

# Forest Service Interdisciplinary Teams: Size, Composition, and Leader Characteristics

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ABSTRACT

Interdisciplinary (ID) teams were created by the US Forest Service in response to environmental legislation. In 2008, we surveyed ID team leaders for National Environmental Policy Act (NEPA) analysis of 106 recreation-related projects conducted between 2005 and 2008. Results were compared with current workforce data and previous studies of ID team leadership and composition for NEPA assessments. ID teams were large in size and diverse in composition, with representatives of a broad range of disciplines and functional areas. The composition of ID teams may be changing from traditional natural resource management to more discipline-specific expertise. The role of social scientists and other human dimension specialists remains modest, despite the importance of social science questions inherent in recreation projects. Results reflect changes in agency hiring practices in the last 20 years and raise questions about the interdisciplinary nature of US Forest Service ID teams.

**Keywords:** US Forest Service, National Environmental Policy Act, interdisciplinary teams, recreation

The National Environmental Policy Act (NEPA) requires US federal agencies to consider the environmental and socioeconomic implications of any major project or land-management decision significantly affecting the quality of the human environment. The NEPA stipulates that an environmental analysis should,

102(2) (a) use a systematic interdisciplinary approach which will ensure the integrated use of the natural and social sciences and the environmental design arts in planning and decisionmaking which may have an impact on man's environment.

To comply with the act, the *US Forest Service Manual* stipulates the agency should

“use a systematic interdisciplinary approach to fully consider the impacts of Forest Service proposed actions on the physical, biological, social, and economic aspects of the human environment” (US Forest Service 2010a). The agency established interdisciplinary (ID) teams made up of subject matter specialists from various disciplines to address effects of proposed land-management actions. The National Forest Management Act of 1976 (NFMA) and an agency shift toward ecosystem management in the 1990s (Keough and Blahna 2006) further solidified the role of ID teams for planning initiatives ranging from site level projects to compre-

hensive forest planning (Phillips and Randolph 2000).

Although ID teams have become commonplace in the US Forest Service and play a significant role in shaping NEPA-related decisions (Sabatier et al. 1995), the composition and functioning of these teams is not well understood (Stern and Mortimer 2009). The purpose of this article is to look at the size, leadership, and composition of ID teams that conducted NEPA assessments for US Forest Service recreation and travel projects between 2005 and 2008. The results suggest that the composition and leadership of ID teams has changed in response to changing agency priorities and workforce composition, posing important questions related to the nature of interdisciplinary planning processes in the agency.

## NEPA and ID Teams

NEPA is designed to inform decision-makers, agencies, and the public about the likely environmental consequences of government actions through a set of general process requirements (Dreyfus and Ingram 1976, Caldwell 1998). NEPA requires agencies to incorporate an interdisciplinary approach to assess the effects of actions on the natural and social environment. A project's

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level of documentation is determined based on the scope and scale of the project. An environmental assessment (EA) requires a moderate degree of documentation, and an environmental impact statement (EIS) is used when impacts are likely to be "significant." For the US Forest Service, both levels of documentation require the use of ID teams (Section 102[2], [a] [42 US Code Section 4321], 40 CFR 1500–1508).

NEPA influences nearly every action taken by the agency to manage the landscape and requires significant agency investment. One report revealed that in 2006 alone, nearly 8,000 US Forest Service employees were engaged and almost \$365 million was spent in performing, roughly, 6,000 NEPA processes (Management Analysis, Inc., 2007). NEPA projects have been criticized for not promoting interdisciplinary collaboration and the lack of rigorous science (Philips and Randolph 2000). ID teams are the backbone of NEPA process in the US Forest Service and other land-management agencies. As conceived, ID teams involve subject matter experts from various disciplines working through group processes to integrate knowledge and generate strategies and solutions (Garcia 1989, Hall and Weaver 2001). Interdisciplinary analysis requires an understanding of basic science and the ability to synthesize and apply relevant knowledge in various stages of the EA process. Barriers to the interdisciplinary process include difficulty communicating across disciplinary boundaries and tendencies for subject matter specialists to become advocates for their discipline (Reid 1996). Simply having a team comprised of diverse specialists charged with addressing a common problem does not guarantee the use of an interdisciplinary process. Some ID teams may, in fact, employ a multidisciplinary process, where work is done in isolation and findings are communicated directly to a team leader, rather than integrated in a group process (Garcia 1989).

