

**ORGANIZATIONAL EFFECTS ON POLICY IMPLEMENTATION  
IN A GEOGRAPHICALLY DISPERSED ORGANIZATION:  
A STUDY OF THE MINNESOTA DEPARTMENT OF NATURAL RESOURCES  
DIVISION OF FORESTRY**

Robert A. Stine and Paul V. Ellefson<sup>1</sup>

June 1995

STAFF PAPER SERIES NUMBER 107

**Staff Paper Series**

**Department of Forest Resources**

**College of Natural Resources and the Agricultural Experiment Station  
University of Minnesota  
St. Paul, Minnesota**

---

<sup>1</sup> Research Associate and Professor of Forest Resource Policy and Administration, respectively, Department of Forest Resources, University of Minnesota, St. Paul, MN. Research supported by the Department of Forest Resources and the Minnesota Agricultural Experiment Station. Published as paper Number 22,052 of the miscellaneous journal series of the Minnesota Agricultural Experiment Station.

## TABLE OF CONTENTS

<b>List of Tables</b> .....	iii
<b>List of Figures</b> .....	iv
<b>Abstract</b> .....	v
<b>Introduction</b> .....	1
<b>Literature Review</b> .....	1
Participation .....	2
Internal Communication .....	3
Organizational Configuration .....	3
Work Autonomy .....	4
Interaction with the Environment .....	4
Feedback and Evaluation .....	5
<b>Division of Forestry Description</b> .....	5
Configuration .....	5
Institutional Environment .....	6
Policy Development .....	7
<b>Propositions</b> .....	7
<b>Methods</b> .....	10
Unit of Analysis .....	10
Data Source .....	10
Variables and Their Measurement .....	13
Dependent Variable .....	13
Selection of policies .....	14
Measurement of policy implementation .....	14
Independent Variables .....	15
Participation .....	15
Internal communication .....	15
Organizational configuration .....	16
Work Autonomy .....	16
Interaction with the institutional environment .....	17
Feedback and evaluation .....	18
Other .....	18
Data Collection .....	18
Data Aggregation .....	19
Dependent Variable .....	19
Independent Variables .....	19

<b>Results</b> .....	20
Propositions .....	21
Critical Factors .....	30
<b>Discussion</b> .....	30
Regional Effects .....	30
Physical Office Location .....	31
Participation .....	32
Communication .....	33
Interaction with the Environment .....	33
Work Autonomy .....	34
Feedback .....	34
Interpretation .....	35
Study Validity .....	37
Content validity .....	37
Intrinsic validity .....	37
Extrinsic validity .....	37
<b>Recommendations</b> .....	38
Policy Development .....	38
Internal Linkages .....	39
External Relationships .....	39
<b>Literature Cited</b> .....	40
<b>Appendix A. Organizational chart, Minnesota Department of Natural Resources, Division of Forestry</b> .....	43
<b>Appendix B. Summary of six policies selected for measuring implementation</b> .....	44

## LIST OF TABLES

Table 1.	Division of Forestry units in which individuals completed policy implementation study questionnaires .....	11
Table 2.	Variables used to measure interactions with the institutional environment .....	17
Table 3.	Mean perceived level of implementation and standard deviation (SD) across all policies for section managers, regional foresters, area foresters, and district foresters .....	20
Table 4.	Overall mean policy implementation scores and standard deviations (SD) for each administrative region .....	20
Table 5.	Analysis of variance table for implementation scores of individual policies in individual districts (POLICY-SCORE) .....	21
Table 6.	Mean policy implementation and standard deviation (SD) among policies .....	21
Table 7.	Tukey pairwise comparison of mean policy implementation by district .....	22
Table 8.	Comparison of mean policy implementation (POLICY-SCORE) among administrative regions for each policy .....	23
Table 9.	Rankings of organizational goals by district foresters in different administrative regions .....	23
Table 10.	Spearman rank correlations for district forester ranking of organizational goals among regions .....	24
Table 11.	External stakeholders with the greatest direct influence on work of units among administrative regions .....	24
Table 12.	Overall policy implementation (DISTRICT-SCORE) and standard deviation (SD) for districts in five different LOCATION categories .....	25
Table 13.	Tukey pairwise comparison of mean frequency of meetings with people in units above the district among districts in five LOCATION categories .....	26
Table 14.	Involvement of individuals in development of five policies, by organizational level ...	27
Table 15.	Pearson correlations (r) between overall level of implementation (DISTRICT-SCORE) and communication variables .....	27
Table 16.	Partial correlations (r) between environmental interaction variables and DISTRICT-SCORE, controlling for region .....	28
Table 17.	Pearson correlations (r) between variables measuring district forester autonomy and overall policy implementation (DISTRICT-SCORE) .....	29

Table 18. Rankings of individuals or units inside the Division of Forestry with the most influence over the district's work, as ranked by district foresters ..... 29

**LIST OF FIGURES**

Figure 1. Location of the 34 districts selected to participate in the policy implementation study ..... 12

Figure 2. Factors influencing policy implementation at the district level in the Division of Forestry ..... 35

## ABSTRACT

The Minnesota Department of Natural Resources, Division of Forestry is a relatively small but complex organization which has a wide geographic distribution of offices and personnel, performs a variety of sometimes conflicting tasks, and has a large and diverse set of stakeholders. It is a line and staff organization with the line consisting of the central office, regions, areas, and districts.

A problem perceived by central administrators in the Division was that policies they develop were inconsistently implemented at the district (field) level. This study was designed to determine the accuracy of that perception and to identify organizational structure factors related to the extent of policy implementation.

Eight propositions relating organizational structure factors and policy implementation were developed and tested. Data were collected regarding the extent of implementation of six policies in 34 district offices. The extent of implementation of each policy in each district was rated by the district forester, the supervising area forester, and the supervising regional forester.

Overall policy implementation averaged across all respondents was between 85 and 90 percent, although nearly 30 percent of the respondents reported implementation of a give policy in a given district at or below 75 percent. No significant differences in the overall perceived level of implementation were found among individuals holding different positions in the Division. There were significant differences in overall policy implementation among the five administrative regions in the Division. There were also significant differences in the extent of implementation among policies and among districts.

There were several critical factors identified which were related to policy implementation in this study. They included direct influence by people in units above the district, the physical location of the district offices in relation to the area and regional offices, regional differences in biophysical, social, and economic factors, influence of other DNR units, particularly field offices of the Wildlife Section, and feedback from staff specialists about job performance.

Using results of the study, research reported in the literature, and personal communication and observations, eight recommendations are provided to help improve the policy development and implementation process in the Division of Forestry.

## **INTRODUCTION**

The Minnesota Department of Natural Resources, Division of Forestry (DOF) is a relatively small but complex organization. Complexity comes not from the number of people employed (approximately 450), but from the wide geographical distribution of offices and personnel, the necessity to perform a variety of sometimes conflicting tasks, and a large and diverse set of stakeholders.

At the time of the study, the Division was organized into line and staff functions. The line portion of the organization comprised four levels; central administration, regions, areas, and districts. Staff positions supported line activities at the top three levels of the organization. Division-wide policies were developed by people at the top of the organization and field implementation occurred at the district level.

A problem perceived by central administrators in the Division was that policy directives developed at the Director's level (highest level in the organization) were inconsistently implemented at the district (field) level. For any given policy, the perception was that appropriate action was taken in some districts to fully comply with the mandates of the policy while in other districts policies were only partially implemented.

For central administrators, complete implementation of policies was a desirable goal and the perceived lack of consistency in the extent of implementation frustrated their efforts to guide the Division in particular directions. Several possible explanations for inconsistent policy implementation were suggested by central administrators. However, they had little quantitative information regarding actual implementation of specific policies on which to base their explanations. To better understand the policy development and implementation process within the DOF, this study was undertaken to accomplish three objectives:

1. Quantify the level of policy implementation among districts in the division.
2. Examine relationships between organizational structure factors and the extent to which policies are implemented at the district level.
3. Provide recommendations to permit more effective policy development and implementation processes by the DOF.

The study was undertaken from the perspective of central administrators wanting to know and understand the extent of policy implementation in their organization. It did not specifically address the quality of individual policies, but assumed the policies studied were reasonably appropriate. It also assumed that, from an administrator's viewpoint, complete, or nearly complete, implementation of an appropriate policy was desirable.

## **LITERATURE REVIEW**

Policy implementation is a relatively little studied phenomenon compared to policy formulation, or in a broader sense, decision making (Bardach 1977:37, Brewer and deLeon 1983:253). This occurs for two primary reasons. First is the difficulty of separating policy implementation from policy formulation. In practice there is often no sharp division between formulating and implementing a policy (Hogwood and Gunn 1984:198, Brewer and deLeon 1983:256). Implementation is often seen as an extension of the decision making process, or simply "executing a selected option" (Brewer and deLeon 1983:253). Thus, inability to demarcate where formulation ends and implementation begins causes difficulties in the study of implementation since it may be unclear what should be studied and what should not.

Second, even though implementation is normally included as a distinct step in the policy process separate from other steps such as formulation, evaluation, reformulation, and termination

(e.g., Hogwood and Gunn 1984:198, Ellefson 1992:29), it is considered complex and difficult to describe and classify analytically (Brewer and deLeon 1983:254). For example, distinctions must be made between macro- and micro-implementation. The former refers to translation of a general policy, often done by bureaucrats, so that it can be assigned to a specific agency. The latter refers to action necessary within an agency to implement the decisions which have been made (Scheirer 1981:16).

Implementation can be studied from several different perspectives, including that of the policy maker, those responsible for actually implementing the policy, or target groups at whom the policy is directed (Mazmanian and Sabatier 1983:12). The predominant approach in implementation research has focused on the perspective of the policy makers (Mazmanian and Sabatier 1983:12). Their basic concerns are the extent to which official policy objectives have been met and the reasons for attainment or non-attainment of the objectives. Until this information is known, a policy cannot be judged as either a success or a failure (Palumbo and Calista 1990:12).

It should be noted that perfect implementation (all actions carried out exactly as planned) of any policy will rarely, if ever, be attained (Hogwood and Gunn 1984:198), even when there is a desire to implement it fully. Less-than-perfect implementation may result from mixed signals from various supervisors, work overload, or lack of resources (Goodman 1965:4). In addition, even carefully worded policies are still open to legitimate interpretation and misrepresentation (Brewer and deLeon 1983:265). In such cases, well-intentioned attempts at policy implementation may not turn out as the policy formulators had anticipated.

There are a number of factors noted in the literature (e.g., Scheirer 1981, Yin 1979, Ellefson 1992) which influence implementation of policies within organizations. Those of specific interest in this case are related to organizational structure. Mintzberg (1979:2) defines organizational structure as "the sum total of the ways in which [an organization] divides its labor into distinct tasks and then achieves coordination among them." Increasing the division of labor normally increases efficiency of individual units, but may permit them to do so in an uncoordinated fashion. Increasing coordination among units leads to more integrated efforts, but often at the expense of reduced efficiency of the individual units. Thus, organizations must properly balance differentiation (or specialization) and integration (or coordination) among units to optimize organizational efficiency.

They often do this in response to the environment in which they operate and the type of task they perform (Thompson 1967:1). In general, more heterogeneous environments require more differentiation, which in turn leads to a need for more integration to achieve a unified effort. Lawrence and Lorsch (1967) view these two organizational needs as antagonistic - differentiation and coordination are difficult to accomplish simultaneously.

Several specific elements of organizational structure were considered in this study. They were participation, internal communication, organizational configuration, work autonomy, interaction with the environment, and feedback and evaluation. There is a substantial amount of overlap and interaction among these factors. However, they are explored separately below and are used to develop several propositions about policy implementation in the Division of Forestry. The interactions among these elements are considered in the results and discussion sections.

## PARTICIPATION

Participation refers to an individual's active involvement in the decision making process within an organization. For any decision, organizations may use a decision making process from along a continuum. On one end of the continuum is a highly centralized, non-participative process; on the other end is a decentralized, participative process (Vroom and Jago 1988:20, Vroom and Yetton 1973:10). In a centralized process, the responsibility for decisions is allocated so all decisions requiring a particular skill will be made by persons possessing that skill (Simon 1957:10).



Such decisions may provide uniform policies across an organization but they do not necessarily guarantee compliance (Perry and Kraemer 1978). A decentralized decision making process may result in more compliance because participation in goal setting is associated with higher levels of performance than when participation is lacking (Kerr and Slocum 1981:119). However, even though there may be more compliance leading to better performance in decentralized units, overall organizational performance may suffer due to lack of uniform decisions among units (Brewer and DeLeon 1983:264).

There is strong support in the literature for policy implementers to be part of the policy making process (Bunker 1972:73, Scheirer 1981:35). Studies of organizational interventions, where new technologies or procedures were introduced into actual work situations, have shown that in cases where workers participated in the process, implementation was much higher than when the intervention was forced upon them (Coch and French 1948:524, Fairweather et al 1974:79,94). Tornatzky et al (1980:79) found this to be true when staff from various levels in the organization were included, but not true when simply more people at any given level participated.

Participation by those ultimately responsible for field implementation of policies can improve implementation by one of several processes. First, using implementers in the policy development process may lead to deeper understanding of and commitment to the new policy. It can also provide lead time in order for those responsible for implementation to develop operating capacity. Third, participation by these individuals creates linkages with central administrators. The linkages help provide information about alternatives prior to policy selection, and also provide a mechanism for feedback following policy selection. Finally, participation can build work group consensus, leading workers to implement the policy if they believe it to be the behavior approved by the relevant peer group (Bunker 1972:73, Scheirer 1981:36). If policy implementers are not used in the policy development process, the operational plans are likely to meet resistance, either out of resentment or ignorance of intent (Bunker 1972:73).

## INTERNAL COMMUNICATION

Communication, both vertical and horizontal, is viewed as a key factor in policy implementation. In general, the more communication that occurs within an organization, the greater the adoption of programs or policies is likely to be (Scheirer 1981:52). Communication provides linkages among units, and can take several forms, including written reports and memos, direct contact (e.g., phone and face-to-face conversations), liaison positions, task forces, and others (Galbraith 1973:10,18, Galbraith and Nathanson 1979:258). Galbraith views written communication as the lowest level of communication among units. The main problem with communicating via paperwork is that it does not permit joint decisions to be made or a large volume of information to be processed. Direct contact provides a somewhat higher level of linkage than written communication. However, it is more difficult with direct contact to keep everyone in an organization equally informed. This can lead to decisions by people in individual units that increase the efficiency of the unit, but that may decrease the efficiency of the overall organization. Liaison positions often exist to foster interaction between two disparate units and, because of their official status, provide even more communication and linkage between units. Finally, task forces work across many units to foster intensive communication for short periods of time.

## ORGANIZATIONAL CONFIGURATION

Mintzberg (1979) proposes five basic organizational structures, each with a dominant coalition and each with its own form of coordination. Of most interest in the context of this study is the professional bureaucracy, in which coordination comes from "the standardization of skills and its associated design parameter, training and indoctrination. It hires duly trained and indoctrinated

specialist - professionals - for the operating core, and then gives them considerable control over their own work" (Mintzberg 1979:349). In these organizations, the professionals work relatively independently from their colleagues, but closely with their clients. They also generally resist efforts to formalize (i.e., standardize) their work and they resist direct supervision. In such organizations, the emphasis is on the operating core (the professionals). A sizeable support staff is also generally present in professional organizations, but their function is to serve the operating core. Finally, the middle line of management in Mintzberg's professional bureaucracy is usually quite small due to relatively small needs for direct supervision of the professionals.

Organizational configuration also relates to the grouping of work units, which provides a fundamental means of coordinating work in an organization (Mintzberg 1979:106). Groupings can be done by knowledge and skill (specialty), function, product, client, or place. The selection of a particular method of grouping has implications for communication, differentiation, and coordination.

### WORK AUTONOMY

Even though professional organizations, as described by Mintzberg, rely on professional standards for control, difficulties with coordination can easily occur. Reliance on professional standards for control and coordination is often thwarted by changing standards of the profession, changing values of constituents, or actual conditions or ambiguous decisions which work in contradiction to the professional standards (Brewer and deLeon 1983:360). Increasing bureaucratization within a professional organization may also lead to conflict between the standards of the profession and the standards of the bureaucracy (Comstock and Scott 1977, Hall 1968, Scott 1966:269). In such cases, the professional standards will not always predominate and the issue of who has control may arise.

Tannenbaum (1966:96) describes control as influence over work that gets done. He views it as an expandable commodity that is available at many levels in an organization, such that supervisors with a large amount of influence can also have subordinates with much influence (Tannenbaum 1966:97), although this clearly does not always happen. By measuring the amount of influence each level has on the work in other levels, it is possible to determine where control lies in an organization. Large differences in the amount of influence indicate disparity in the amount of control at each level while smaller differences indicate more uniform levels of control.

### INTERACTION WITH THE ENVIRONMENT

Since organizations must interact at some level with their environments, it is important to consider the impacts of such interactions on policy implementation. Environment includes people and organizations such as clients and suppliers, employee associations, the public (Mintzberg 1983:Chap. 4), and other organizations (Van de Ven and Walker 1984:598). In the case of public organizations, environment also includes policy makers, special interest groups, the media, and others (Ellefson 1992:55). For natural resource managing agencies, the bio-physical properties of the geographic territory in which the agency operates is also part of the environment. Interacting with the environment generally creates uncertainty for organizations, and according to Thompson (1967), organizations often attempt to shield their technical core (the place where the good or service is produced) from uncertain environments. They do this by creating what Thompson (1967:11-13) calls boundary spanning units (e.g., sales, marketing, legal) which provide an interface between the environment and the technical core. The boundary spanning units are meant to absorb much of the environmental uncertainty, and in such a manner they decrease uncertainty for the technical core, which can then operate closer to the norms of rationality. If a reduction of uncertainty is accomplished, policy development and implementation related to operations of the technical core are simplified.

## FEEDBACK AND EVALUATION

In all cases of policy implementation, non-compliance (the failure to implement a policy) is an issue that must be considered. Non-compliance may result because the implementer did not know what the policy maker wanted, may not have been able to do what the policy maker wanted, or may have refused to do what the policy maker wanted (Goodman 1965:2). Evaluation is necessary to distinguish between situations where implementation was not successful, and situations where implementation occurred, but the policy itself was not successful (did not have the anticipated outcome) (Hogwood and Gunn 1984:220).

In the literature, the terms feedback and evaluation are sometimes used interchangeably. Here, feedback refers to the gathering of information about policy implementation. Evaluation refers to the analysis of that information to determine the extent of implementation and whether the policy had the intended affect.

Feedback, the process of sending information about policy implementation from the field to the central office, often in and of itself is a strong motivator for compliance (Goodman 1965:4). However, most feedback is informal (Brewer and deLeon 1983:345) and getting good feedback requires a deliberate and intensive search by administrators. Quite often, all the information does not point in the same direction (Goodman 1965:49). Even so, feedback mechanisms should be included in all policies and should be considered at the options selection and program design stages (Hogwood and Gunn 1984:219).

Likewise, the method of evaluation should also enter at the options selection and program design stages. The very process of doing an evaluation can be used as a means of control (Brewer and deLeon 1983:359) or it can be used as support for taking other actions to insure compliance (Brewer and deLeon 1983:347). If implementation is satisfactory but the policy itself is not, the results of an evaluation can also be used to restart the iterative policy making process (Mazmanian and Sabatier 1983:8).

Evaluations of policy implementation can be directed at the processes involved in delivering a policy, or at the outputs or impacts of the policy (Hogwood and Gunn 1984:220, Brewer and deLeon 1983:345). In either case, more than empirical studies are needed. Fox (1990) suggests cultivating an awareness of the history of the organization, an understanding of the situational context for particular policies, and studies over longer time spans. The following section describes the specific study of policy implementation undertaken and describes both the empirical measures used and the situational context for those measures.

## DIVISION OF FORESTRY DESCRIPTION

The Division of Forestry provided an opportunity to study policy implementation in an organization with a combination of attributes not commonly found in the organizational or implementation literature. It is a public agency whose employees are predominantly professionals, the organization is arranged primarily in a geographic structure, with functional differentiation submerged in the geographic structure, and strong line and staff components exist, as does a small but powerful core central administration.

## CONFIGURATION

At the time of the study, the DOF was a line and staff organization, following in large measure Mintzberg's description of a "professional bureaucracy" (Mintzberg 1979: Chap. 19). The agency was headed by a director, who had as staff an assistant director, two section managers and their staffs, five supervisors and their staffs, and administrative support personnel. The assistant director and two section managers were similar to the "line-staff officers" described by Kaufman

(1967:45), in that they had considerable authority over activities in the line portion of the organization. Functional specialists (e.g., private forest management, silviculture, insect and disease, etc.) served as support staff for the line portion of the organization. They worked out of regional and area field offices.

The line portion of the DOF included the director and field-based personnel at three administrative levels; regions, areas, and districts. The five regional foresters reported to the director and up to five areas reported to each regional office. From three to six districts reported to each area. A professional forester (bachelor's degree or higher) headed nearly every unit at all three levels. The line portion of the DOF diverged somewhat from Mintzberg's model of a professional bureaucracy in that the middle line management portion of the organization was fairly large. The maximum span of control (number of people reporting to a supervisor) anywhere in the line portion of the organization was six, more often was four, and in some cases was only two. This was probably due in part to the large geographic area covered by the organization (nearly the entire state of Minnesota) and the desire to keep supervisors, staff specialists, and field units in reasonably close proximity. In all there were 75 separate office locations in 69 different cities (see Appendix A for an organizational chart of the line portion of the DOF).

#### INSTITUTIONAL ENVIRONMENT

The Division is charged with accomplishing a wide variety of tasks. Its general charge is to manage state-owned forest land. However, this includes coordinating many specific activities such as timber harvesting, reforestation, intermediate silviculture, fire and pest protection, resource assessment, and recreation development, all of which at times may be in conflict with one another. In addition, the Division provides technical assistance to private forest land owners, and must work in cooperation with other public and private forest land managing organizations in the state.

As a public agency, the DOF has limited capability to alter its environment or its mission. It must interact with a large and diverse set of stakeholders, including other divisions within the Department of Natural Resources, the state legislature, other land managing agencies in the state (federal government, counties, municipalities), forest industry, private forest land owners, the University of Minnesota, special interest groups, and citizens of the state. As a public agency, its institutional environment is continually shifting, sometimes slowly and sometimes more rapidly. Shifts in the environment which the DOF has had to adjust to in recent years include declining state appropriations, change in political power, changing public attitudes about forest management, and substantial wood products industry expansion, among others. The DOF's technical core comprises its field units, and there are few boundary spanning units in the DOF to shield them from these changes in the environment.

Within this institutional environment, the DOF must deal with its organizational structure, including differentiation and coordination, its professional employees, and its grouping of work units. With the DOF's structure at the time of the study, there was little task differentiation among units at the same level in the Division - each district provided essentially the same types of services to its constituents as all the other districts. However, there was significant geographical differentiation among units. Some districts were located in major metropolitan areas, others were located in or near towns with only a few hundred residents. Some district offices were co-located with the area and/or regional offices, some were co-located with other DNR division offices (usually Wildlife), and some were by themselves. Finally, important stakeholders varied among districts across the state. Thus, even though task differentiation was fairly low, geographic variation among districts was relatively high and was likely to cause difficulties with coordination.

## POLICY DEVELOPMENT

In the area of policy development, the DOF primarily used a centralized, non-participative approach. The Directors Management Team (the director, the three section managers, and the five regional foresters) was responsible for Division-wide policy development. Area offices were responsible for on-the-ground program development and district offices were responsible for program implementation (DOF Director, personal communication). Policies were normally communicated to field-based foresters in what is called a "circular letter" written by the Director. However, in some instances they were distributed through an office memorandum or other methods.

