4 Utilizing Issue Network Analyses to Assess Potential Policy Implications of Sustainable Forest Management in the United States

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Introduction

Sustainable forest management (SFM) has generated a high level of interest throughout the US forestry community, although many people are unsure what SFM will mean to them and to forestry (Sedjo *et al.*, 1998). While some consider SFM to be a passing issue akin to the 'new forestry' paradigm that affected forest policy discussions in the late 1980s and early 1990s, others see SFM as a continuation of a process that in the USA began with the introduction of scientific forestry methods in the early 20th century. Although some claim that SFM results in new markets and market premiums for certified forest products in the USA, concerns have been raised that SFM will limit management options and raise costs (Berg and Olszewski, 1995; Viana *et al.*, 1996). Based upon previous debates among US foresters about the merits of regulation, one question may have universal interest: Will sustainable forest management result in new federal or state regulatory policies?

This chapter proposes and tests a method to answer that question. Network analysis studies the organizations and individuals that form around an issue problem (Heclo, 1978). An issue network can consist of dozens, and even hundreds, of interest groups, prominent knowledgeable individuals, federal and state agencies, and legislative committees and subcommittees (Berry, 1997). Networks play a key role in the policy process by identifying problems and getting them on a policy agenda, starting a process that can result in new policies and programmes (Anderson, 1984; Kingdon, 1984). Consequently, this chapter assumes that to predict the effect of SFM one starts with the players who initiate the policy process.

Network analysis

Research on issue networks began with qualitative studies to demonstrate that networks existed (Milward and Provan, 1998). The next generation

of studies used quantitative methods as part of social network studies (Aldrich and Whetten, 1981). With the introduction of quantitative methods, research on issue networks grew rapidly and moved beyond documenting relationships among members. Various studies characterized the structure of networks (Heinz *et al.*, 1993) and developed taxonomies of network types (Rhodes and Marsh, 1992; Blom-Hansen, 1997). Some researchers attempted to link network types to associated sets of policy outcomes (Knoke, 1990; Lehmbruch, 1991; Marin and Mayntz, 1991; Sciarini, 1996) and focused on influence relations among network members (Wilks and Wright, 1987). Others concentrated on methodology (Laumann and Knoke, 1987; Knoke *et al.*, 1996) to study networks. The largest body of literature consists of case studies describing how the relationships between network members affected a discrete policy event (Borzel, 1998).

According to Borzel, two schools of thought dominate current network research: the interest intermediation school, centred in the USA, and Germany's governance school. The interest intermediation school interprets networks as a generic concept that applies to relations between public and private actors, whereas the governance school sees issue networks as a specific form of governance. Scholars in Canada and the UK have articulated a third and comparative approach that more accurately reflects their own parliamentary system of government's influence on the structure, function and effectiveness of what have been termed 'policy communities' (Coleman and Skogstad, 1990; Atkinson and Coleman, 1992; Hoberg, 1993; Cashore, 1997).

The interest intermediation school largely regards issue network analysis as a tool for examining relationships between the state and organizations of civil society. It assumes the existence of policy networks, which reflect the relative status or influence of particular interests in a policy area, and which affect policy outcomes (Borzel, 1998). Given the lack of a governing structure and the openness of transactions between government agencies and civic organizations in the SFM issue network, and our lack of need to compare the structure and function of different networks, the interest intermediation approach seemed most appropriate to this study.

Practically all network analysis has been applied to past events. This is largely because the researchers want to develop an explanatory model that links network types and network relationships to past policy action in a effort to provide greater insights into the process of governance, rather than to chart potential outcomes. Another reason is stability: network conditions related to active issues are constantly changing. Such changes create a degree of imprecision that limits the effectiveness and explanatory power of models, but is less of a concern in research to identify potential short-term outcomes. An exception to this historical research trend was an investigation into the network motivated by the threat of earthquakes in the Pacific Northwest (Michaels, 1992).

Network analysis has been applied to numerous environmental policy actions. Selected examples include: Daugbjerg (1998), Lenschow (1997), Richardson (1997) and Steward and Conway (1998). Considerably less attention has been given to issue network analysis and forestry policy (Howlett and Rayner, 1995; Wellstead, 1996; Hoberg and Morawski, 1997; Cashore and Vertinsky, 2000), although it is worth noting that these studies were all conducted in Canada. At the time this research was conducted, the technique had not been used to study US forestry issues by US researchers.