Although the US Forest Service is mandated by NEPA to use an interdisciplinary process, little guidance is offered on team size, leadership, or composition. The *Forest Service Handbook* (FSH 1909.15:12.20; US Forest Service 2010b) simply indicates the need to, "limit the team to a manageable number of persons" (US Forest Service 2010a). Literature on ID teams suggests that team size should be based on form and function (Hackman 1987). A 1985 study of US Forest Service ID teams related to NEPA

assessments for forest planning projects found that team size ranged widely from 2 to 50, and the average size was 10 (Garcia 1989). In our review of 164 US Forest Service EISs completed between 2006 and 2008, ID team size ranged from 6 to 67 members. [1] ID teams can last for several months or several years, and the size and composition may vary depending on the project scope and significance.

Team leaders play a critical role in NEPA ID team processes. The ID team leader is selected by the line officer (district ranger or forest supervisor) based on criteria specified in the *Forest Service Handbook* (FSH 1909.15:12.21), which include working experience with NEPA and other environmental laws and regulations, knowledge of activities associated with the proposed action, and skills in team leadership, data analysis and interpretation, and communication (US Forest Service 2010a). Together, the team leader and line officer develop the project purpose, decision framework, key issues, resource areas, and team member roles (US Forest Service 2010a, 2010b). The ID team leader is responsible for managing group interactions, synthesizing scientific findings, and coordinating analysis of alternatives. In a recent survey of US Forest Service employees, effective team leadership was ranked first in importance among various factors attributed to the success of NEPA processes (Stern et al. 2010). Although research on leadership is common in the general management literature, studies of ID team leadership are rare. One study examining NEPA implementation in the US Forest Service found that leadership selection was based foremost on staff availability, and that subject matter expertise and prior experience were secondary qualities (Stern and Mortimer 2009).

The composition of ID teams is important to ensure the presence of relevant subject matter experts. NEPA requires that ID teams integrate natural science, social science, and environmental design arts, which implies participation from these disciplines (Section 102[2][a]). According to the Council on Environmental Quality regulations (40 CFR 1502.6), "The disciplines of the preparers shall be appropriate to the scope and issues identified in the scoping process" (Section 1501.7). The ID team leader and line officer identify appropriate team members. The *Forest Service Handbook* (FSH 1909.15:12.22) stipulates that team selection is based on relevance of the team mem-

ber's skills and discipline to the problem, their ability to work in a team environment, and skills in communication, problem solving, and objective analysis (US Forest Service 2010a). ID team members identify information needs, access relevant information, and develop project alternatives that rely on the best available science. Their explicit function is to determine the individual and cumulative effects of the project or action on the natural and social environment (US Forest Service 2010b).

Empirical studies assessing ID team deliberations are scarce. Garcia (1989) found a wide range of disciplinary specialists on ID teams, with over two-thirds of teams meeting NEPA standards for diversity and one-half meeting NFMA requirements. This study was conducted in 1985, when ID teams were relatively new and the agency workforce was more homogeneous than today (Brown and Harris 1993). Twenty years later, the agency's professional composition is more diverse. However, a study of ID teams in several land-management agencies found the absence of staff with necessary expertise to be a stumbling block in effective NEPA implementation (Stern and Mortimer 2009). Our study of the composition of present-day ID teams must be understood in the context of this broader policy of agency diversification in the US Forest Service.

## Professional Diversification in the US Forest Service

The US Forest Service is responsible for 155 national forests and 20 national grasslands (193 million ac) in nine administrative regions located throughout the United States. National forests are under the leadership of forest supervisors and are divided into ranger districts, administered by rangers and their staffs. Planning and EA activities occur both at the forest and at the district levels. The national forests are managed for multiple uses and values, including commodity and noncommodity purposes. Recreation represents an important function of national forests, which are used by the public for motorized and nonmotorized travel and activity.

Up through the 1960s, the agency was relatively homogeneous, with more than 90% of the workforce trained in forestry professions (Kaufman 1960). In response to environmental legislation of the 1970s and shifting public values, more diverse profes-

sionals began to be sought. In 1987, the agency issued a report advocating "strength through diversity" and the need for recruitment of women, minorities, and new disciplinary experts with training outside forestry and range (Culhane 1990, Kennedy 1991, Tipple and Wellman 1991, Brown and Harris 1993, Thomas and Mohai 1995). Thomas and Mohai (1995) found an increase in the proportion of employees in "nontraditional fields" (e.g., biological science, physical science, recreation, and social science) compared with "traditional fields" (e.g., forestry, range, and engineering) between 1983 and 1992. Still, traditional fields made up 51% of the agency's professional staff in 1992, compared with 15% for nontraditional fields (Thomas and Mohai 1995). (Other fields were clerical or administrative.) Early analyses of this policy change revealed a continued emphasis on commodity values among agency employees (Brown and Harris 1993, Twight and Lyden 1989).

By 2000, it was becoming evident that the agency was shifting to a more balanced approach to managing for commodity and noncommodity values (Brown and Harris 2000, Brown et al. 2010). This change was also reflected in the agency's workforce. Between 2002 and 2007, there was a 6% decline in full-time permanent workers agencywide (US Forest Service 2007). During that same period, there was a 24% decline in professional grade foresters (672 positions) and a 23% increase in biological series professionals (695 positions). The combination of traditional fields (forestry, range, and engineering) comprised 41% of permanent employees in 2007 and nontraditional fields (biology, physical science, recreation, and social science) were approximately 34% (US Forest Service 2007). [2] Methodological differences in calculating employment make direct comparison with data from Thomas and Mohai (1995) problematic, but these data still suggest the growing prevalence of nontraditional fields in the agency. In the context of changing US Forest Service composition, our study looks at the size, leadership, and composition of ID teams that conducted NEPA assessments for recreation and travel projects.

## Methods

A web-based survey of ID team leaders in the US Forest Service (National Forest System) was the primary source of data for this study. In March 2008, an invitation to

participate was sent to all identifiable ID team leaders of recreation projects that related to travel management between December 2005 and March 2008. The initial sample was drawn using key word searches in the US Forest Service's Planning, Appeals, and Litigation System (PALS) database. The PALS database includes a list of current and recently completed NEPA projects. We used key words to search for recreation projects that involved roads, trails, and travel management, including travel management, motorized, off-highway vehicles, all-terrain vehicles, and access. [3] Identified projects were further reviewed to eliminate redundant entries and restrict the sample to those explicitly involving recreation. Our sample was limited to EA and EIS projects, which are the levels of documentation that precipitate use of an ID team.

We specifically selected recreation projects with an emphasis on travel management for a number of reasons. These processes provide a common framework for comparison among a variety of cases. Although the projects were diverse in scale and geographic region, they shared goals associated with recreation and access. Our assumption is that NEPA processes for recreation would be expected to incorporate a wide variety of social and natural science disciplines, as recreation projects tend to be interdisciplinary in nature (Blahna 2007).

Initially, the database search resulted in 167 total projects, (46 EISs and 121 EAs). The projects included a range of spatial scales, from a specific site or trail, to an entire district, national forest, and even multiple forests. After sending a query e-mail to persons listed in the database, we realized that many recipients actually were not ID team leaders, but played some other role in the project. Through follow-up e-mails and phone calls we identified contact information for 142 ID team leaders: 103 for EA projects (62 completed) and 39 for EIS projects (8 completed). The survey instrument included questions about indicators of successful NEPA processes, team interactions, project goals and outcomes, decisions about documentation, and characteristics of the ID teams. The survey consisted of closed-ended questions with a few open-ended follow-up questions.

## Results

We describe the results of our study related to ID team size, leadership, and composition for recreation and travel manage-

**Table 1. Characteristics of study sample.**

Sample statistics	EIS	EA	Total
No. of respondents	39	67	106
Completed	7	45	52
In progress	28	20	48
On hold	1	2	3
Cancelled	3	0	3

ment projects. Of the 142 possible projects, 106 ID team leaders completed the online survey, representing a 75% response rate. Table 1 contains additional information about the types and status of the projects represented. All regions within the national forest system were represented in the sample.

## Team Size

There was substantial variation between the sizes of ID teams for the two levels of project documentation. The average number of team members for an EIS was 15.2 for the life of the project, which was nearly double that of an EA project (8.7 members). The range of team members participating also varied greatly, with as few as 5 to as many as 35 on EIS projects. EA projects had a narrower range (3–18 members). Moreover, EIS teams averaged 10.6 different disciplines compared with 8.6 for EA teams. EIS processes typically require more documentation than for EAs, and thus necessitate a greater investment in time and resources.

## Characteristics of ID Team Leaders

Team leaders in the sample showed a depth of experience on ID teams. Seventy-four (70%) of the 106 ID team leaders who responded to the survey reported having participated on NEPA-related ID teams at least 10 times before. Only five respondents reported that this was their first such experience. Job titles of team leaders are listed in Table 2. Actual job titles provided by respondents were diverse and thus were grouped into more general categories to enhance clarity. There was a fairly even distribution of team leaders among the top three categories of planning (26%), disciplinary specialists (25%), and recreation and public service professionals (21%). Environmental coordinators and foresters occasionally served as team leaders.

Analysis of the educational backgrounds of ID team leaders also suggests a diverse range of skills (Table 3). Two-thirds

held bachelor's degrees, and just under one-third had earned a graduate degree. We grouped the degrees into three categories: traditional natural resource management, biophysical sciences, and human dimensions. [4] The more traditional resource management degrees were earned by 45% of team leaders, with forestry being the most common degree. Those with backgrounds in biological or physical sciences represented more than one-third of the sample, with a high concentration in fish and wildlife. The human dimensions grouping (28%) captured a wide range of disciplines, including social sciences, recreation, planning, humanities, and "design arts" (landscape architecture).

### Composition of ID Teams

Table 4 shows the job functions of the ID team members. The table includes the actual number and percentages of teams in which each job function was present. Results show the predominance of wildlife biologists, recreation specialists, and archaeologists. Finally, we asked ID team leaders to report their opinions regarding any specific expertise missing from their ID teams that they felt would have been particularly valuable (Table 5). Twenty-seven (25%) ID team leaders answered this question and reported at least one area of expertise missing from the team, with social science-related expertise (e.g., social scientist, sociologist, and socioeconomist) most frequently mentioned.

### Discussion

In the US Forest Service, ID teams were developed to meet NEPA requirements for interdisciplinarity. By definition, ID teams are intended to be interdisciplinary in composition, with subject matter specialists contributing collectively to the integration of knowledge surrounding a particular problem. Understanding the size, leadership, and membership of ID teams allows us a glimpse at the structure behind the interdisciplinary process.

### Team Size

Literature on ID teams suggests that there is no ideal team size, but scholars endorse a team that is large enough to get the work accomplished without having extra team members (Hackman 1987, Hackman and Wageman 2005). In our study, team size for recreation-related EIS projects (15 members) was actually larger than

**Table 2. Job titles of ID team leaders (n = 106).**

Job titles by category	Job titles included	No.	Percent
Planner	Ecosystem planner, environmental planner, natural resource planner, forest planner, and land-use planner	27	25.5
Disciplinary specialist	Biologist, hydrologist, botanist, geologist, soil scientist, resource specialist, and resource analyst	26	24.5
Recreation	Recreation manager, trails manager, travel management, cabins, public services, and wilderness	22	20.8
Environmental coordinator	Environmental coordinator, and NEPA coordinator	14	13.2
Forester	Forester, supervisory forester, and silviculturist	13	12.3
Engineer	Civil engineer	5	4.7
Landscape architect	Landscape architect	5	4.7
Line officer	District ranger	4	3.8
Other	Realty specialist, minerals, and public affairs	5	4.7

Note: Some respondents noted more than one job title, so total does not match number of respondents.

**Table 3. University degrees of ID team leaders.**

Degrees	Bachelor's degree	Graduate degree	Total	Percent of total degrees held
Resource management				
Forestry	38	8	46	
Range management	6	0	6	
Watershed management	2	2	4	
Other natural resource management	3	2	5	
Total resource management			61	45
Biophysical sciences				
Fish and wildlife	11	7	18	
Biology	11	0	11	
Ecology/environmental science	4	4	8	
Hydrology/geology	3	1	4	
Other physical science	5	1	6	
Total biophysical sciences			47	35
Human dimensions				
Landscape architecture	5	2	7	
Planning	3	4	7	
Recreation	4	2	6	
Arts and humanities	3	0	3	
Other social science	2	1	3	
Anthropology/sociology	1	1	2	
History	2	0	2	
Archaeology	1	1	2	
Communications/public relations	2	0	2	
Business marketing	2	0	2	
Geography	1	0	1	
Education/interpretation	1	0	1	
Total human dimensions			38	28
Other	6	2	8	
Total degrees held	103	33	136	

Note: Some team leaders held multiple degrees, so column total does not match the number of respondents.

those of forest planning projects in the 1980s, which averaged 10 members (Garcia 1989). Forest planning projects typically are broader in scope than the recreation and travel management projects we investigated. Team size for EA-level recreation projects, which were more commonly conducted at the district level, averaged nine members, which is just shy of the average size for broad-scale forest planning teams in the 1980s. Although these studies are not directly comparable, this

suggests that the agency may be seeing a trend toward an increase in overall team size for NEPA assessments. However, turnover and attrition also may be responsible for some swelling of team size over the life of the project. A study of ID teams in several land-management agencies found that staff turnover was one of the key stumbling blocks in effective implementation of the NEPA (Stern and Mortimer 2009). Still, these findings suggest the US Forest Service has made a signifi-

cant investment in human capital for ID teams and associated NEPA activities.

### Team Leadership

Team leaders on recreation and travel management projects showed considerable ID team experience, which suggests that previous leadership experience may be a highly desired quality. In another NEPA study (Stern and Mortimer 2009), respondents indicated that previous NEPA experience and staff availability were important criteria for leadership selection, along with subject matter expertise. The high level of experience among team leaders also raises questions about whether responsibilities for the NEPA may be falling on the shoulders of a few individuals with backgrounds in project management and NEPA protocol.

Team leaders on NEPA projects received formal training in a diverse range of disciplines, especially forestry and biophysical sciences, but were less likely to have formal training in human dimensions subjects. This is particularly interesting given that the recreation projects we examined had an explicit human dimensions component. Team leader job titles indicated a wide range of functional areas represented, with the most common being planning and biophysical sciences. In general, these data suggest that, at least for recreation projects, one's disciplinary specialization and job function are not the primary criteria for determining ID team leadership. It could be that team leaders are chosen not based on their subject matter expertise, but rather for their team management, coordination, and planning skills or some other criteria. More research would be necessary to better understand the qualities and experience sought in ID team leaders and the implications of leadership choices.

### Team Composition

The NEPA requires integration of three major subject areas—natural sciences, social sciences, and the environmental design arts—thus, ID teams minimally should include representation from these three categories. We are cautious about making a direct link between team membership and the need for that particular area of expertise in the interdisciplinary process, because team participation also could be based more on staff availability than function (Stern and Mortimer 2009).

Our analysis of team composition found that natural and biological scientists

**Table 4. Number and percent of teams with each job function represented (n = 106).**

Job function	ID teams no.	ID teams (%)
Wildlife biologist	98	95
Recreation specialist	92	89
Archeologist/cultural resource specialist	87	85
Hydrologist	79	77
Engineer	74	71
Aquatic ecologist/fisheries specialist	72	69
Botanist	70	67
Planner	69	66
Soils scientist	58	56
Policy/public affairs specialist	40	39
Landscape architect	31	30
Lands and minerals specialist	31	30
Range management specialist	29	28
Silviculture/timber management specialist	29	28
Fire management specialist	24	23
Geologist	15	14
Other social scientist	13	13
Ecologist	10	10
Other	25	24

**Table 5. Areas of expertise lacking from ID team on NEPA processes.**

Desired expertise missing from team	Times reported
Social scientist	15
Economist	6
Recreation specialist	3
Writer	3
Engineer	2
Soils	2
Ecologist, environmental mediator, fire specialist, forest supervisor, geologist, GIS specialist, hydrologist, planner, and silviculturalist	1 (each)

Note: Some respondents reported multiple disciplines missing. GIS, geographic information system.

were well represented. These findings were consistent with Garcia (1989), who also reported a high concentration of wildlife biologists, hydrologists, and other natural scientists on forest planning NEPA processes. One notable difference in our study was the predominance of aquatic and fisheries specialists, which was double that of the 1985 study (Garcia 1989). This could reflect the agency catching up with the requirement of the Endangered Species Act to protect aquatic species on the "threatened and endangered" list, which prompted the hiring of fish biologists in the US Forest Service (Kennedy 1991).

Expertise in social sciences was seemingly well covered with strong representation from recreation specialists and archaeologists. However, job titles do not always reflect subject matter mastery. A recent study of US Forest Service recreation managers found that only about one-third held academic degrees in recreation (Cervený and Ryan 2008). The pervasiveness of archaeologists, on the other hand, can be seen as the

result of the Archaeological Resources Protection Act (1979) and other legislation mandating legal protection of historic and prehistoric resources (Kennedy 1991). The presence of archeologists on ID teams most likely relates to the need for analysis of historic and cultural materials, rather than for general social science expertise. Interestingly, Garcia's (1989) study found a higher proportion of social scientists, especially economists, than we did, but that probably reflects the agency's reliance on FORPLAN and other economic analysis models in the 1980s (Kent et al. 1991). The lack of staff trained in social science disciplines in the agency today may be a factor in their low participation on ID teams, and the reason leaders identified social science and economics as the expertise areas most likely to be missing from their teams.

The one required NEPA category of ID team expertise that was distinctly underrepresented was the "environmental design arts." Landscape architects appeared on just 30% of ID teams in our sample. Although

design arts may be incorporated by engineers, planners, or other specialists, most of the knowledge of environmental design lies in the small cadre of landscape architects. Garcia (1989) reported landscape architects on nearly three-fourths of ID teams for forest planning. Agency workforce data show an 18% decline in landscape architects between 2002 and 2007, when there were just 148 landscape architects in the entire agency, fewer than one per national forest (US Forest Service 2007).

### Agency Diversification and ID Teams

As noted previously, the leadership and composition of ID teams in the US Forest Service seems to reflect broader changes in agency hiring practices in response to federal legislation, shifts in agency values, and the adoption of ecosystem management (Brown et al. 2010, Butler and Koontz 2005, Keough and Blahna 2006, Thomas and Mohai 1995). All these initiatives require the integration of biophysical and socioeconomic information for planning and decisionmaking, thus necessitating professionals trained in a variety of natural and social science disciplines. Workforce data confirm the declining presence of foresters and other "traditional" fields and the gradual emphasis on "nontraditional" expertise (Thomas and Mohai 1995, US Forest Service 2007). Reflecting this pattern, our study of ID teams found that just 37% of team leaders held degrees in forestry, compared with 64% in the study on forest planning ID teams 20 years earlier (Garcia 1989). Although recreation projects are not the same thing as forest planning, there are other similar patterns in the data. Fewer team leaders had degrees in all the traditional resource management fields, despite the fact that more US Forest Service staff had jobs in traditional fields in 2007 (US Forest Service 2007). Again, compared with the study of forest planning ID teams conducted in the 1980s (Garcia 1989), ID teams in our study had far fewer members with job titles in timber, lands and minerals, range, fire, and other "traditional" forest functions, and greater participation in areas such as botany, ecology, and aquatic biology, despite the larger size of the teams in our study.

The relatively low presence of traditional professionals on the ID teams in our study may be a result of the nature and scope of projects our team investigated, which emphasized recreation and travel planning, and which may have required less input from tra-

ditional resource management professionals. However, the results also seem to mirror the workforce diversification efforts of the 1980s and 1990s and the agencywide decline in traditional resource management professionals (Thomas and Mohai 1995). The implications of these patterns for conducting interdisciplinary work on ID teams have not been investigated.

### Conclusions

NEPA regulations require interdisciplinary processes be used for environmental analyses. The law provides little direction to agencies about how to implement the interdisciplinary requirement. In the US Forest Service, environmental analyses for NEPA take place in the context of ID teams. An examination of ID team size, leadership, and membership suggests that ID teams are large and diverse, with a variety of job functions and disciplinary specializations represented. The composition of ID teams may be changing from traditional natural resource management to more discipline-specific expertise. Team composition may reflect the specific expertise needs for recreation and travel projects, but it also mirrors shifting management and workforce priorities. It is unclear what influence this shift may have on ID team interactions and the ability to work in interdisciplinary, rather than multidisciplinary, ways. This is an important question for future research. Meanwhile, the role of social scientists and other human dimension specialists remains relatively modest on contemporary ID teams, despite the importance of social science questions and conflict potential related to recreation and travel management projects.

### Endnotes

- [1] In June 2008 a member of our research team traveled to the Northwestern University Transportation Library where the Environmental Protection Agency deposits all filed draft and final EIS documents. We reviewed 164 EISs completed by the US Forest Service between April 2006 and April 2008.
- [2] The Workforce Analysis Report presents data on the top 20 professions (in terms of quantity) for each of the three classification areas: professional, administrative, and technical (US Forest Service 2007). For job series with fewer than 60 employees there is no data shown. For professional series occupations, all but 14% of permanent employees are represented in this analysis. For administrative positions, nearly 100% of permanent employees were included, and for technical positions, it was all but 17%. Because of

these gaps in available data, these figures should be understood as rough estimates.

- [3] For the search term "access," only projects identified as "roads management" or "recreation management" were considered for inclusion in the sample.
- [4] We have made some assumptions about where the degrees fall within these three broad categories. For example, we view "fish and wildlife" as a biophysical degree, because they traditionally focus very heavily on biology and ecology (Jacobson and McDuff 1998). Range and forestry degrees tend to be more multidisciplinary and usually include courses in recreation, economics, policy, and resource management.

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