The method used to distribute policies is related to the overall issue of communication. A wide geographic distribution made face-to-face contact across the DOF difficult as a general rule. However, differences in office locations created a situation where some district level people had ready access to their supervisors and support staff because they were located in the same building, while others had much less access because their offices were in separate locations. Thus, while written communication could be fairly uniform across the organization, direct contact could not. In the same manner, liaison positions (e.g., staff specialists), which were located in area and regional offices, were not equally accessible to all units in the organization. Thus, uniform communication of the content of policies developed by the Director's Management Team was not likely to occur across the division. In all, central administrators in the DOF faced a significant challenge in maintaining coordination among units of the organization.

One means of maintaining coordination is the implementation of uniform policies, or standard operating procedures, across all units (Thompson 1967:17). Crozier (1964:164, 189-190) views such actions as a way of bringing uncertainty, and power, under control. According to his theory, people who face and cope with uncertainties have power over others who are dependent on their choices. Following this line of thinking, central administrators develop policies or guidelines that standardize what work is to be done and how that work is to be performed. They do this in an attempt to control uncertainty, coordinate activities, and more closely control the direction of the organization.

One difficulty with this approach is that it attempts to concentrate power in the hands of a few central administrators. It does not recognize the professional standards of field personnel, their accumulated knowledge and skills, or the value of participation in policy development. As opposed to coordinating activities, the role of central administrators becomes one of control (Handy 1992:62), and as noted earlier, policy implementation can suffer.

## PROPOSITIONS

Using the research literature as a background and with information known about the DOF, it was possible to formulate several propositions regarding the success of policy implementation activities within the Division.

*Proposition 1.* There will be differences in the level of implementation of policies among districts in the DOF.

The method of statewide policy formulation in the DOF was highly centralized. Participation by people from lower administrative units was minimal. While the intent of such a policy development process was to provide uniformity across the organization, it was likely that implementation would actually vary from location to location. Unique combinations of nearly every factor described above (participation, internal communication, work autonomy, interaction with the environment, feedback and evaluation), all of which can influence the extent of implementation, were

likely to exist at each district. Thus, it was expected that differences in the extent of implementation would be found among the districts, and that the differences would be related to one or more of the factors listed above. Assuming this proposition would hold true, the following propositions explored possible causes for differences in implementation.

*Proposition 2.* Regional differences among the operating environments of districts will cause differences in the extent of implementation of certain policies on a regional basis.

The DOF's administrative regions aligned closely with major bio-physical regions in the state. Characteristics such as forest type, land ownership patterns, and land use patterns varied among the regions, giving rise to issues which were of greater importance in one location than they were in others. Ellefson (1992:144) points out that "forest and administrative conditions vary widely; uniform rules are not always appropriate to the multitude of site-specific conditions that are likely to be encountered." If policies did not recognize bio-physical differences among administrative regions, they were likely to be poorly implemented, or perhaps ignored. Therefore, implementation of policies which attempted to apply uniform rules was expected to vary among regions, in part because of the region-based differences.

*Proposition 3.* Policy implementation will be lower in districts with separate office locations than in those co-located with the area office, which will be lower than those co-located with the area and regional offices.

Besides regional environments, districts also operated in local environments. One significant component of the local environment was the level of interaction with other DOF units. Policy development occurred at the top of the DOF and was communicated downward, and performance feedback came from supervising units. Since the literature indicates both communication, particularly direct contact (Galbraith 1973:10,18), and feedback (Hogwood and Gunn 1984:219) are related to policy implementation, it was expected that districts which were physically co-located with the area offices would implement policies at a higher level than districts which were in separate office locations. Further, because of the regional forester's official involvement in the policy development process, it was expected that districts co-located with both the area and the regional office would implement policies to a greater extent than those that were co-located with the area office only, again due to better communication and feedback between policy developers and policy implementers.

*Proposition 4.* Participation in the policy development process by district foresters will lead to higher levels of implementation than if district foresters do not participate.

The implementation literature strongly supports the participation of field implementers in the policy development process (Bunker 1972:73, Scheirer 1981:35). Such participation may produce better policies, may increase understanding of and commitment to the policies, should foster feedback linkages, and should help develop group norms for implementation. Under the existing DOF procedures, there was little opportunity for field implementers (district foresters) to participate in policy development. That activity was reserved primarily for central administrators. However, to the extent that field implementers were involved in policy development, it was expected that implementation would be higher.

*Proposition 5.* Districts in which there is a higher level of communication with other units in the DOF, particularly direct contact, will implement policies better than districts with less communication.

Communication via paperwork, direct contact, and other methods provides linkages, or coordination, among units within an organization (Galbraith 1973:10,18). In general, the more communication that occurs within an organization, the greater the adoption of policies is likely to be (Scheirer 1981:52). The large geographic area covered by the DOF made effective communication difficult, which reduced the ability to coordinate among units. Thus, districts which communicated more frequently with other units in the organization, particularly through meetings and other face-to-face contact, should have implemented policies better than districts which communicated less frequently within the organization.

*Proposition 6.* Districts which interact more with the institutional environment will implement policies at a lower level than districts which interact little with the environment.

The environment in which an organization must operate typically is a source of uncertainty. Most organizations try to protect their operating core from the environment to reduce the amount of uncertainty it must contend with (Thompson 1967:11-13). As a geographically dispersed organization with field-based personnel whose job was to interact with citizens and people in other organizations, this was rarely possible for the DOF. In fact, in some instances the DOF encouraged interaction with the environment by co-locating offices with other DNR units, particularly the Wildlife Section of the Division of Fisheries and Wildlife.

Coping with uncertainty generally leads organizations to differentiate units in an effort to contend with the uncertainty (Thompson 1967:1). This in turn generally reduces the ability to coordinate (Lawrence and Lorsch 1967). Thus, districts which interacted more with their environments were likely to be less responsive to coordination efforts and less likely to implement division-wide policies than districts which interacted less with their environments.

*Proposition 7.* Policy implementation will be lower in districts where the district forester has a high level of work autonomy than in districts where the autonomy is lower.

The field level of the DOF is highly professionalized. Professionals typically bring a set of standards into an organization that reduce the need for formal controls and standard operating procedures, and are often given significant autonomy over how they do their work (Mintzberg 1979:349). On the other hand, policies were often aimed at standardizing work over many units, thus reducing the work autonomy of individual workers (Brewer and DeLeon 1983:264). In instances where district foresters perceived they had high levels of autonomy, implementation of policies aimed at standardizing procedures should be lower than in instances where task authority was perceived to be low.

*Proposition 8.* Districts which are subject to higher levels of feedback and evaluation will implement policies to a higher degree than those which are subject to lower levels of feedback and evaluation.

The implementation literature is as supportive of the role of feedback and evaluation in policy implementation as it is of participation (Hogwood and Gunn 1984:219). The process of feedback and evaluation itself promotes implementation (Goodman 1965:4), as does analysis of and response to the information gathered (Mazmanian and Sabatier 1983:8). Thus, districts which were subject to more intensive feedback and evaluation should implement a given policy better than districts which were less subject to them.

## METHODS

The primary purposes of this study were to quantify the extent of policy implementation among districts in the division and to identify reasons for inconsistencies which were found. Because of earlier discussions with central administrators, it was assumed that inconsistencies in implementation would be found, although that assumption had to be verified. Thus, at the same time data were collected to measure the extent of policy implementation among districts in the DOF, data were also collected which were designed to help explain inconsistencies which were found.

### UNIT OF ANALYSIS

The primary aim of the study was to determine the extent of policy implementation among districts within the DOF and the possible causes of variation in implementation. Thus individual districts, of which 34 were included in the study, formed the basic unit of analysis. However, because of bio-physical differences among administrative regions in the state, it was expected that some of the variation in implementation would be explained by regional differences (Proposition 2). To examine bio-physical effects, responses were aggregated at the regional level, and the administrative region was used as the unit of analysis.

### DATA SOURCE

The line portion of the DOF was configured to include, from top to bottom, the central office, regions, areas, and districts (Appendix A). There were five Regions (numbered 1,2,3,5,6), corresponding approximately to different forest types in Minnesota. Each region was referred to by the name of the town in which the headquarters were located (e.g., Region 1 = Bemidji Region), except Region 6 which was known as the Metro Region (see Figure 1).

Within Regions 1, 2, and 3 there were four or five administrative areas, and within each area there were three to six districts. Region 5 had two administrative areas, each with four districts. Because of its small size, the Metro Region (Region 6) had no area level and comprised only three districts which reported directly to the regional office. In all, the DOF had 68 district offices which were geographically dispersed across the forested portions of Minnesota.

A subset of districts was selected to represent variation in geographic location and physical office location (i.e., physical location of the district office with respect to the area and regional offices). To provide some consistency in the number of selected districts among regions, all the districts reporting to two areas in each region were included in the study. Specific districts were chosen in each region as described below.

**Region 1 (Bemidji).** All five districts in the Bemidji area were selected since the Bemidji district is co-located with the Bemidji area and Bemidji regional offices. The three districts in the Warroad area were selected because the Warroad district and Warroad area are co-located.



**Region 2 (Grand Rapids).** The three districts in the Deer River area were included in the study because the Grand Rapids district is co-located with the Grand Rapids regional office. All four districts in the Orr Area were selected because the Orr/Crane district is co-located with the Orr area office.

**Region 3 (Brainerd).** The four districts in the Brainerd area were chosen since the Brainerd district is located in the same building as the Brainerd area and regional offices. All four districts in the Moose Lake area were included since the Moose Lake district is co-located with the Moose Lake area office.

**Region 5 (Rochester).** There are only two administrative areas in Region 5, so all eight districts in the two administrative areas were included.

**Region 6 (Metro).** There are no administrative areas and only three districts in Region 6, all of which were included.

In all, 34 districts were included in the study. A listing of all districts which were selected is shown in Table 1 and their locations are shown in Figure 1.

---

Table 1. Division of Forestry units in which individuals completed policy implementation study questionnaires.

<b><u>REGION 1</u></b>	<b><u>REGION 2</u></b>	<b><u>REGION 3</u></b>	<b><u>REGION 5</u></b>	<b><u>REGION 6</u></b>
(Bemidji)	(Grand Rapids)	(Brainerd)	(Rochester)	(Metro)
<b>Bemidji Area</b>	<b>Deer River Area</b>	<b>Brainerd Area</b>	<b>Lewiston Area</b>	North Metro
Bemidji	Deer River	Brainerd	Lewiston	East Metro
Cass Lake	Effie	Little Falls	Caledonia	West Metro
Guthrie	Grand Rapids	Pillager	Preston	
Roy Lake	<b>Orr Area</b>	Long Prairie	Lake City	
Bagley	Orr/Crane	<b>Moose Lake Area</b>	<b>Mankato Area</b>	<b><u>CENTRAL</u></b>
<b>Warroad Area</b>	Kabetogama	Moose Lake	Rochester	Administration
Warroad	Tower	Eaglehead	New Ulm	Resource Mgt.
Wannaska	Cook	Hinckley	Willmar	Resource Protection
Grygla		Mora	Faribault	

---

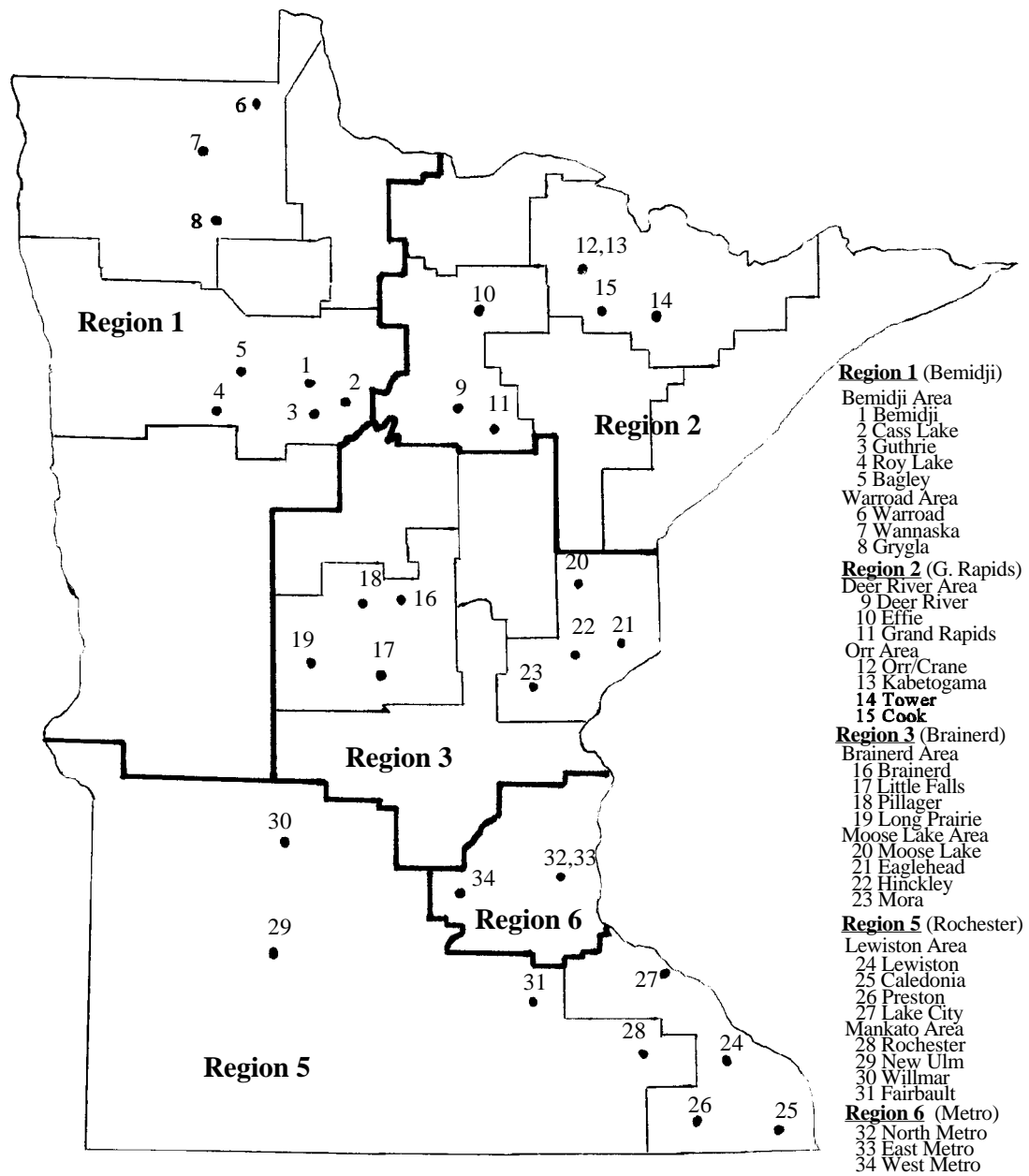


Figure 1. Location of the 34 districts selected to participate in the policy implementation study.

Two approaches to data collection about policy implementation were considered. One possible approach was to examine reports, memos, records, and other written documentation to measure the level of implementation. Had it been available, this type of information might have been used as an "unbiased" measure of implementation. However, such so-called "objective" information is not immune to error or mis-representation since it often represents a subjective measure once removed (Campbell 1976:53). In addition, such documents are often difficult for an outside researcher to interpret properly (Van de Ven & Ferry 1980:38).

A second possible approach was to seek the subjective evaluations of informants - those responsible for development and implementation of policies. One drawback to this approach is that the data are clearly subjective and generally represent the "perceptions" of those providing the information. However, using a properly constructed written questionnaire, informants can be just as accurate in measuring performance (in this case implementation) as analyzing existing records (Van de Ven & Ferry 1980:38). When using such an approach, more accurate assessments of organizations can be obtained by incorporating the perspectives of those at the top, middle, and bottom of the organization (Fox 1990:210). This second approach was used.

To increase the accuracy of the assessment of policy implementation, multiple observers were used for each district. The district forester, the area forester supervising that district, and the regional forester supervising the area and district each rated the extent to which several policies had been implemented in the selected district(s) for which they had supervisory responsibility. Thus, the district forester rated the perceived extent of implementation of a given policy in his or her own district only. The area foresters rated the perceived extent of implementation of the policy in each district under their supervision. Finally, the five regional foresters rated the perceived extent of implementation in each of the selected districts for which they had supervisory responsibility. Using this method, implementation of each policy in each district was rated by three different individuals, each at a different administrative level in the organization.

Since the three section managers were deeply involved in policy development through their participation on the Director's Management Team, they also provided information about the extent of policy implementation at the district level. Section managers did not possess enough information to rate implementation within all the individual districts, so instead they provided an overall rating of the extent of policy implementation across all districts.

To help understand the cause of differences in the extent of policy implementation among districts, each respondent (district, area, regional foresters and section managers) also answered a series of questions about the structure of the DOF (described in detail below).

## VARIABLES AND THEIR MEASUREMENT

In order to test the eight propositions a dependent variable (i.e., extent of policy implementation) and a set of independent variables that were believed to be related to and cause variation in policy implementation were defined.

### **Dependent Variable**

A measure of the level of policy implementation was needed to construct the dependent variable. The word "policies," as used by the DOF, referred to the division's internal rules for conducting business. Ellefson (1992:141) refers to such policies as "guidelines", which "translate general statements of forest policy into specific prescriptions for administrative action." The division's policies cover a wide variety of issues. Some govern programs in which the division interacts with people outside the organization (e.g., those covering services provided to private land owners), some provide programmatic guidelines (e.g., identifying old growth stands), and others simply provide procedures for internal operations (e.g., purchasing or record keeping procedures).

Although many policies exist, this study focused only on policies which were developed for implementation at the district level.

To test certain propositions (e.g., propositions 1 and 4), the extent of implementation of individual policies at individual districts had to be determined. For other propositions (3, 5, 6, 7, 8), a broader measure of implementation was required, focusing on general levels of implementation by a district across several policies. For proposition 2, a measure of the general level of implementation of a specific policy across several districts within an administrative region was needed.

### Selection of Policies

To construct these measures, five policies were chosen for study. Each policy met four criteria. First, they were developed to be implemented by district foresters. Policies which were developed to be implemented at higher levels in the organization were not considered. Second, the policies had statewide application. Policies which were regional or local in nature were not considered for this study. Third, the policies were developed during the three or four years prior to the study so that policy developers were generally in their current positions. Fourth, the policies and their content were relatively well known to district foresters so they could easily answer questions about the extent of implementation of each policy.

Policies which met the above criteria were identified by several methods. A former division employee (an area forester) and several current district foresters were asked to suggest policies, as were the managers of the resource management and resource protection sections in the St. Paul office. Twelve policies were suggested by these individuals and examined to determine if they met the four criteria listed above.

Of twelve policies considered, five were selected which not only met the above four criteria but also covered a variety of issues and methods of implementation. The policies dealt with the following specific issues:

- identification of candidate old growth stands,
- implementation of best management practices (BMP),
- provision of forest management services to private woodland owners (PFM),
- timber harvesting in the vicinity of recreational trails, and
- time-sheet coding during fire suppression activities.

A summary of each policy is included in Appendix B.

### Measurement of Policy Implementation

For each policy, a five-point modified Likert scale was used to measure the extent of implementation in each district. Likert (1932) determined that answers from a five-point scale often followed normal distribution. Thus, rather than measuring discrete data, the anchor points (possible responses) measure a continuum. Scores can be calculated by assigning a numerical value to each possible response and combining responses arithmetically (e.g., sum, mean, median). Others have considered the appropriate number of anchor points on such a scale, and determined that five points provide an adequate level of resolution (Matell & Jacoby 1971).

In this case, implementation values corresponding to points 1 through 5 on the scale were 0, 25, 50, 75, and 100 percent, respectively. In addition, respondents could indicate that a policy did not apply to their unit.

As noted earlier, district foresters rated the extent of policy implementation in their own districts only, area foresters rated policy implementation in each of the districts (which were part of the study) they supervised, and regional foresters rated implementation in each of the districts (which were part of the study) which were under their supervision. Thus, for each policy and each district there were three ratings for the extent of implementation, one each provided by the district forester,

the area forester, and the regional forester. These individual ratings are referred to as SCORE and represent the raw data provided by each respondent for each policy in each district.

### **Independent Variables**

Organizational structure refers to how organizations divide and coordinate their work (Mintzberg 1979:2). Several organizational structure factors were possible causes of variation in policy implementation at the district level. For this study the possible factors were arranged in the following categories: participation, internal communication, organizational configuration, work autonomy, interaction with the environment, and feedback and evaluation. Within each of these broad categories there were several specific variables that were measured. Specific variables included in the final questionnaire are described below. Variable names are shown in capital letters.

#### Participation

In the literature, participation is considered to be highly related to policy implementation. The most direct method of participation is actual involvement in the policy development process. However, by communicating procedures, intent, and other information, it is possible to foster an atmosphere of participation in the organization, even though not everyone may be directly involved in every decision. Thus, besides measuring direct involvement, participation in a broader sense can also be evaluated by measuring the levels of understanding and agreement about particular issues. In this case, those issues were the policies.

Direct participation in the policy making process (INVOLVED) was measured by asking, for each of the six policies, "How involved were you in the development of this policy?" Responses on a five-point scale ranged from "not involved at all" to "involved very much." In a similar manner, agreement (AGREE) was measured by the response to the statement "Indicate your overall level of agreement with this policy," choosing from a five-point scale ranging from "strongly disagree" to "strongly agree". Finally, understanding (UNDERSTAND) was measured by asking "How well do you understand all the issues related to development of this policy?" Potential responses ranged from "no understanding" to "full understanding."

#### Internal communication

Communication plays crucial roles in participation, coordination, and control. In the DOF communication can occur using several different methods and with many different people as its focus. The methods of interest were written communication and direct contact. These were divided into four distinct forms of communication: written memos and reports received (WRITTEN RECEIVED), written memos and reports sent (WRITTEN SENT), discussions (face-to-face or by phone) (DISCUSSIONS), and meetings (MEETINGS).

At the district level, communication efforts are generally directed upward or laterally within the organization. Two specific foci of internal communication were included in the survey, people in units above the district (ABOVE) and people in other districts (PEERS). In all, there were 8 variables in the communications category, one for each combination of type (4) and focus (2) of communication (specifically, WRITTEN RECEIVED-ABOVE, WRITTEN RECEIVED-PEERS, WRITTEN SENT-ABOVE, WRITTEN SENT-PEERS, DISCUSSIONS-ABOVE, DISCUSSIONS-PEERS, MEETINGS-ABOVE, MEETINGS-PEERS).

For each method and partner combination, respondents were asked how many times they communicated with people in each of the groups using each form of communication. Response points on the five-point scale included: none, about 1-3 times per month, about 1-3 times per week, about 1-3 times per day, and 4 or more per day.

### Organizational configuration

Because of the geographic area it must cover, DOF field offices are located fairly uniformly throughout the forested portion of the state. As one organizing mechanism, the DOF divided the state into geographic regions, each conforming approximately to major forest eco-regions. Because of the bio-physical differences among the various administrative regions, the administrative region in which a district resides provided one measure of organizational configuration. The variable (REGION) was created using the organizational chart to distinguish among the administrative regions. The value assigned to the variable corresponded to the administrative region number. To further understand differences among administrative regions, respondents were asked to rank-order eight organizational goals taken from the Minnesota Forest Resources Plan (1991).

At a more detailed level of configuration, the need to have the district office located within the specific geographic territory for which it was responsible usually resulted in the office being physically separated from supervisory (area and regional) offices. However, there were instances where the area office was within the bounds of a particular district, in which case area and district personnel normally were located in the same building. In a few cases, regional and district offices were located in the same building. In all, there were five different location categories that district offices fall into relative to area and regional offices. They were:

- Co-located with both the regional and area offices
- Co-located with the regional office only
- Co-located with the area office only
- Separate location, regional and area offices co-located
- Separate location, regional and area offices not co-located.

Values of 1 through 5 were assigned, respectively, to the above office locations. These values were chosen to correspond approximately to the physical closeness (1 being closest, 5 being least close) between the district office and the area and regional offices. The number of districts in each location category varied considerably. Two districts were co-located with both the area and regional offices, four were co-located with the regional office only, six were co-located with the area office only, two were separate offices, but the area and regional offices were co-located, and in twenty instances, the district, area, and regional offices were all physically separate from one another. The location category was assigned the variable name LOCATION.

### Work Autonomy

Work autonomy was defined as the ability to make decisions about the kind of work to be done and how the work will be accomplished. It includes both long-term and day-to-day components. The variables in this category were divided into the categories of influence, reliance, and authority and were measures of the internal workings of the DOF.

Influence measured how much say people in various units had on the work that was done in a district. Two questions were asked regarding influence, "How much direct influence do each of the following people have on the kinds of work performed in your district?" (INFLUENCE-KIND) and "How much direct influence do each of the following people have on how work is performed in your district?" (INFLUENCE-HOW). Respondents answered these two questions for three different people or groups of people: people in line management or staff positions above the district (ABOVE), themselves (SELF), and people in other DOF districts (PEERS). In all, six variables related to influence were measured: INFLUENCE-KIND-ABOVE, INFLUENCE-KIND-SELF, INFLUENCE-KIND-PEERS, INFLUENCE-HOW-ABOVE, INFLUENCE-HOW-SELF, and

INFLUENCE-HOW-PEERS. The five possible responses were "none", "a little", "some", "quite a bit", and "very much".

To more fully understand influence relationships within the DOF, respondents were asked to identify the individuals or groups of individuals within the organization who had the greatest direct influence on their work. Respondents were allowed to select and rank up to five individuals. There was no variable name assigned to this question.

Reliance was a measure of how much the respondents depended on various people to accomplish their job. Two questions were asked to measure the level of reliance, "To obtain the materials, clients, or information needed to do your job, how much do you rely on the following people?" (RELY) and "To fulfill your work responsibilities, how much do you depend on each of the following people?" (DEPEND). The two groups of people asked about were people in units above the district (ABOVE) and people in other districts (PEERS). The four specific variables used to measure various aspects of reliance were RELY-ABOVE, RELY-PEERS, DEPEND-ABOVE, and DEPEND-PEERS. Again, the five possible responses were "none", "a little", "some", "quite a bit", and "very much."

Authority looked specifically at how much control individuals had over their work on a day-to-day basis. They were asked how much authority they had to make each of the following decisions (variable names follow in parentheses): "Determining what tasks I will perform from day to day?" (AUTHORITY-TASK), "Setting quotas on how much work I have to complete?" (AUTHORITY-QUOTA), and "Determining how work exceptions are to be handled?" (AUTHORITY-EXCEPTION). The same five responses were possible.

Interaction with the institutional environment

The DOF is a highly public agency that interacts with a wide variety of stakeholders. Because of its geographic distribution and by the very nature of the work, the DOF is not able to provide much buffer for its technical core (district foresters). Thus, the core is subject to considerable interaction with its environment. Using the same questions for communication, influence, and reliance as were used for measuring internal interactions, the levels of communication, influence, and reliance were measured for people in other DNR units outside the DOF (DNR) and people outside the DNR (OUTSIDE). The sixteen variables (8 questions, 2 groups) are shown in Table 2.

---

Table 2. Variables used to measure interactions with the institutional environment.

	People in DNR units <u>other than DOF</u>	People in units <u>outside DOF</u>
Communication		
Written received	WRITTEN RECEIVED-DNR	WRITTEN RECEIVED-OUT
Written sent	WRITTEN SENT-DNR	WRITTEN SENT-OUT
Discussions	DISCUSSIONS-DNR	DISCUSSIONS-OUT
Meetings	MEETINGS-DNR	MEETINGS-OUT
Influence		
Influence on kind of work	INFLUENCE-KIND-DNR	INFLUENCE-KIND-OUT
Influence how work is done	INFLUENCE-HOW-DNR	INFLUENCE-HOW-OUT
Reliance		
Reliance for resources	RELY-DNR	RELY-OUT
Reliance to complete	DEPEND-DNR	DEPEND-OUT

---

To more fully understand the interactions with the environment, respondents were asked to select and rank from a list the five people or groups of people outside the DOF who most directly influenced their work during the past year. No variable name was assigned to this question.

### Feedback and Evaluation

Feedback and evaluation are generally related to job performance, and in a line organization, feedback and evaluation generally come from the direct supervisor, in this case the area forester (except in Region 6, where the direct supervisor is the regional forester). However, staff specialists at the area (or regional) level also provided information and technical assistance to district foresters to help them perform their jobs. Thus, feedback and evaluation may also come from them. Feedback and evaluation were measured using responses to the following statements, "The area forester often provides feedback about my job performance" (FEEDBACK-AREA FORESTER) and "Area program staff often provide feedback about my job performance" (FEEDBACK-AREA STAFF). Response choices were "disagree strongly", "disagree somewhat", "neutral", "agree somewhat", or "agree strongly."

In Region 6, where there is no administrative area, these questions were altered to read "The Regional Forester often provides..." and "Regional program staff often provide..."

### Other

Nearly all the questions in the questionnaire were structured so the respondents had to select one answer from a five point scale. Respondents were given an opportunity to write additional comments about each policy if they so chose. The last page of the questionnaire provided respondents an opportunity to answer an open-ended question about policy development or implementation within the DOF or about their jobs. It was designed to elicit comments that would help in understanding the policy development and implementation process in the DOF. Specifically, the statement read, "If there is anything else you would like to say about policy development or implementation or about your job, please write your comments below. Your comments will be kept in strict confidence." In all, 44 independent variables were measured.

### **Data Collection**

Data were collected using a paper-and-pencil questionnaire administered to the section managers, and the district, area, and regional foresters in the offices identified earlier. The questionnaire was adapted from the Unit Member Questionnaire of the Organizational Assessment Instrument (OAI) developed by Van de Ven and Ferry (1980).

To ensure content validity (to the extent possible), an initial draft of the questionnaire was given to a university extension forester with extensive experience in written surveys, a DOF planner and fellow graduate student, a district forester, and a former DOF area forester for review and comment. Based on their comments, some duplicative or unnecessary questions were deleted and others were reworded. The questionnaire was then administered to individuals in a DOF area and its associated districts, with the understanding that they were pre-testing the instrument. These individuals were not part of the actual study and their responses are not part of the analysis. This pre-test was conducted to identify any ambiguous questions or language and to determine the approximate time necessary to complete the questionnaire. No changes were made in the questionnaire as a result of the pre-test, and it was found that individuals took about 30 to 45 minutes to complete it. As a last step, the questionnaire was administered to districts in one more area (again, not part of the sample) to check administration procedures.

The questionnaire was administered by the researcher to nearly all district and area foresters during regularly scheduled area meetings. A cover sheet on the questionnaire briefly explained the



purpose of the survey and gave general instructions for completing it. A verbal explanation of the purpose of the study and instructions for completing the questionnaire were also provided at each meeting where the questionnaire was administered. Anonymity was promised to respondents both verbally and in writing. Copies of the six policies which were part of the study were made available to respondents if they asked to see them (which happened two or three times). The researcher remained in the room during the time the questionnaires were completed to answer questions related to the questionnaire.

Questionnaires were left with supervisors for a few district people who did not attend the meetings, all of which were subsequently mailed back to the researcher after completion. At their request, questionnaires and a cover letter briefly explaining the study were mailed to the regional foresters and the section managers, all of which were mailed back after completion. Using these methods, a completed questionnaire was obtained from all individuals selected to participate in the survey (i.e., 100 percent response).

## DATA AGGREGATION

### **Dependent Variable**

Dependent variable data were aggregated to create more general measures of policy implementation than was possible by using data from just a single policy. To create the broader measures, SCOREs (the raw data of each respondent for implementation of each policy at each district) were aggregated at two levels.

First, for each district, the level of implementation of each policy was calculated by aggregating the data provided by the district, area, and regional foresters. A simple, linear combination model (Hage & Aiken 1967:77, Van de Ven & Ferry 1980:173) was used which placed equal weight on each of the three respondent's assessment of the degree to which a policy was implemented in a specific district. In cases where values were missing (14 total out of 510 possible responses), least square means were calculated and used as an approximation of the arithmetic mean. The result of this calculation was named POLICY-SCORE and represents the extent of perceived implementation of each policy in each district.

Although POLICY-SCORE was useful for certain analyses, a more generalized measure of the level of policy implementation within districts was needed to measure relationships with the independent variables. Thus, a second aggregation was done by aggregating the POLICY-SCORE values across all policies for each district. Again, a linear combination model was used which placed equal weights on all the policies. The resulting value was named DISTRICT-SCORE and represents a general level of policy implementation within a district that is not closely tied to any one policy. After this level of aggregation, there were 34 DISTRICT-SCORE values (one for each of the 34 districts in the sample), each calculated by averaging 15 data points (district, area, and regional forester ratings of implementation of five policies:  $3 \times 5 = 15$ ).

### **Independent Variables**

District foresters were the sole providers of information about the structure of their individual districts. Independent variables were not aggregated for district-level analyses since each was designed to measure a specific structural characteristic of the district.

## RESULTS

Across all five policies, the average policy implementation score, calculated from responses by district, area, and regional foresters, was 4.56. Based on the scale used, this equates to an overall implementation level of 85 to 90 percent. However, nearly thirty percent of the respondents reported implementation of a given policy in a given district at or below 75 percent.

Section managers scored overall policy implementation lower ( $\bar{x} = 4.15$ ) than did any of the field based foresters. Regional foresters scored overall implementation the highest ( $\bar{x} = 4.71$ ), followed by area foresters ( $\bar{x} = 4.69$ ) and district foresters ( $\bar{x} = 4.56$ ) (Table 3). However, no significant differences in the overall perceived level of implementation were found among individuals holding different positions in the Division ( $F = 2.01$ ,  $p = 0.126$ ).

---

Table 3. Mean perceived level of implementation and standard deviation (SD) across all policies for section managers, regional foresters, area foresters, and district foresters.

	Mean Perceived Implementation	SD
Section managers	4.15	0.132
Regional foresters	4.71	0.225
Area foresters	4.69	0.290
District foresters	4.56	0.411

$F = 2.01$ ,  $p = 0.126$

---

There were significant differences ( $F = 4.97$ ,  $p = 0.0036$ ) in overall policy implementation among the five administrative regions. Region 3 (Brainerd) had the highest perceived implementation ( $\bar{x} = 4.80$ ), followed by Region 6 (Metro,  $\bar{x} = 4.57$ ), Region 1 (Bemidji,  $\bar{x} = 4.56$ ), Region 2 (Grand Rapids,  $\bar{x} = 4.49$ ) and Region 5 (Rochester,  $\bar{x} = 4.36$ ) (Table 4).

---

Table 4. Overall mean policy implementation scores and standard deviations (SD) for each administrative region. F and p values were calculated using a one-way analysis of variance.

Region	Mean Score	SD
3	4.80	0.152
6	4.57	0.201
1	4.56	0.144
2	4.49	0.106
5	4.36	0.333

$F = 4.97$ ,  $p = 0.0036$

---

Results of more specific data analyses are presented below, in the context of each of the eight propositions, to help more fully understand the differences in policy implementation. For each proposition an explanation is provided about what was found and whether the proposition was supported based on the findings. A more generalized discussion which attempts to synthesize information across the propositions is contained in the Discussion section of the paper.

PROPOSITIONS

*Proposition 1.* There will be differences in the level of implementation of policies among districts in the DOF.

The aggregated variable POLICY-SCORE (combined district, area, and regional forester responses for a single policy at a single district) was used in a two-way analysis of variance comparing policy implementation among districts and among policies. Results of the analysis are shown in Table 5.

Table 5. Analysis of variance table for implementation scores of individual policies in individual districts (POLICY-SCORE).

<u>Source</u>	<u>DF</u>	<u>SS</u>	<u>MS</u>	<u>F</u>	<u>P</u>
District	33	11.28	0.34	2.10	0.0017
Policy	4	10.58	2.64	16.26	0.0000
<u>District*Policy</u>	<u>132</u>	<u>21.45</u>	<u>0.16</u>		
Total	169	43.29			

The analysis of variance detected significant differences in the extent to which individual policies were implemented ( $F = 16.26, p = 0.00$ ). Pairwise comparison showed three different groupings of policies with means that were not significantly different at the 0.05 level (Table 6). Implementation of the fire cost coding policy and the best management practices policy was not significantly different. Implementation of the timber harvesting policy was not significantly different from implementation of the best management practices policy or the private forest management policy. Finally, implementation of the timber harvesting, private forest management, and old growth policies were statistically similar.

Table 6. Mean policy implementation and standard deviation (SD) among policies. Means followed by the same letter are not significantly different from one another ( $p \leq 0.05$ ) using Tukey's pairwise comparison method.

<u>Policy</u>	<u>Mean</u>	<u>SD</u>
Fire cost coding	4.94a	0.152
Best management practices	4.66ab	0.319
Timber harvesting/Rec. trails	4.53 bc	0.469
Private forest management	4.39 bc	0.574
Old growth	4.21 c	0.562

Significant differences were also found among districts in the level at which policies were implemented ( $F = 2.10, p = 0.002$ ). To help understand the differences in implementation among districts, pairwise comparison between districts was performed using Tukey's method (Statistix 1992:206). The pairwise comparison showed two groupings of districts whose means were not significantly different from one another at the 0.05 level (Table 7). All districts with means followed by the letter "a" are statistically similar to one another, as are all districts with means followed by the letter "b."

Table 7. Tukey pairwise comparison of mean policy implementation by district. Means followed by the same letter are not significantly different from one another ( $p \leq 0.05$ ).

District	Mean	District	Mean	District	Mean
17	4.93a	5	4.67ab	25	4.51ab
18	4.93a	8	4.67ab	22	4.49ab
23	4.93a	6	4.67ab	12	4.47ab
20	4.87ab	1	4.60ab	28	4.37ab
16	4.80ab	13	4.60ab	2	4.33ab
27	4.77ab	4	4.60ab	7	4.33ab
32	4.75ab	3	4.60ab	24	4.31ab
19	4.73ab	15	4.53ab	10	4.23ab
21	4.73ab	9	4.53ab	34	4.10ab
26	4.71ab	14	4.53ab	30	4.08ab
33	4.68ab	11	4.53ab	29	4.00ab
				31	3.92 b

### Finding

The results of this analysis supported the proposition that there would be differences in the level of implementation of policies among districts, but this analysis alone does not provide information about possible causes of differing levels of implementation.

*Proposition 2.* Regional differences among the operating environments of districts will cause differences in the extent of implementation of certain policies on a regional basis.

Statistically significant differences ( $p \leq 0.05$ ) in policy implementation were found among administrative regions (as measured by POLICY-SCORE for all districts in a region) for four of the five policies (Table 8). The only policy for which there were no significant differences among regions in implementation was the fire cost coding policy.

Tukey's pairwise comparison method was used to compare among regions ( $p \leq 0.05$ ) for the four policies for which significant differences were found. Implementation of the BMP policy was significantly less in Region 5 than it was in Regions 2 and 3, but there were no other differences among regions in implementation of this policy. Regions were divided into two groups for the old growth and the timber harvest policies, and into three groups for the private forest management policy.

Four of the five regions had the highest average level of implementation for a least one policy (Regions 2 and 5 tied for the fire cost coding policy). Only Region 1 did not rank first for any of the policies considered, although statistically it was in the top group of regions for all the policies. By the same token, four of the five regions also had the lowest average level of implementation for at least one policy. Again, only Region 1 did not ever rank last, although its score was in the same statistical group as the last ranked region for four of the five policies.

Table 8. Comparison of mean policy implementation (POLICY-SCORE) among administrative regions for each policy. Averages within a column followed by different letters are significantly different ( $p \leq .05$ ) using Tukey's pairwise comparison method. F and p values were calculated using one-way analysis of variance.

<u>Old Growth</u>		<u>BMP</u>		<u>PFM</u>		<u>Timber Harvest/ Rec. