources were managed by searching out and utilizing newly gained competence to create a method of habitat protection for the species. Management of procedural risk occurred by making changes to comply with the new interpretations of NEPA. External relationship risk sources were also perceived to be managed, because if these changes were not made, it could have stirred up increased public controversy. As far as the TM knows, this effort was unprecedented, and they were waiting to see if it would be appealed or litigated. The TM said,

We're hoping that it's gonna hold up. Hoping it's not going to go to court, but if it does go to court, that we were thorough enough...

When court cases changed the methods deemed acceptable, these changes could be conveyed to the TMs in a multitude of ways. At times, the TMs, IDTLs, or DMs may have been aware of the needed changes because they were involved with the previous process that went to court. Other major sources for this information were NEPA coordinators or USFS attorneys. One IDTL explained,

[W]e have a NEPA workshop every year. And we try to bring back, you know our attorneys are down there, and they suggest to us certain ways to be doing things. So, we try to bring that back to the specialist every year and say, 'Hey, you need to be doing it this way. You need to be taking on and maybe using this model because of the court cases.' I mean we are pretty good as far as having the attorneys engaged, and we have a monthly conference call with the attorneys in the Regional Office and the Regional Planners, so that helps keep us abreast of the issues.

NEPA coordinators and attorneys advised this ID team on how to manage and minimize possible procedural and external relationship risks with regards to the changing interpretations of NEPA requirements. The focus of these meetings and calls were to improve their methods of getting through the process.

Process and Resource Risk Summary

The DM and IDTLs typically entrusted TMs to determine the appropriate resources and techniques to include in analyses at the initiation of the impacts analysis phase. Analyses of certain resources seemed to be done in a similar way on every project. While analytical findings could technically lead to additional analyses or adjustments, this was rarely found in the cases in our sample. In our cases, issues brought up by the public and prior rulings of the courts were the primary drivers of changes to analyses. Public issues represented a possible threat of public opposition to the process that needed to be considered in analysis, and court rulings changed what was deemed appropriate for resource protection and what was needed to comply with prior legal interpretations of NEPA. The DM, IDTL, Regional Supervisors, NEPA coordinators, or attorneys stepped in and advised the TMs regarding these changing needs. In each case in our sample, the emphasis of this advice was related to minimizing process risks. The people advising the TMs wanted to avoid public opposition, appeal points, and litigation. These external demands to change analytical techniques sometimes caused frustration on the ID team that affected relationships internal to the agency and team morale. While these changes may have decreased sources of technical, procedural, and external relationship risks, they may have also negatively affected internal relationships.

Table 12. Disclosure Component Table

Project Activities	Determining what information to disclose and what level of detail	Formatting of document
Risk Source	<ul style="list-style-type: none"> • Technical • Procedural • External Relationship • Internal Relationship 	<ul style="list-style-type: none"> • Technical • Procedural • External Relationship • Internal Relationship
Risk Management Actions by:	DM: There were instances when the DM determined how much analysis detail was included in the final NEPA document. Including more detail was driven more by the external relationship risk from public opposition or courts than by the technical or procedural risks.	The DMs sometimes reviewed the document to ensure it had the information the court was thought to look for, but the responsibility for formatting details was primarily the IDTL's.
	IDTL: The IDTLs had the primary role of determining what information was included in the document even though they may have erred on the side of including more information to please the DM or the public. They first fulfilled the perceived procedure requirements of documentation, and then, they included more information in hopes that it would prevent the public from requesting the full project record, which was perceived to increase public scrutiny and workload. Disclosure seemed to be constantly increasing and contributing to other risks and negative outcomes, such as decreasing team morale and cost escalation.	The IDTLs in our sample typically asked for certain information to be included in the format of the document because it was perceived to make the document more defendable in court by minimizing possible appeal points.
	TM: The TMs generally had a level of detail they thought was necessary to fulfill technical and procedural needs, but there were also instances when the amount of detail was increased at DM's or IDTL's request.	Sometimes TMs already wrote in this more defendable format. Others had to be coaxed or guided to write in this format. This became frustrating for some IDTLs and possibly contributed an internal relationship risk.

Disclosure

What Information to Disclose and What Level of Detail

First and foremost, disclosure was made sufficient to fulfill NEPA procedural compliance. Above that level, more information was disclosed to minimize perceived external relationship risks. IDTLs were held responsible for the first level of disclosure. A TM explained,

...[W]ith her [the IDTL] expertise and... her background in NEPA of knowing what is required in order to allow a document to stand on its own and be defensible, then those are calls that she can make as the ID team leader.

Others, such as a writer/editor, may have written or helped write the final NEPA document, but the IDTL seemed to be entrusted to assure procedural requirements were met. The DM and IDTL seemed to share the role of determining what information was perceived as necessary outside basic procedural requirements. Although there have been initiatives to decrease the length of the final NEPA documents in the agency, court losses have caused a reaction to leave more in the document. IDTLs reported that experience in NEPA has taught them to provide more information up front.

Sometimes you take the approach, well, if the public can see it, then they are not so, I guess, quick to be questioning other things. I mean a lot of times it's just easier if you got it out there for the public to see it. Then, maybe they feel more comfortable with your analysis, and they wouldn't tend to come in and look at your project record or FOIA a specialist report or things like that if it is just kind of all laid out there.

Another IDTL described that she would have been comfortable with including less information regarding a particular species, but the DM was not.

I would have been comfortable just... putting a little piece down saying look at this resource report, but the decision maker wasn't as comfortable doing that. So, again, I'm modeling [creating] my

document to make him comfortable. And you know the publics like to see that, especially our environmental public. They like to see all that spelled out.

Some DMs preferred more detail in the documents, because they perceived it would defend against public scrutiny and losses in appeal or court. The amount of comfort the IDTL and DM felt appeared to be dependent on the amount of information they felt was necessary to appease the public or minimize the chance they would use their Freedom of Information Act (FOIA) rights to ask for resource specialist reports or the entire project record. FOIA and other requests were viewed as a major workload burden and may open the agency up to additional scrutiny.

This extensive exercise of documentation could be overwhelming to the IDTL and the ID team, especially when responding to public comment. One IDLT explained,

Constantly, every day, every day, the documentation is overwhelming at times, but every day it's just trying to follow the process and make sure you have everything in your record... this project I'm working on now, I think I have spent the last two weeks heavily involved with answering phone calls and dealing with emails more than I ever had on any other project. That's just one part of the... documenting... I mean, because if you have a complete project record, it's going to look much better in the courts or when you go to any appeal review. But yeah, it's just constant the documentation.

This same IDTL explained in the interview how she felt burned out on NEPA and was going to talk about this with her supervisor at her next performance evaluation. Managing external relationships had a clear link to internal problems, including burnout and decreasing agency morale. Sometimes attention that was given to guard against predominantly process-related external relationship and procedural risks came at the expense of not addressing other risk sources.

Formatting of the Document

IDTLs and DMs had varying preferences regarding the format of the final NEPA document. A couple of the IDTLs gave their TMs a format for information that they wanted included in the resource specialist reports, which would be used to create the final NEPA document. The typical aspects the IDTLs spoke of were having a clear rationale with data sources, assumptions, methods, and general limitations. It was described that the TMs did not have to prove they were "correct" or "right," but instead, they had to lay out the logic of why they decided to propose an action, used an analysis method, or made a determination. The appearance and defensibility of the document in court was repeatedly stressed.

The researchers specifically examined the environmental effects chapter of the sample documents. The vegetation management project was the smallest document with the least information included. The analysis chapter outlined only the direct, indirect, and cumulative effects of the different alternatives for each resource analyzed in the process. The other four documents from the case studies generally follow an outline described by an IDTL as a format to prepare for appeals and litigation.

You have early in the outline a subject called... the legal framework. And so therein each resource specialist described what's relevant to their expertise and is applicable law, regulation, and policy. And not just say what it is, but list it, particularly the Forest Plan. Anything in the Forest Plan related to your topic, I want to see it there. I want to see it itemized. Okay, you get all that captured up, and you do a pretty comprehensive search of law, regulation, and policy relevant to this resource and this project. Alright, and then you do your effects analysis, and at the end of that, you do a review of the legal framework with regards to the effects that you just disclosed and consistency with law, regulation, and policy. If you do that in a rigorous way and you don't just say yes it is consistent or no, it's not consistent, you say why. If you do a good job with that, in a decision that is going to be challenged, 99 times out of a 100 you're going to be very defensible...This is the subject where your key audience is the judge and appeal teams.

The resiliency, salvage, travel plan, and fire recovery project each included information about the legal framework for each resource analyzed in the document to varying degrees and generally followed the outline explained above. Discussing consistencies and complying with law, regulations, and policy was perceived to decrease technical and procedural risks and contribute to avoiding external relationship risks by including the information that judges and appeal teams were thought to look for in the document.

Process and Resource Risk Summary

Process disclosure techniques were primarily driven by desires to demonstrate compliance with the legal framework, which includes the standards, regulations, and policies with which the USFS must abide. Standards, regulations, and policies were generally established for the purpose of maintaining and improving the quality of the resource, so complying with them could be considered linked to resource protection. However, interviewees described that increased detail in documentation was primarily associated with avoiding public opposition and defensibility in court. Once again, extra time and effort was driven primarily by process-related risks rather than resource-related risks.

Table 13. Final Decision Component Table

Project Activities	Last modifications to chosen action	Negotiations with external groups
Risk Sources	<ul style="list-style-type: none"> • Technical • Procedural • External Relationship • Internal Relationship • Structural 	<ul style="list-style-type: none"> • External Relationship • Internal Relationship
Risk Management Actions by:	<p>DM:</p> <p>Generally, the DMs had the primary role in determining the last modifications to a chosen action. DMs made modifications to alternatives and mitigations to minimize various risk sources. Some examples of reasons included the perception of resource impacts as too close to breaching a standard (technical), continued social-political controversy (external relationship), or budgetary constraints (structural). The primary reasons given for modifications or delays in making a decision were social-political opposition and threats of appeals and litigation.</p> <p>The DM may or may not have made efforts to include the ID team. This could minimize or increase possible internal relationship risks, possibly effecting team morale (see Stern and Predmore 2011).</p>	<p>Generally, the DMs were the primary spokesperson and final negotiator with external public groups when making the final decision. There were intentional delays in making the final decision while DMs negotiated with these groups. It was thought this could improve public relations and minimize the threat of appeals.</p>
	<p>IDTL:</p> <p>The IDTLs may have facilitated communication between the TMs and DM and/or been asked to advise the DM on procedural risk issues.</p>	<p>IDTL and TM:</p> <p>Generally, the IDTLs and TMs seemed to have a minor role in negotiations and adjustments in the final decision component.</p> <p>Changes due to public negotiations sometimes could lower team morale and feelings of empowerment.</p>
	<p>TM:</p> <p>The TMs were sometimes called upon to counsel the DM concerning modifications the DMs perceived necessary because they had the technical knowledge to assure that changes do not cause impacts outside what had been analyzed.</p> <p>When the DM made modifications, some TMs seemed to accept the changes as long as they did not bring impacts outside what had been analyzed. However, some TMs found the DM's ability to change the alternatives they had designed frustrating. This, in turn, lowered morale and feelings of empowerment.</p>	

Final Decision

Last Modifications to the Chosen Action

Though the ID team members proposed possible alternatives in the NEPA process, the DM commonly modified alternatives or even combined alternatives when he or she made the final decision.

One TM explained,

What I have seen done by this decision maker in the past is that we do our best job of developing alternatives to address issues. I have not seen a proposed action selected. I've seen modified proposed actions selected.

The reasons for the changes that the DMs made to alternatives were numerous, including social-political concerns, possibly technical problems causing non-compliance with a standard, or a treatment not being fiscally feasible. The primary emphasis was on minimizing public opposition and threats of appeals and litigation. By making these adjustments to minimize risks emerging from external entities, other risk sources may have increased.

When the DM was going to make a decision that modified the alternatives, he or she sometimes went to the IDTL and TMs to ask if the changes would fall outside what was analyzed during the process and if the changes could cause new technical and procedural risk sources. This could have made the ID team feel like they were involved in the final decision, which one DM expressed as being important.

I think it is important. I mean everybody understands that I sit in the chair, that I'm the decision maker. It's ultimately my responsibility, and I'm the one that signs my name. But I think if they [ID team] feel like I've asked what their thoughts are and what their concerns are, is this the decision you want me to make? Now I may have to go back and say, 'I really would like to do that [the decision the ID team wants], but let me tell you, there's this and this and this. And I've got to deal with those [public issues], and you guys know it. So this is what we are going to do.'

The ID team may or may not have been included in the final decision discussion, but their desired course of action was not always chosen because of public opposition to the project. In the cases above, the DM chose to deal with these conflicting desires by appeasing the wishes of the public, suggesting the public presented the greatest process risk at the time. Despite how ID team members may have felt about this choice, whether they cared or not, they most likely would not purposely hinder the process, while the public group might. The DM also sometimes looked to his staff, upper management, or NEPA coordinators to guide his or her final decision, but it appeared that the desires of public opposition groups, who had the power and motive to delay and impede the process, again received the most attention in the final decision.

The agency personnel and ID team members may have served to help identify and respond to these public issues, but in interviews, ID team members expressed mixed feelings about the practice of catering to the public issues and making changes to the ID team's established alternatives. A TM expressed this about the changes:

As long as it doesn't exceed the effects that I discussed, then I'm fine with it. The problem is you need to be very careful about doing something, adding something. If you move something and the effects are less than what you analyzed, then that's fine. But if you create additional effects, you can't do that because then you need to stop and reanalyze.

This TM did not care if modifications were made by the DM as long as they fit within the analyses done by the specialists. Another conversation showed that a TM on a different project was frustrated when a DM modified alternatives designed by the team because it broke apart the compromises the ID team had made together.

Interviewer: Does it feel bad to not have the package [alternative] taken?

TM: Yeah ...I mentioned that the line officer was involved in the alternative development, but also the specialist cause you are representing a resource. And so, you have ownership, and when you make an alternative, it is almost, I won't say compromise, but sometimes there are compromises. And you feel that's a good balance, but then when things start getting broken out, that package becomes eroded. And some of the compromises then become eroded, and they don't necessarily mean the same as they did before...

This reference and other comments from DMs and IDTLs support that these frustrations were present in more than one instance. An IDTL explained,

[T]he specialists need to realize they are not the decision maker. That their job is to do the analysis and provide the consequences and the ranger or the Forest Supervisor gets to make the decision.

TMs cared about their resource and champion its protection in a project. They worked together to make compromises they felt worked, but the DM may have perceived that more changes were necessary in the final decisions, which were predominantly associated with external process-related risks. This may have been frustrating to some TMs, because it discounts the decisions they had already made in the process. Generally, the TMs and IDTLs accepted that the DM had the right to make these changes, but if the DM made these modifications without discussing it with the ID team, it could contribute to contention in internal relationships.

In the interviews, there were two primary examples of methods that seemed to decrease internal relationship risks during the final decision process. In one example, the ID team was invited to give their opinion on the final decision, but it came to the attention of the DM that he/she would have to make a decision that was against the views of a specific TM. The TM explained how the DM was aware that a certain TM would not be pleased with a decision, so the DM went and talked with that person.

I remember a few specific things that I had fought pretty hard for. I felt pretty passionate about treating a specific unit, but they had issues with other resources. And I remember in decision he [the DM] came and said listen here's how I am going to go. How do you feel about that? Can you live with it? You know if you can't live with it, we will do something different...

The DM went out of his way to check if the TM could "live with" the decision, suggesting that he in some way cared about the well-being of the specialist and respected the specialist's opinion. The TM appreciated that the DM would do this when he was making changes to resource treatments or areas that were important to the TM. It mollified some of the TM's frustrations and engendered respect and trust in the DM. It was explained by the IDTL that though some ID team members did not always personally agree completely with the final decisions made by the DM, they generally trusted him to make the appropriate decision. Maintaining interaction between the DM and the ID team when making adjustments in the final decision helped to manage not only technical and procedural risk, but also internal relationship risk related to staff morale and future teamwork.

Negotiations with External Groups

The DM, or the District Ranger below the DM, was most commonly the spokesperson or negotiator with external entities during the final decision's deliberation. The extra effort to work with these public groups was intended to diminish external relationship risks and avoid unwanted outcomes, such as appeals and litigation. One DM explained,

The county commissioners were not keen on us not designating more [roads]...They were working it through the governor's office, so we just had one delay after another... The rhetoric was well, you're not listening to us. Well, is it that we're not listening or that we're not coming up with the answer that you want? Those are two different things, and so we spent a lot of extra time courting those relationships. We could have made that decision long before...but we needed to spend, we needed to make sure our primetime players were, I don't want to say comfortable, that might be too strong,

but we, I wanted to minimize the threat of appeal and litigation and so that meant spending a little extra time courting, making sure that they felt that they truly were involved.

This describes a situation in which great care was taken to work out the final details so that the project could hopefully be implemented without appeal or harm to external relationships. It appeared in other components of the NEPA process that the ID team was able to share this role of minimizing the external relationship risk sources, but our examples from the interviews seemed to indicate that management of the external relationship risks in the final decision was primarily the DM's responsibility. For instance, in the vegetation management project, the ID team handled the local concern adjustments during the process more than the DM. However, the project received an objection from one land owner at the final decision, and the DM stepped in to work through that objection. The ID team did not share in this responsibility.

Process and Resource Risk Summary

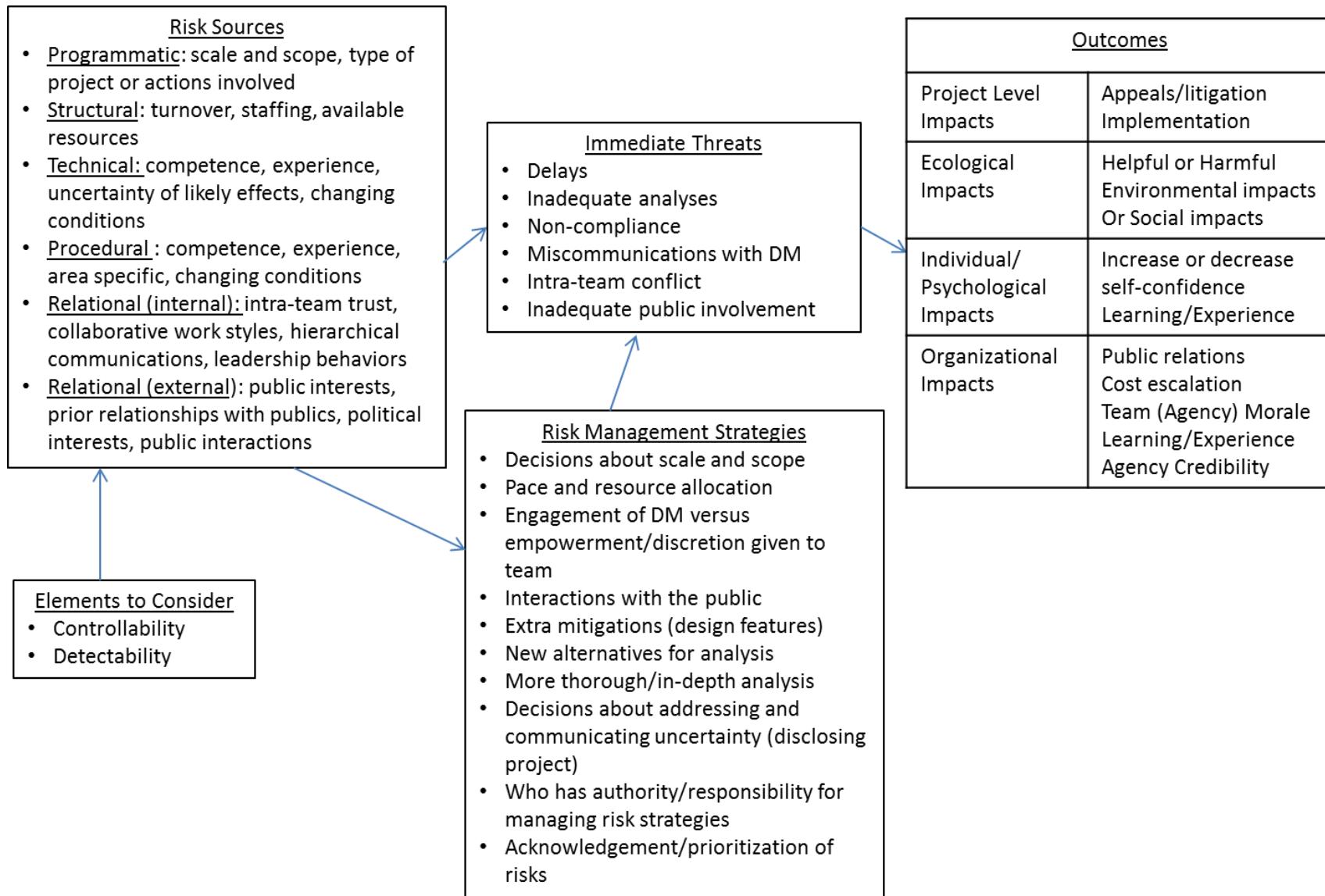
DMs had the primary control of making incremental decisions as the final decision was approached. The DMs sometimes asked for advice from the ID team to prevent causing more technical or procedural risks through modifications. These changes sometimes caused strife in internal relationships but not always. Making modifications in the final decision may have contributed to resource protection, but the primary emphasis for modifications in our sample was to diminish process risks.

Section III: Exploring Decisions in NEPA Risk Management

The previous section discusses how risk sources were identified and managed in different NEPA decision components. In this section, we summarize how risk was managed in the NEPA process, examine how focusing on process vs. resource-related risks appeared to affect risk management decisions, and then look more closely at the explicit decisions that were observed in the NEPA process and general implications of those choices.

As risk sources were identified in different NEPA decision components, the implementers and DMs made explicit decisions regarding what type of risk management strategy they would use to diminish threats and unwanted outcomes in the process. Figure 2 depicts the relationships between these risk sources, threats, outcomes, and risk management strategies that emerged during the research. The figure shows that risk sources emerge, or are anticipated, in the process. These risks can lead to threats and impact outcomes if they are not managed. However, risk management strategies can be used in an effort to minimize these threats and promote desired outcomes.

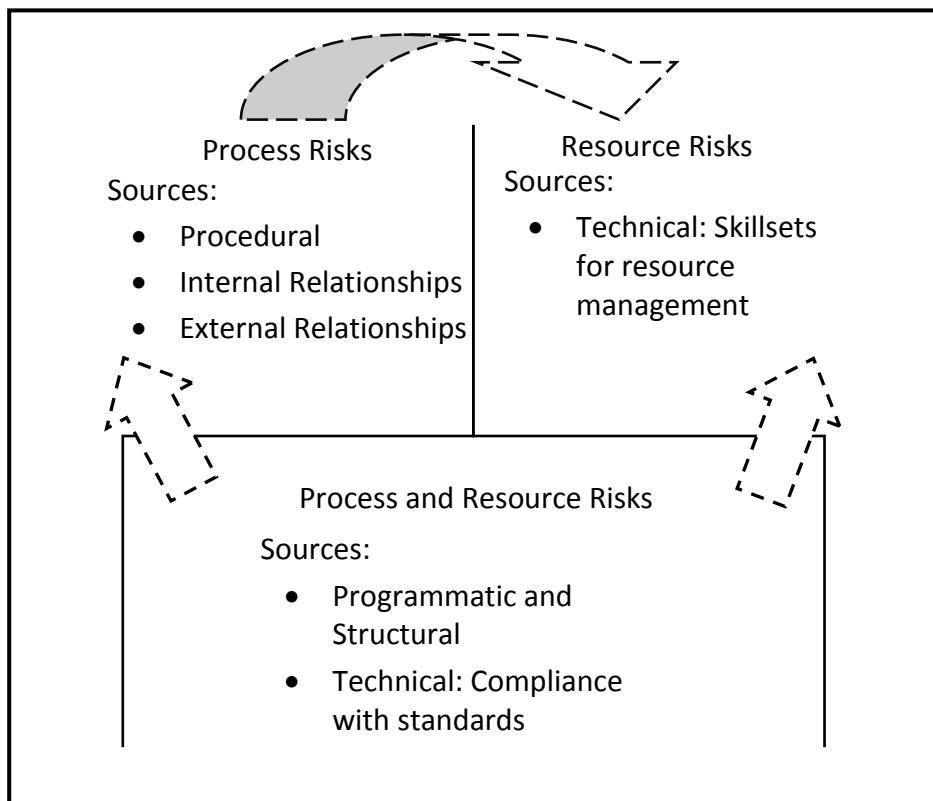
Figure 2. Interactions of Risk Sources in the NEPA Process



As risk sources emerged in the process, they were addressed by TMs, IDTLs and DMs, who have differing roles in managing certain risk sources and determining which risk management strategies to utilize. In the cases studied, certain risks sources were given priority more often than others. MacGregor & Seesholtz's (2008) categorization of resource-related and process-related risks is useful in explaining some of this prioritization.

Figure 3 depicts the relationships between resource and process-related risks. All risk sources can be linked to resources in some way, but some risk sources are clearly more process-related, due to decisions being made to respond to procedural or relationship risks first and foremost. The following bullets describe how each risk source relates to the process or resource more directly.

Figure 3. Relationships of Process and Resource Risk Sources



- **Programmatic and structural risks** are both process and resource-related risks. They are dependent upon the objectives and external context of the project and are managed by determining the needed allocations, scale, and scope of the project. Implementers and DMs can either take on higher process risk to possibly have better resource protection outcomes, or they can avoid the process risk by excluding controversial resource areas or treatments from the project, regardless of whether the resource treatment is needed.
- **Technical risks** are also both process and resource-related. Having the technical skillsets for resource protection in a project is highly linked to resource risk. The TMs primarily have these skillsets that directly influences whether treatments maintain or improve the resource. Technical risks also include compliance with resource standards, which can contribute to resource protection, but it is more directly linked to process-related risk in the form of mandated guidelines or regulations.
- **Procedural, internal, and external relationship risks** can be indirectly connected to resource risk through process risk.
 - Procedural requirements and risks, handled mostly by IDTLs, are more directly connected to affecting process risk by maintaining or not maintaining process compliance.
 - Internal relationships can affect the working relationships of the process, affecting process risk and staff outcomes.
 - External relationships can affect public relations and how the agency responds to threats the public poses to the process.
 - Each of these can affect resource risks by contributing to completing and implementing processes.

This research reveals that incremental decisions in the NEPA process are often based on process-related risk management and that even resource risks are linked to process risks. Generally, NEPA projects are intended to maintain or improve the condition of the resource. To reach this goal, NEPA procedures must be completed. As such, managing process-related risks contribute to the ultimate goal of implementing the project and resource management. Many types of process risks received attention from the interviewees, but risks from external entities, in the form of opposition and threats of appeal/litigation, received the primary focus and energy of the TMs, IDTLs, and DMs. Anticipated and emerging public opposition contributed to changing the scale and scope of a project, increasing the number and modifying alternatives and mitigations, increasing analyses and disclosure, and modifying the final decision. These changes, extra precautions, and defenses were put into the

process and document because they were thought to minimize or defend against threats to implementing the process. Table 14 goes into more detail about these explicit incremental decisions made in different NEPA decision components and explores some of the major risk management strategies and their implications.

Table 14. Incremental Decision Options in NEPA Processes

Component	Types of Decisions, Strategies, and Implications Faced in NEPA Processes
Planning Scale and Scope	<p>Actors decide the scale, scope, and time/resource allocations of a project.</p> <p>Strategies</p> <ul style="list-style-type: none"> ○ Change scale and scope: <ul style="list-style-type: none"> ▪ Prepare: Establish a scale or scope that includes controversial resource types or treatments and prepare by strategizing more about public involvement and analysis ▪ Avoid: Narrow the scope and avoid involving certain controversial resource types or treatments <p>Implications</p> <ul style="list-style-type: none"> ○ Change scale and scope: <ul style="list-style-type: none"> ▪ Prepare: This could engender more public support and trust for the project and create more information to make a decision, or it could be a costly source of delay and public opposition. Either way it may bring cost escalation. ▪ Avoid: This could avoid costly delay and opposition from the public, but it also limits the scale and scope of resource treatment in certain areas. Attempts to parse out and manage individual ecological components or land areas within an ecosystem are thought to hinder overall ecosystem management (Committee of Scientists 1999). There is also no evidence that smaller projects have any better chance of avoiding opposition than larger ones.
Project Design	<p>Actors decide on the number of alternatives and mitigations that are going to be included in the project design.</p> <p>Strategies</p> <ul style="list-style-type: none"> ○ Amount: <ul style="list-style-type: none"> ▪ Have more: a wider range of alternatives and more mitigations ▪ Have less: fewer alternatives and/or mitigations

	<p>Implications</p> <ul style="list-style-type: none"> ○ Amount: <ul style="list-style-type: none"> ▪ Have more: More alternatives may provide decision space for the DM to avoid, diffuse, or appease process risks from public opposition, or by having multiple alternatives, it may also create divisiveness by people choosing one alternative and being unwilling to change their stance (See Stern and Mortimer 2009). More alternatives also can add a greater analysis workload, and the project can still be accused of not having a full range of alternatives. ▪ Have less: Fewer alternatives may be deemed appropriate in a project, but the agency may be more likely to be accused of not having a sufficient range of alternatives.
Scoping and Public/ Interaction	<p>The actors make decisions on how they will incorporate the public.</p> <p>Strategies</p> <ul style="list-style-type: none"> ○ Timing: <ul style="list-style-type: none"> ▪ Public involvement early ▪ Public involvement late in process ○ Amount: <ul style="list-style-type: none"> ▪ Allow lots of public involvement ▪ Avoid involvement ○ Techniques: <ul style="list-style-type: none"> ▪ Formal ▪ Informal ○ Who interacts with the certain publics: <ul style="list-style-type: none"> ▪ DM ▪ ID team <p>Implications</p> <ul style="list-style-type: none"> ○ Timing: <ul style="list-style-type: none"> ▪ Early: Having public involvement early may bring support to the project, but it may also bring earlier controversy and more delay. ▪ Late: Having it late may or may not cause delay. It may or may not cause more controversy as more elements in the projects become established without public involvement. ○ Amount: <ul style="list-style-type: none"> ▪ More involvement: More involvement can require the agency to respond to more information, which can cause delay. It also exposes the project to greater public scrutiny. ▪ Avoid involvement: Avoiding or having less involvement may initially cause less delay, but it could cause controversy in the final decision, causing delay at that point. ○ Techniques: <ul style="list-style-type: none"> ▪ Formal: Formal involvement may shield some agency personnel from types of public opposition. It may engender less public trust or harm

	<p>public relationships. It may signify that the agency is preparing more for defending their actions to the public and to the courts.</p> <ul style="list-style-type: none"> ▪ Informal: Informal allows more avenues of public comment possibly putting the agency personnel and the project under greater public scrutiny. This may engender more public support and better relationships with the public; however, it could mean more delays and controversy. ○ Who: <ul style="list-style-type: none"> ▪ The DM may become more involved in the process when interest groups or political leaders are seeking involvement. ▪ The DM may still be involved, but when local community concerns are raised, the ID team may be able to make the adjustments needed to work with local publics.
Analysis	<p>The actors decide the types of analyses necessary and the level of detail.</p> <p>Strategies</p> <ul style="list-style-type: none"> ○ Types of analyses: <ul style="list-style-type: none"> ▪ More types ▪ Less types ○ Detail of analysis: <ul style="list-style-type: none"> ▪ More detail ▪ Less detail <p>Implications</p> <ul style="list-style-type: none"> ○ Types of analyses: <ul style="list-style-type: none"> ▪ More: Having more analyses can be a defensive strategy against public opposition and appeals and litigation. It can bring more information for the decision, but it can also cause delay and more costs. ▪ Less: Fewer analyses may lead to appeals and accusations from the public that a resource was not adequately analyzed, or it may be deemed that more analysis is not necessary for the projects without public relations repercussions, leading to less time and energy costs to the process. ○ Detail of analysis: <ul style="list-style-type: none"> ▪ More detail may be more defensible in court. ▪ Less detail may leave exposure for public accusations of analysis being inadequate. Less detail may also contribute to inadequate analysis and possible harm to the resource. However, the specialist may not think more detail is necessary, and the public may not be interested in a certain resource. Less detail may thus be more cost effective and appropriate.
Disclosure	<p>The actors decide how much disclosure is adequate for the project.</p> <p>Strategies</p> <ul style="list-style-type: none"> ○ What information to disclose: <ul style="list-style-type: none"> ▪ Disclose about more different types of resources or treatments

- Disclose less about different types of resources or treatments
 - How much detail to disclose:
 - Disclose more detail about resources
 - Disclose less detail about resources
 - Disclosure of legal compliance with standards, regulations, and policies:
 - Emphasize legal compliance in disclosure
 - Legal compliance is not emphasized in disclosure
- Implications**
- What information to disclose:
 - Disclose about more: This may or may not defend against public opposition and appeals/litigation by more comprehensively disclosing the resources that could be affected by the proposed treatments. It can be costly in time and energy for the ID team
 - Disclose about less: This could bring a greater likelihood of public requests for information or opposition concerning resource effects that were not disclosed or disclosed as fully. This could initially bring less cost and delay, but if public opposition and accusations arise, more costs and delay could follow if work has to be redone. However, the specialist and public may not be concerned about a specific resource so disclosure about it is not necessary, leading to less cost.
 - How much detail to disclose:
 - Disclose more detail: More detail about resources may or may not defend against public opposition and appeals/litigation. It is more costly and adds more work. It may deter the public from asking for the project record if more detail is in the final document, which can alleviate public scrutiny and the project work load.
 - Disclose less detail: This can be acceptable when the public and specialist are not concerned about having more detail about a resource disclosed. It can save time and money if public opposition does not arise. However, if some part of the public is not satisfied with the level of detail, they could request the entire project record, which could bring more public scrutiny on the project and more work for the ID team.
 - Disclosure of legal compliance with standards, regulations, policies
 - Emphasize legal compliance: This can help prepare for defense in appeals and litigation and diminish appeal points available to the public to oppose the process. It can be labor intensive, but it can help get a project implemented.
 - Legal compliance not emphasized: The agency may deem that stressing legal compliance is not necessary because of the nature of the project. They may not be preparing to go to court. This may be less costly, but it may leave appeal points or inadequacies that may contribute a project losing in court.

Final Decision	<p>The DM makes final modifications to the chosen action based on interactions with external entities and possibly the opinions of the specialists.</p> <p>Strategies</p> <ul style="list-style-type: none"> ○ Modifications to alternatives or mitigations: <ul style="list-style-type: none"> ▪ Make modifications to alternatives or mitigations ▪ Modifications are not made to alternatives or mitigations <p>Implications</p> <ul style="list-style-type: none"> ○ Modifications to alternatives: <ul style="list-style-type: none"> ▪ Make modifications: The DM may deem it is necessary to make modifications to the project design established by the ID team. The TMs may or may not feel frustrated by these changes yet may have little power to protest the changes. The changes may be to avoid impacts to the resource, but many times the changes diminish unwanted public opposition or appeals/litigation concerning the final decision. This could cause delay in the making the final decision. ▪ Modifications not made: If modifications are not made, it could be because the public is not interested in the project, or the agency thinks the established project design options are adequate. The project could be implemented without delay, or the lack of modifications could contribute to public opposition and appeal/litigation of the process, causing delay and more costs.
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CHAPTER 4

We highlight the key observations about risk management decisions made in the sampled NEPA processes that surfaced in the study. These observations include which actors appeared to take responsibility for managing different forms of risk at different points in the NEPA processes and how process or resource-related risk sources are prioritized. We also discuss some of the potential implications of these observations on NEPA projects and the agency as a whole, particularly with regard to organizational learning, social learning, ecosystem management, and organizational culture and morale.

Risk Decisions in NEPA

The USFS does not explicitly direct its personnel to conduct risk management in the NEPA process. However, the general response to different pressures felt by USFS personnel conducting NEPA has been to incorporate implicit or explicit forms of risk management into incremental NEPA decisions to avoid unwanted process outcomes. In our cases, the prominence of different risk sources varied, but their presence was always evident in some form. As risk sources surfaced, different actors (TMs, IDTLs, and DMs) were observed taking responsibility for assessing and responding to different risks. Certain risks were also emphasized over others in terms of the energy and attention they received. Though they interrelate, in our sample cases, process-related risks generally received more attention than resource-related risks with regard to driving incremental decisions and modifications made throughout the processes.

Managing process-related risks may eventually contribute to reducing resource risks, but in the short-term, time and energy are rather allocated away from direct resource management efforts. NEPA mandates that the agency conducts an environmental analysis to consider and fully disclose likely

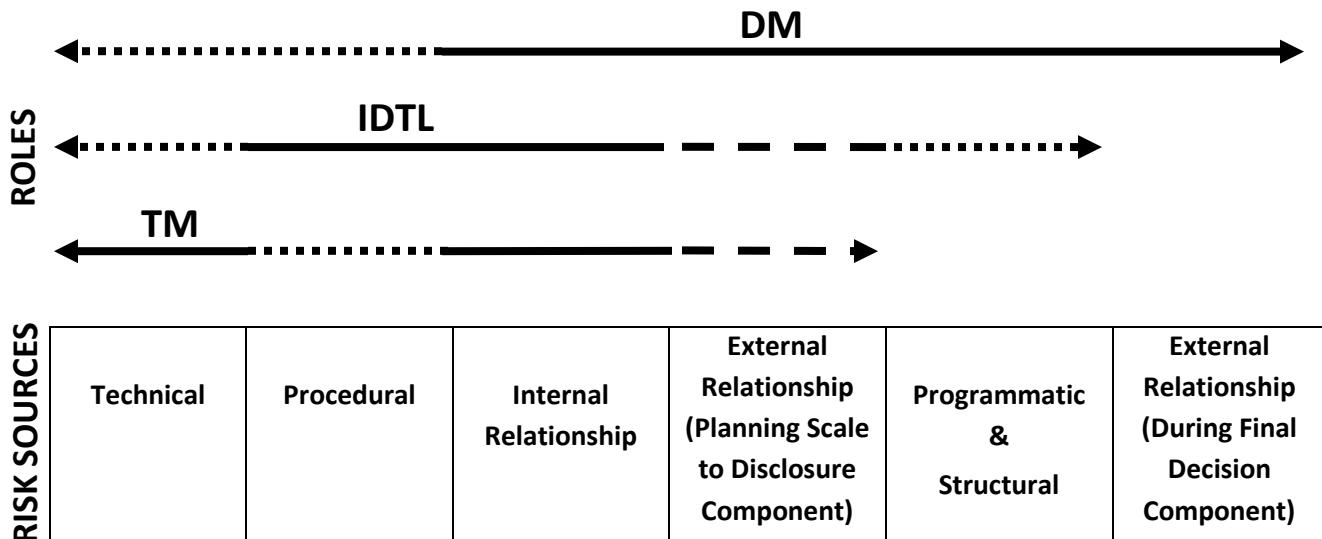
impacts prior to implementing major actions that may result in a significant impact on the environment (42 USC Sec. 4321-4347). The practice of considering and disclosing possible resource impacts puts external pressure on the agency by exposing resource management decisions to additional public scrutiny (Ackerman 1990, Espeland 1994). Agency reactions to these external pressures in our sample cases included: working to anticipate public issues, incorporating extra resource protection measures, increasing the detail of analyses and disclosure, or otherwise adjusting project design to lessen public interest or to defend against potential lines of attack. Interviewees indicated that addressing process-related risks would sometimes result in what they considered to be sub-optimal resource management. The implementers we interviewed regularly made trade-offs between what they considered to be sub-optimal management vs. the threat no management at all if a project might be stopped altogether. In other words, it was better to get something implemented, even if it was not the best case, than to run the risk of having the entire project hung up in appeals or litigation. As such, emphases on process-related risks commonly shifted implementers' perceptions of resource risks, moving their foci from what they considered to be best for the resource to what they considered to be acceptable, so that at least partial resource management could be implemented. One TM described a DM's actions this way,

This decision maker was very good at that saying, 'Okay, if I make this decision, I best meet the purpose and need; however, I have a very high likelihood of appeals and litigation. In this case, meeting the purpose and need is time sensitive. Appeal and litigation affect time. I therefore cannot take that risk, because I can't meet my purpose and need, so it is best to back off in the beginning and less meet my purpose and need instead of not at all.

Perceived Responsibilities and Risk Management

Agency actors (DM, IDTL, TM) took differing roles in managing certain risk sources. While risk responsibilities were not formally assigned, the capabilities and general process roles of each actor typically formed perceived responsibilities or shared expectations in risk management. Some of these divisions of responsibility were clearer than others. The literature suggests that risk management improves when responsibilities for risk management are made clear (Pritchard 1999, Parker and Mobey 2004). The lack of clearly assigned responsibilities for risk management in Forest Service NEPA processes may pose particular challenges in cases when responsibilities are ambiguous. Figure 4 depicts the perceived responsibilities that TMs, IDTL, and DM felt for each risk source based on this study. Solid lines in Figure 4 indicate greater perceived responsibility. The dashes indicate moderate or variable degrees of responsibility felt by each actor. Dotted lines indicate lower degrees of felt responsibility, and no line depicts very little to no responsibility.

Figure 4. Perceived Responsibilities for Risks



The interviews revealed some tendencies for certain forms of risk to be addressed by different actors. We discuss these roles below and how each relates to process-related vs. resource-related risk management.

Technical Risk

TMs tended to primarily manage the technical risks associated with maintaining resource protection and compliance with applicable regulations and policies that dictate acceptable levels of resource impact. They most commonly reported recycling known treatments or methods unless they were directed by the DM, IDTL, or prior court decisions to use an alternative method. In some projects, the IDTL or DM may have training as a specialist, giving them technical resource competence to more directly guide the treatments and analytic methods used in the project.

Of the different risk sources observed in the NEPA processes under study, technical risk was the most directly related to resource risk. TMs were especially focused on the resource protection part of technical risk. In addition to their technical training, they were typically first and foremost concerned about protection of the resources they study (see also Stern et al. 2010a). Technical risk also involves maintaining compliance with resource standards. Compliance addresses both resource and process risk. In addition to meeting resource protection standards, interviewees viewed compliance as a means to avoid appeal points and other external threats that may hinder the process. IDTLs and DMs joined the TMs in ensuring compliance with resource standards. Some examples of managing process-related technical risk included changing treatment methods or adding treatments that would go above what was considered necessary to protect the resource in hopes to appease or receive favor from external entities, particularly potential appellants and the courts.

Procedural Risk

The primary risk management responsibility for the IDTLs in the case studies was to maintain compliance with NEPA procedure throughout the process. In our sample, TMs and DMs did not claim to have this competence. Addressing procedural risks helps to ensure that the process is not impeded by non-compliant project elements. Otherwise, non-compliance is an obvious appeals point or grounds to lose a case in court, preventing or hindering implementation.

External Relationship Risk

TMs and IDTLs each had a role in building relationships with some groups of the public and other agencies, but the relationship DMs built with locals, political leaders, and broader interest groups were perceived to be more critical in public involvement, especially when the final decision was being made. This may have shielded the TMs and IDTL from some social-political pressures. Risk management strategies primarily involved assessing and reacting to public issues in a manner that was perceived to appease the public, be defensible in court, and increase the likelihood of project implementation. There were also some instances in which interviewees reported that substantive comments from the public contributed to better resource protection or that public involvement contributed to achieving implementation of the project. As such, while external relationship risks were primarily process-related, they also had some impacts on resource management.

Internal Relationship Risk

The NEPA requirement of having an ID team was intended to give the decision maker more diverse and complete information (Tipple and Wellman 1991, Stern and Predmore 2011). In this way, the ID teams have the potential to help make better resource management decisions as they function in collaboration and pull together differing expertise. However, this was not always the case. All

implementers and DMs were subject to threats of internal relationship risks. The IDTLs were expected to maintain communication between the DM and the ID team and facilitate interaction among the TMs. The TMs were expected to collaborate. Strained internal relationships may diminish resource protection, contribute to delays, and lower team morale (Stern and Predmore 2012). Strained relationships could also have impacts on relationships with external stakeholders, through inconsistent communications, affecting process outcomes (Stern 2010). In our case studies, interviewees expressed relatively high degrees of team harmony, with few exceptions. These exceptions included turnover of positions on the ID team and DMs' final decisions that did not conform to the opinions of the ID team. Each posed challenges to team morale. Team members greatly appreciated DMs who openly sought input from the team before modifying alternatives in the final decision phase in response to process-related risks.

Programmatic and Structural Risk

While DMs may have been advised by their staff, regional officials, and possibly the IDTL, decisions about scale, scope, and resource allocations were predominantly in the hands of the DMs. The TMs seemed to have little to no influence on these decisions. Programmatic and structural risks were managed by making adjustments and allocations for a project based on anticipated technical needs, procedural requirements, and external pressures. In some cases, certain areas might be removed from a project to assuage external relationship risk. If a larger scope were included, interviewees might increase allocations time, staff, and energy due to anticipating greater external relationship risks. Programmatic and structural risks developed from early trade-off decisions and affected what additional risks emerged or dominated the process and outcomes. In our cases, when larger scales or intensities of treatments were proposed, it raised more controversy and opposition later in the process. When process risk management was emphasized and treatments were dropped, process risks may have been diminished, but effective resource management may have been diminished as well.

External Relationship-Driven Risk Management

Our findings suggest that greater energies were typically expended attempting to address process-related risks, particularly those associated with external relationships, instead of resource-related risks. These findings are consistent with prior research. Mortimer et al. (2011) found that agency personnel typically would choose to conduct a more labor-intensive EIS instead of EA, not based on possible significant impact to the resource but instead based on external social pressures that could impede the process. Agency personnel reported beliefs that EISs were more defensible in appeals or court, even though data suggested this not to be the case (Mortimer et al. 2011). Using their own terminology and phrasing, interviewees in the current study indicated that they thought external entities had the most potential to hinder process implementation and possibly other desired process outcomes. We discuss the implications of this focus of energy within USFS NEPA process decision-making.

Implications

While multiple decisions are made and relevant actions are taken before and after NEPA processes, we focus on the implications of decisions made within the processes themselves. Our interviews indicate that these decisions were commonly based on attempts to manage risk posed by external entities, in particular public interest groups and the courts. Tradeoffs were commonly made that interviewees felt would compromise the resource management that they perceive as optimal to satisfy concerns of the public or to make the process more defensible in court. This phenomenon is not necessarily good or bad, as what is best for the resource is socially constructed by both agency personnel and external entities, and each may have competing ideas about what ought to happen on

the landscape. We discuss some potential implications of the focus on process-related risk regarding organizational learning, social learning, ecosystem management, and internal team relationships.

What are the implications of focusing on process-related risk for learning within the organization?

Learning, in which experience gained is used to modify the next action to better reach a desired end, is not a novel idea (Edmonson 2002, Brown and Squirrell 2010). In organizational learning, organizations use acquired experience to make changes that maintain or improve organizational actions (DiBella 1996, Argote and Miron-Spektor 2011, Edmonson 2002). Experience-driven learning on the individual and organizational level has been connected to better natural resource management through a process called adaptive management (Holling 1978, Walters 1986, Lee 1993). Adaptive management uses natural resource management actions as learning opportunities or purposeful experiments to adjust future actions and policies (Stankey et al. 2005, Brown and Squirrel 2010.). In this manner, natural resource organizations can learn how to better manage the resource.

Learning through adaptive management has been recognized as a critical component of ecosystem management, the espoused approach of the USFS (Christensen et al. 1996, Johnson et al. 1999, Butler and Koontz 2005, Predmore et al. 2008). Ecosystem management has been defined by multiple authors and emphasizes the “scientific knowledge of ecological relationships with a complex sociopolitical and values framework toward the general goal of protecting native ecosystem integrity over the long term” (Grumbine 1994, 31). With the complexities of land management, this definition points out that ongoing learning about ecological and social-political issues and changes is necessary for natural resource professionals, including USFS personnel (Daniels and Walker 1996).

Adaptive management potentially can be used in the NEPA process to promote ongoing learning to improve the management and protection of resources through monitoring the environmental impacts of actions. This contributes to incrementally improving the ecological knowledge required in

ecosystem management. However, despite this potential and its wide acceptance as an idea, the adaptive approach has had variable results (Walters 1997, Karkkainen 2003, Stankey et al. 2003, Butler and Kootnz 2005, Brown and Squirrel 2010, Cundill et al. 2012). One of the major criticisms is that the agency lacks adequate ecological monitoring (Karkkainen 2002, Bear 2003, Pouyat et al. 2010, Schultz 2008, 2012). We posit the extensive energy and time that the agency focuses on process-related risk management may be contributing to the slow establishment of ecological monitoring and adaptive ecosystem management.

While a focus on process-related risk may lead to adaptive organizational learning in one sense, it may hinder it in another. The focus on process-related risk directs agency personnel to encourage and reward learning that promotes better procedural compliance, better defensibility in appeals or court, and better assessment and pacification of public controversy. To do this, the ID teams consult NEPA advisory personnel, attend appeal proceedings, and monitor court rulings for analysis and project design modifications that may make a project more likely to be implemented. Through these efforts, agency personnel learn how to better manage process risks, which is undoubtedly useful in completing processes. However, these actions require tremendous energies and are quite labor-intensive. In an era of tightening budgets, this expenditure may come at the opportunity cost of monitoring ecological outcomes necessary for learning about and enhancing resource management strategies. They also may limit learning that could arise from treating interactions with public entities more as learning opportunities about effectively managing social-ecological systems (Daniels and Walker 1996, Reed et al. 2010, Cundill et al. 2012).

Learning to develop and adapt to changes is necessary for an organization to remain resilient and sustainable (Baral and Stern 2011). The question becomes what type of learning does (or should) an organization prioritize or value more? Learning from process elements is arguably necessary and

valuable in the NEPA process. Without projects being implemented, resource maintenance and improvement would not occur, so being vigilant to minimize process risks can be a means to the end of resource management. However, the increased energy devoted to this learning could be contributing to slowing the establishment of adaptive ecosystem management in the USFS through diverting energy away from the ecological experimentation, monitoring, and assessment necessary to continually enhance resource management through effective organizational learning. It seems in some incremental decisions in NEPA, the process-related emphasis may be beneficial to organizational learning, and in others it may be less beneficial.

What are the implications of focusing on process-related risk for social learning in NEPA?

Social learning is another component of adaptive management which has increasingly become a generally accepted goal in natural resource management (McLain and Lee 1996, Stringer et al. 2006, Reed et al. 2010, Cundill et al. 2012). Social learning is not simply stakeholder participation, in which people are engaged in the decision-making processes that affects them, nor does stakeholder participation always lead to social learning (Reed et al. 2010). Social learning involves active exchanges between the agency and stakeholders, which result in shifts in understanding within all parties that extend from the individuals involved throughout their social networks (Daniels and Walker 1996, Reed et al. 2010, Cundill et al. 2012).

NEPA requires certain forms of public involvement in planning (Predmore et al. 2011), but the initiative to move to adaptive ecosystem management encourages more than just traditional public involvement that seeks to educate and inform the public or to receive comments back from the public. While public involvement can be seen in NEPA planning as a way to assess and alleviate public controversy and conflict (Stern and Mortimer 2009, Stern et al. 2010b), Daniels and Walker (1996) suggest that is not what social learning seeks to do. “The challenge in social learning is therefore not to

resolve or eliminate conflict; rather it is to learn about complex issues in an inherently conflictual environment” (Daniels and Walker 1996, p. 74). As a component of adaptive management, social learning seeks to establish lasting learning relationships between agency personnel, scientists, and the many stakeholders that can foster mutual, ongoing learning and understanding (Stankey et al. 2005). This requires new perspectives about public involvement that include openness to learning and finding shared meaning within conflicting situations.

In general, activities conducive for social learning have not been widely incorporated into the natural resource management (Daniels and Walker 1996, McLain and Lee 1996, Cundill et al. 2012). We observed one case within our sample in which explicit social learning appear to take place. In the resiliency project, the interviewees reported examples of building common meaning in formulating problems and experiencing changed perspectives among the agency and stakeholders during the project. These experiences were reported to improve external relationships as a result of the process, easing project implementation. In the other cases, though some public comments contributed more directly to enhanced resource management, at least one interviewee in every sample case described public involvement as a defensive strategy intended to decrease controversy and complete projects rather than to invoke greater understanding among the individuals involved. Major investments of energy and effort were focused on changing mitigation strategies, alternatives, analyses, disclosure, and final decisions to avoid conflict with the public and process risks.

If a system of interaction that promotes shared meaning and social learning in NEPA processes is to be established in more projects, it will most likely take intentional activities and large investments of time and energy (Mathev et al. 2011). Focusing on process-related risk and getting projects completed in a timely manner may hinder this transition if and as it occurs.

What are the implications of narrowing scale and scope due to process-related risk?

Adaptive ecosystem management calls for holistic thinking, in which the ecosystem is seen as a holistic unit. Attempts to parse out the ecological components or land areas within an ecosystem are thought to hinder overall ecosystem management (Committee of Scientists 1999). Despite this alleged impediment, research pertaining to NEPA has found that USFS personnel prefer to narrow the scale and scope of projects or divide the project into smaller more manageable parts when the project is expected to be controversial (MacGregor and Seesholtz 2008, Stern et al. 2010a). This practice is perceived to decrease the possible points that can be criticized by the public by declaring points of controversy outside the scope of the project (Stern and Mortimer 2009). In our sample, points of controversy, such as Roadless Areas, were removed because they were perceived to bring increased process risk. While we cannot evaluate what might have happened if the area was not excluded, opportunity costs clearly exist and would benefit from further exploration. We are not aware of any empirical data that shows piecemeal NEPA is more effective at diminishing external relationship risks than large-scale NEPA, nor are the impacts known on ecosystem management objectives.

What are the implications of focusing on process-related risk for relationships internal to the agency?

The research of Stern and Predmore (2012) suggests that internal team functioning and relationships may be the most powerful drivers of NEPA process outcomes in the USFS. Agency personnel also commonly viewed effective intra-team collaboration and intra-agency communication as top contributors to greater success in NEPA processes (Stern et al. 2010a). Despite this apparent importance, actions described by interviewees in our cases suggest that external relationship risks were given the highest priority in risk management, while internal relationships risks were among the lowest priorities and given the least energy and attention.

In sample cases, discretion in decision-making was generally given to the ID team when it came to technical or procedural tasks needed to maintain resource protection. As controversy with external entities about certain issues increased, however, the DM appeared to reclaim some of that discretion by adding or making changes to aspects of the ID team's process decisions. In some cases, these changes were accepted and even welcomed as needed modifications without much consideration from the ID team, but in others, we found that these changes were sources of frustration because the resource specialists' expert advice was not followed or because of perceptions of changing expectations from supervisors. Despite possible increased strain on internal relationships, it was generally thought by agency personnel that decisions made to appease the public or prepare for the courts were preferable, because they were thought to increase the chances that the project would be implemented and/or be less contested.

Internal relationship risks may not always emerge on every process. The ID teams in our sample cases reported predominantly positive internal relations. However, interviewees commonly relayed moments of strife about projects outside of our sample cases. Though these implications may not pertain to every process, they raise an important consideration. As the actors allocate their limited time and energy to diminish resource impacts, comply with procedure, and add extra considerations to accommodate and defend against public opposition, little energy and time may be left to manage internal relationship risks if they arise.

Conclusion

NEPA processes are made up of multiple incremental decisions that direct the path of the process. Though advising personnel, external entities, standards, and regulations have influence on these decisions, the primary locus of control in these decisions remains with the implementers and DMs. Through interviews with these actors concerning why they make certain decisions in NEPA processes,

risks to the process and the resource consistently emerged as dominant considerations. Within our sample, there were multiple risk sources that emerged in the context of NEPA. Often times, these sources competed for attention from the IDTL, TMs, and DMs that share and specialize in managing different risk sources. We found that process-related aspects of risk received more focus over the resource-related aspects in decision-making throughout the process. Risk management strategies were often developed in reaction to a perceived external social risk or pressure from external entities. While this socially driven process-related emphasis may have been clearly intended by NEPA, it may cause trade-offs with potentially negative implications for agency morale, organizational and social learning, and adaptive ecosystem management. These findings align with other research efforts on Forest Service NEPA processes (MacGregor and Seesholtz 2008, Stern et al. 2010a, 2010b, Mortimer et al. 2011, Stern and Predmore 2012). They also build greater understanding on how risks are managed in the process by different actors. Future research is needed in these areas to determine if they are a general trend and if the suggested implications are supported.

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APPENDIX A: IRB Approval Letters



Office of Research Compliance
Institutional Review Board
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Website: www.irb.vt.edu

MEMORANDUM

DATE: September 21, 2011

TO: Marc Stern, Caysie Taylor

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)

PROTOCOL TITLE: Influences and Accountabilities in the USFS NEPA Process

IRB NUMBER: 11-752

Effective September 20, 2011, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the new protocol for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

PROTOCOL INFORMATION:

Approved as: **Expedited, under 45 CFR 46.110 category(ies) 6, 7**

Protocol Approval Date: **9/20/2011**

Protocol Expiration Date: **9/19/2012**

Continuing Review Due Date*: **9/5/2012**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federally regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

Invent the Future

VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY
An equal opportunity, affirmative action institution

*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office (irbadmin@vt.edu) immediately.



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MEMORANDUM

DATE: December 2, 2011

TO: Marc Stern, Caysie Taylor

FROM: Virginia Tech Institutional Review Board (FWA00000572, expires May 31, 2014)

PROTOCOL TITLE: Influences and Accountabilities in the USFS NEPA Process

IRB NUMBER: 11-752

Effective December 2, 2011, the Virginia Tech IRB Chair, Dr. David M. Moore, approved the amendment request for the above-mentioned research protocol.

This approval provides permission to begin the human subject activities outlined in the IRB-approved protocol and supporting documents.

Plans to deviate from the approved protocol and/or supporting documents must be submitted to the IRB as an amendment request and approved by the IRB prior to the implementation of any changes, regardless of how minor, except where necessary to eliminate apparent immediate hazards to the subjects. Report promptly to the IRB any injuries or other unanticipated or adverse events involving risks or harms to human research subjects or others.

All investigators (listed above) are required to comply with the researcher requirements outlined at <http://www.irb.vt.edu/pages/responsibilities.htm> (please review before the commencement of your research).

PROTOCOL INFORMATION:

Approved as: **Expedited, under 45 CFR 46.110 category(ies) 6, 7**

Protocol Approval Date: **9/20/2011**

Protocol Expiration Date: **9/19/2012**

Continuing Review Due Date*: **9/5/2012**

*Date a Continuing Review application is due to the IRB office if human subject activities covered under this protocol, including data analysis, are to continue beyond the Protocol Expiration Date.

FEDERALLY FUNDED RESEARCH REQUIREMENTS:

Per federally regulations, 45 CFR 46.103(f), the IRB is required to compare all federally funded grant proposals / work statements to the IRB protocol(s) which cover the human research activities included in the proposal / work statement before funds are released. Note that this requirement does not apply to Exempt and Interim IRB protocols, or grants for which VT is not the primary awardee.

The table on the following page indicates whether grant proposals are related to this IRB protocol, and which of the listed proposals, if any, have been compared to this IRB protocol, if required.

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VIRGINIA POLYTECHNIC INSTITUTE AND STATE UNIVERSITY

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Date*	OSP Number	Sponsor	Grant Comparison Conducted?
9/19/2011	08017307	USDA, Forest Service	yes on 9/19/2011
9/19/2011	08272806	USDA, Forest Service	yes on 9/19/2011

*Date this proposal number was compared, assessed as not requiring comparison, or comparison information was revised.

If this IRB protocol is to cover any other grant proposals, please contact the IRB office
irbadmin@vt.edu immediately.