Prior to committing to a network analysis for SFM, however, a methodology needed to be chosen. Laumann and Knoke's (1987) book *The Organizational State* has a good reputation among scholars. Furthermore, their research linked influence relationships within the networks they studied with policy outcomes, which suggests that network analysis could be appropriate to predict whether SFM will result in new policies. A closer look at Laumann and Knoke's methodology found three limitations: (i) their method of identifying the network population had the potential to weave a net that would miss many in the SFM issue network; (ii) the information they requested from respondents regarding allies and collaboration had the potential to reduce participation by government actors who do not want to appear to show favouritism; (iii) their approach used a costly but effective methodology, i.e. they conducted face-to-face interviews and achieved a 92.3% response rate. While mail-based surveys have problems with response rates, limited funding usually rules out interviews as a practical methodology.

The first two concerns apply directly to the problems with studying an active issue. Discussion

with others indicated that these problems would probably remain regardless of the method. Accordingly, the Laumann-Knoke approach was utilized, but the Delphi method was incorporated as a way to minimize these two problems. The Delphi method collects and distils knowledge from a group of experts by means of a series of questionnaires interspersed with controlled feedback (Ziglio, 1996). This method is often compared to a committee meeting where a brainstorming session yields group consensus. Proponents of Delphi claim that the anonymity, controlled feedback and mathematical summarization of this approach are advantages over face-to-face meetings where dominant personalities may stifle others or monopolize the session, lack of agenda control can allow irrelevant digressions, and consensus may be assumed but not proven (Baumann *et al.*, 1982).

Incorporating Delphi into network analysis addresses the criticism that highly quantitative studies simplify complex and difficult-to-model relationships between network members in the quest for reliability. Marin and Mayntz (1991) suggest that combining the qualitative and quantitative approaches may achieve quantitative precision while at the same time disclosing details that would otherwise have been missed. Delphi asks qualitative questions in a quantitative fashion that avoids much of the interviewing, coding, and other concerns of qualitative research methods. Numerous Delphi studies have been conducted on environmental problems (Baumann *et al.*, 1982; Brogan, 1997; Wilenius and Tirkkonen, 1997). Delphi has also been applied to forestry research (de Steiguer *et al.*, 1990; Egan *et al.*, 1995). At the time this study was initiated, no research incorporating Delphi methods with issue network research had been conducted, and none appears to have been performed in the intervening months.

Methodology

Applying the Laumann-Knoke issue network analysis methodology

Laumann and Knoke's methodology was used to: (i) identify members of the SFM issue network, (ii) survey them, and (iii) specify the coalitions and perceptions of each member's influence. The list

of potential network members was generated from: (i) a Lexis-Nexis search of articles in newspapers and news magazines covering all regions of the country; (ii) SFM-related hearings before major congressional subcommittees; (iii) 'friend-of-the-court' participants in SFM-related cases before the federal appellate courts; (iv) lobbyist registrations specifically for SFM; and (v) suggestions by individuals familiar with SFM. A list of 177 groups was generated and categorized into six sectors: academia, federal government, forest industry, non-governmental organizations, foundations and private research institutions, and state government and state associations.

A survey instrument was constructed from Laumann and Knoke's (1987) interview questions and implemented using Dillman's (1978) Total Survey Design Method. The survey was posted on the World Wide Web. Calls to target organizations identified the appropriate contact person who was sent a letter directing him/her to the survey's URL address and offering to send a paper survey if preferred. Responses were returned by e-mail and conventional mail.

A total of 85 surveys were returned, giving a response rate of 48%. An additional 31 people indicated that they would not complete the survey, making the total contact rate 66%. Some non-respondents gave their reasons for declining to participate. Most of the federal organizations cited concerns about impartiality as their reason for not completing the survey; all non-responding research institutions cited lack of time; 7% of the respondents indicated that they were not involved in SFM, including four of the seven responding federal government actors. Another federal organization refused to identify others with whom it communicates about SFM. The end result was a representation rate of 10% for the federal government sector.

To measure influence in the network, respondents were asked to identify the organizations that they regarded as particularly influential. The organizations were then ranked by the total number of votes each received. The ranked list was divided into five quintiles, and the percentage of votes given to each sector in each quintile was calculated. This procedure reveals an influence structure. For example, Laumann and Knoke's (1987) study of energy and health policy found that 64.4% and 82.3% of the groups in their respective top quintile

were federal government organizations, thus suggesting that federal agencies dominated the energy and health policy process.

To identify collaborative memberships and describe the relationships between coalition members, Laumann and Knoke's procedures were closely followed. Respondents were asked to: (i) list the groups they join with when trying to influence policy and (ii) give the names of the major organizations (including government agencies) which often oppose their policy positions. Based on the responses, a set of x,y coordinates can be generated for each organization by calculating (i) its perceived influence in the network and (ii) its relationship (cooperative, non-cooperative) with other network members. These x,y coordinates can be plotted on a graph in a manner that reveals detail about the coalitions of members within a given network and the influence that each coalition and coalition member is perceived to have. These influence relationships, in turn, can be linked to the policy process.

Applying the Delphi method

The Delphi method was used to create an alternative list and ranking of network members and to identify and estimate the likelihood of a set of policy outcomes. A panel of experts was convened; they supplied the information and ratings for each member of six forestry sectors in the SFM network. The process of identifying experts used a reputational approach (Sanders, 1966): each selected expert had to be an acknowledged leader or recognized authority in the given sector, or be recommended by at least two consultants for this project. This generated a list of 50 potential panellists: ten from the forestry industry; seven from the federal government; six representing state government or state associations; five from foundations or private research institutions; 12 from NGOs; and ten from academia. Each was contacted by telephone and invited to participate; 94% of those identified as potential panellists agreed to participate.

Three rounds of surveys were conducted. The survey items were measured using 5-point scales that allowed panellists to indicate their level of agreement with a statement or to indicate their opinion regarding the likelihood of an event or outcome. Panellists were provided with definitions to increase the reliability of their answers, e.g. the term 'very likely' was defined using several parameters. Open-ended questions were used to identify network members. Finally, panellists were free to add their comments and questions.

The first round of the survey: (i) identified the SFM network's type; (ii) characterized desired policy outcomes; (iii) identified factors motivating network members; and (iv) nominated organizations and individuals in the SFM network. The second round built on the first round and asked panellists to: (i) finalize their evaluation of the network's type, and (ii) rank the influence of the groups they had listed in the first survey. The final round expanded upon the policy outcomes and motivating factors by asking the panellists to: (i) rank nine motivating factors and (ii) indicate the likelihood of a series of possible outcomes. Response rates varied among the three survey rounds. Some participants answered the first round but not the second and third rounds; a few skipped the first and third rounds and completed only the second round; and two did the first two rounds but not the third. Response rates were 79% in round one, 95% in round two and 89% in round three.

Results

The Laumann-Knoke survey

Using the 'quintiles' influence procedure outlined earlier, we counted the number of times a group was identified as influential, and ordered the list of groups from highest to lowest by the number of influential votes they received. The list was divided into five sections or quintiles, and each quintile's influence structure was described. Laumann and Knoke (1987) caution the user against over-valuing this information. They note that doing so has theoretical and empirical limitations, but they also note that it seems reasonable to expect that participants can discriminate between those actors who count in their and others' calculations and those who are largely ignored. Accordingly, each organization's rank is less useful than is the distribution of influence among sectors in each quintile, with particular emphasis placed on the top one-fifth.

To provide greater detail among the sectors, government and NGOs were separated into federal government and state government and into environmental NGOs and forestry NGOs. This division results in the influence distributions shown in Table 4.1. Influence in the top quintile was fairly evenly distributed among government (31.4%), NGOs (31.4%) and industry (25.7%). The federal sector had the highest share of influence with 28.5% as compared with state government's share of 2.9%. The timber industry and environmental NGOs each had a 25.7% share of influence, with forestry NGOs, foundations and academia sharing 5.7% each. The proportion of influence among government actors shifts through the lower quintiles with the state and federal sectors gaining and losing shares, respectively. All other distributions remained relatively constant throughout all quintiles. Unlike the energy and health domains described by Laumann and Knoke (1987), no single sector dominates the top level of influence in the sustainable forest management network.

Unfortunately, the low response rate from the federal sector (10%) and the research institutions and foundations (17%) prevented a valid application of the influence-graphing ordination procedures. Accordingly, we were unable to complete the planned analyses to obtain Laumann and Knoke's constituency view of influence structure and coalition memberships.

The Delphi survey

Panellists were initially asked to determine whether the groups promoting SFM form: (i) the most common type or 'open' issue network; (ii) a public policy network (defined as an issue network seeking the formulation and implementation of public policy); or (iii) a private policy network (defined as an issue network seeking the formulation and implementation of private policy). The panel indicated the highest level of agreement (84%) that SFM groups form an issue network, although there was also agreement that the SFM network fits the public policy network and private policy network (45 and 56%, respectively) definitions. This result validated our decision to proceed with the methodology and approach we selected. Finally, the panellists nominated 312 different organizations, agencies and individuals as being active in promoting or pursuing SFM in the USA – in other words, to their thinking, the network is quite large.

In the second round, the rankings that the panellists assigned to each network member were used to describe the influence structure of the SFM network. As can be seen in Table 4.2, the results are similar to the Laumann-Knoke-based rankings, with the federal/state governments having a 23% and 6.6% share of influence in the top quintile, with these proportions switching in the lower quintiles. Environmental (23%) and forestry NGOs (6.6%)

Table 4.1. Distribution of influence votes (%) across ranked quintiles of split sectors: quantitative survey.

	Federal govt	State govt	Forest industry	Env. NGO	Forestry NGO	Found./ Research	Academia
Top quintile	28.5	2.9	25.7	25.7	5.7	5.7	5.7
Second quintile	11.1	11.1	27.8	25.0	0	8.3	16.7
Third quintile	8.6	25.7	37.1	14.3	0	5.7	8.6
Fourth quintile	8.1	13.5	40.5	21.6	8.1	0	8.1
Fifth quintile	5.9	14.7	32.4	23.5	5.8	0	17.7

Table 4.2. Distribution of influence (%) across ranked quintiles of split sectors: Delphi survey.

	Federal govt	State govt	Forest industry	Env. NGO	Forestry NGO	Found./ Research	Academia
Top quintile	23	6.6	21.3	23	6.6	13.1	6.6
Second quintile	21	9.7	11.3	32.2	8.1	8.1	9.7
Third quintile	8.2	13.1	14.8	23	0	9.8	31.2
Fourth quintile	0	16.1	50	17.7	1.6	3.23	11.3
Fifth quintile	3.2	24.6	44.3	11.5	0	6.6	9.8

have roughly the same proportional influence throughout all quintiles. Forest industry firms represent 21.3% of the top quintile and vary between 11 and 50% in the other four. Academia and research institutions comprise the smallest share, although research institutions and foundations have double the proportion in the Delphi top quintile (13.1%) than they have in the Laumann-Knoke (5.7%), while academia has roughly the same proportion in both (6.6 vs. 5.7%). With some exceptions in the middle quintiles, these distributions remain similar throughout.

Comparing the ratings

The results of the Laumann-Knoke and the Delphi influence distributions were compared using the χ^2 test to determine whether the distributions of influence were statistically different between methods and between influence quintiles. There were no statistically significant differences between the methods for any of the quintiles, with most important top influence quintile showing the highest degree of similarity. The pertinent statistics for the χ^2 test are summarized in Table 4.3.

Desired policy outcomes and motivating factors

In the first round survey, a majority of the panel agreed that federal policy (66%), state policy (66%) and avoiding policy (82%) were desired outcomes for at least some of the groups participating in the SFM network, illustrating conflicting objectives and lack of consensus among network members. The panellists also evaluated a list of factors likely to motivate organizations to participate in the network. The panellists expressed the most agreement that worries about other groups (100%) and societal interest in the environment (97%) were important motivators; less important were the demand for certified products, United

Nations' (UN) efforts, and tropical forestry programmes. This suggests that groups taking action about the SFM issue are doing so partly to protect themselves from what they perceive might be undesirable actions by others.

In the third round, these factors were revisited for a more detailed analysis. Panellists ranked the importance of nine motivating factors (the original five plus four nominated by panellists). The top-ranked motivating factors were dissatisfaction with past forest management practices, societal interest in the environment, and the desire to sustain forests, suggesting that SFM has been absorbed into the broader debate over the desired management of US forests. Further support for this observation exists in the lower rankings for the UN and other tropical forest programmes that served as the origins for the modern concept of SFM. The overall confidence rate expressed by the panel was 51%. Results of the ranking process are presented in Table 4.4.

The panellists were asked questions to determine how likely it was that various possible policy actions might be taken in each sector. Results for the federal-sector outcomes indicate that new policy (84% agreement) and policy changes (90% agreement) are more likely to apply to federal lands and to selected federal land management agencies (USDA Forest Service, 87%; Bureau of Land Management (BLM), 67%) than are new policies (25%) or changes to old policies (42%) affecting private landowners. The Forest Service is projected to be the most likely to change management (80%) and structure (58%), with the BLM, Fish and Wildlife Service, and National Park Service being increasingly less likely to incorporate SFM into their management and structure. The complete results for this exercise are summarized in Table 4.5.

The panel indicated similar patterns in state-level outcomes, although there is a substantially higher probability of state-level actions with respect to private lands. A total of 61% of the panellists believed that new forestry policies affecting private landowners are likely as a result of SFM, and 48% projected that changes in existing state policies for

Table 4.3. Results of comparing the Delphi quintile rankings to the quantitative quintile rankings.

	Top quintile	2nd quintile	3rd quintile	4th quintile	5th quintile
χ^2	2.345	9.110	13.105	9.605	11.020

(df = 6, P < 0.01)

private landowners will occur. This compares with 80% agreement with the likelihood of new policies for state lands and 58% agreement with policy changes for state lands. According to the combined opinion of this group of experts, SFM will have significant policy impacts in the public and private sectors at the state level. Complete results are presented in Table 4.6.

Table 4.4. Results of the exercise to rank factors motivating participation in the sustainable forest management issue network (1 = most important factor, 9 = least important factor).

Rank	% Rank[a]	Median rank	Factor
1	61	2	Dissatisfaction with past practices
2	52	2	Societal interest in the environment
3	29	3	Desire to sustain forests
4	16	4	Dissatisfaction with past conflicts
5	26	5	Worries about how SFM will be defined
6	9	6	Efforts by the United Nations
7	6	7	New scientific discoveries
8	3	8	Efforts for tropical timber
9	0	9	Demand for certified forest products

[a]Percentage of panellists who ranked the factor as the first or second most important.

Table 4.5. Results of outcome projections for the federal sector.

	Federal level outcomes				
	Very likely (%)	Likely (%)	Possible (%)	Unlikely (%)	Very unlikely (%)
New policy for private land	6	19	29	39	6
New policy for federal land	29	55	10	6	0
Policy changes: private land	10	32	29	26	3
Policy changes: federal land	45	45	10	0	0
Policy of USFS	39	48	13	0	0
Policy of BLM	19	48	23	10	0
Policy of FWS	10	23	32	32	3
Policy of NPS	6	19	35	35	3
Change in USFS management	48	32	16	3	0
Change in BLM management	23	35	29	13	0
Change in FWS management	10	19	29	42	0
Change in NPS management	6	16	39	35	3
Structure of USFS	19	39	23	19	0
Structure of BLM	10	26	29	35	0
Structure of USFWS	6	6	39	42	6
Structure of NPS	6	3	29	45	16

Table 4.6. Results of outcome projections for the state sector.

	State level outcomes				
	Very likely (%)	Likely (%)	Possible (%)	Unlikely (%)	Very unlikely (%)
New policy for private land	16	45	26	13	0
New policy for state land	32	48	19	0	0
Policy changes for private land	13	45	29	13	0
Policy changes for state land	26	32	35	6	0
Policy changes for agencies	23	39	29	10	0
Management of state lands	29	42	26	3	0
Structure of state agencies	13	19	42	26	0

Private sector outcomes are projected to have the greatest impacts within the forest industry (84%) and in the way that the forest industry procures wood and fibre from non-industrial private forest owners (NIPF) (61%). Less agreement (33%) exists regarding the likelihood of changes to NIPF lands. On the market side, 61% project an increase in the supply of certified wood products, but only 16% predict that a price premium will develop, while 25% project that a differentiated market for certified/non-certified wood products will develop. Most panellists believe that consumers will spot efforts by the industry to 'greenwash' itself by paying only lip service to sustainability issues. The full results are summarized in Table 4.7. The panellists indicated that SFM was likely to change university curricula, extension programmes and research.

Discussion

Identifying issue network members

The 312 actors generated by the Delphi and the 177 yielded by the Laumann-Knoke study compare favourably with the numbers found by Laumann and Knoke (1987) in the health domain (135 members) and energy domain (198 members). Other researchers have determined that studying a high number of participants adds little to the overall quality of the research. For example, in a study of a private policy network, Kenis (1991) utilized the Laumann-Knoke bounding method and then eliminated all but the 40 most influential groups based on consultation with experts. Nevertheless, at this stage of research into SFM, the full lists may be more interesting and also may be potentially useful for other purposes.

Ranking

In the majority of cases, the individual groups in each sector that were judged to be the most influential were those that had taken concrete steps to implement SFM programmes. Among the federal actors, executive branch agencies, such as the USFS, the BLM and the President's Council on Sustainable Development, headed the list. At the state level, programmes which had been certified by independent, third-party forest management groups, which had comprehensive forest practices laws or which had hosted certification demonstration projects, were the highest ranked. Industry leaders were either involved in the American Forest and Paper Association's Sustainable Forestry Initiative or were among the companies with properties certified by Forest Stewardship Council-accredited firms. This trend was carried through the research institutions and foundations, where the leaders had all been involved in funding or facilitating certification projects. With few exceptions, NGOs were also headed by certification-oriented groups but also included the Society of American Foresters, the National Association of State Foresters and a few traditional environmental groups. Finally, universities that had been among the first to establish active research programmes in SFM, or that had been influence leaders for some time headed the influence categories.

Motivating factors and possible outcomes

The low response rates and omissions in the Laumann-Knoke approach negatively affected our ability to perform certain analyses. The few responses from organizations in the federal sector

Table 4.7. Results of outcome projections for the private sector.

	Private sector outcomes				
	Very likely (%)	Likely (%)	Possible (%)	Unlikely (%)	Very unlikely (%)
Changes to industry	26	58	13	3	0
Changes to NIPF	3	30	23	43	0
Changes to procurement	6	55	26	13	0
Increased demand	16	23	45	16	0
Increased supply	13	48	32	3	3
Price differential	3	13	37	40	7
Public approval 'Greenwashing'	0	10	45	45	0
Differentiated markets	6	19	35	39	0

raised questions about the validity and accuracy of conducting an analysis to quantify and diagram the relationships between network members. The findings would have been particularly useful in projecting strategic alliances in the sustainable forest management network, especially given the roughly equal distribution of influence in the top quintile.

The Delphi results compensated for this limitation, however, and provided us with most of our key findings. According to the Delphi panel, SFM appears to have moved beyond its roots in UN activities and third-party certification programmes and has been pulled into the broader and deeper debate about how, why and for whom US forests will be managed. The three highest ranked motivating factors (dissatisfaction with past practices, societal interest in the environment, and the desire to sustain forests) have shaped the forest policy climate in the USA since the late 1800s. The incorporation of SFM into this pre-established framework weakens claims that SFM has hidden agendas or is a passing fad. Market forces appear to have little impact on motivating participation in the SFM network: the panel ranked demand for certified products last among the nine possibilities. Mid-ranked motivators are: (i) worries that actions by individual members and coalitions in the network will negatively impact other members and (ii) dissatisfaction with past conflicts.

Our research on potential outcomes predicts that activities to promote sustainable forest management in the US will most probably happen within existing sectors, and will not be mandated by the domination of one sector over another. At the federal level, it is estimated that changes will be confined primarily to the USDA Forest Service, to other federal agencies and to the management of federal lands. State governments are deemed more likely than the US federal government to implement new or to revise old policies that affect activities on private lands, and appear only slightly less likely than the USDA Forest Service to adopt new or to revise old policies and management practices for state lands. Despite projections that SFM will have weak impacts on the market and demand side in the private sector, forest industry is projected to change its management and procurement practices in response to SFM. NIPF owners are estimated to be the least likely to change. A slight majority projects that academic curricula, extension programmes,

and research directions will change due to SFM.

The panellists' response to the potential outcomes further supports the relatively equal distribution of influence among the major sectors in the top quintile: activities for SFM appear to be confined within the individual sectors at the moment. For example, changes at the federal level are projected to affect federal agencies and management; state-level changes are projected to affect state agencies and management, and so on. These findings should provide some encouragement for those in the private sector most worried about government policy outcomes or other regulatory mandates resulting from SFM.

Methodological issues

The results of the Delphi surveys and of the Laumann-Knoke (L-K) approach overlapped. Delphi performed in a similar way to the L-K methodology in each area; 77% of the individual organizations ranked in the top quintile by the L-K approach were also included in the top Delphi quintile. Further support for the similarity between the two methods is the lack of statistically significant differences between them in the distribution of influence. These outcomes support the conclusion that the Delphi method can be a useful tool in network analysis applications. While of limited value in identifying communication patterns and coalition memberships, the technique can allow for consensus regarding potential outcomes of the network's activities, which may prove useful to political scientists interested in how issue networks function to make policy.

The results also suggest that traditional network analysis methods are not as effective at identifying the relationships in active issue networks, as opposed to their perceived efficacy at evaluating relations in networks that are no longer active. Perhaps a merging of the two approaches can address the shortcomings of each for this particular application. Of course, one way to test the validity of this combined approach would be to track the actual policy outcomes and compare them to these projections, and then perform interviews with the network members to determine how the relationships and influence structure between groups affected the actual policy outcomes. To

increase the accuracy of such Delphi projections, however, one would need to define the issue or sub-issue of focus with a high level of clarity to reduce conflicts in interpretation as well as specify the type of policy change (tax, protective-regulatory, state, federal) anticipated. Our use of 'sustainable forest management' as an issue may have been too broad, and 'policy change' as an outcome may not have been specific enough to test this approach in the most robust manner.

Conclusion

An analytical framework was developed to meet the research objectives of: (i) describing the relationships between members in the sustainable forest management issue network and (ii) discerning potential public and private outcomes for SFM given the relationship structure of the network's members. A review of the literature suggested that issue network analysis meets these objectives. Network analysis has traditionally been applied to describe how policy was made. Applying network analysis to an issue that had yet to generate policy action provided an opportunity to attempt something new.

The primary concerns with applying network analysis to an emerging issue were the usual low response rates that limit the ability to perform the necessary data analyses and the potential of the method to overlook important participants. Efforts to address these concerns led us to apply the Delphi technique to the research problem. This again presented a research opportunity because the Delphi methodology had never been applied to network analysis research. Accordingly, the objectives of the study were expanded to include the testing of the hypothesis that the Delphi methodology could provide results comparable to network analysis.

Both methods were applied. The approach to issue network analysis developed by Laumann and Knoke (1987) was utilized. This entailed identifying the network's population and surveying it to determine: (i) the patterns of influence among network members, and (ii) the number of and membership in the network's coalitions. The Delphi method required the creation of a panel of experts and using an iterative survey process to: (i) identify the network population; (ii) identify the patterns of influence among the actors; and (iii) estimate the likelihood of potential outcomes at the federal, state, and private levels. Results were generated in three areas: (i) methodology, (ii) network character, and (iii) potential outcomes for SFM.

The results indicate that Delphi can produce results comparable to traditional methods of network analysis, which typically are concerned first and foremost with different relations between the state and societal actors, and have only seldom been utilized to forecast potential, discrete policy actions. While this particular Delphi has proven to be less adept at determining these relationships, it shows promise in identifying areas where policy action is likely to result, which may be of use to political scientists and to others in the forestry community.

Results of the Delphi predict that SFM is likely to affect forest practices within individual sectors, but that broad-scale policy actions are unlikely in the short term. Results also show that no single sector is dominant. Finally, the apparent absorption of SFM into the broader debate over the management of public and private forests in the USA suggests that although the terminology may be transitory, the philosophy of economically viable, environmentally sound, and socially responsible forestry may be with us for quite some time.

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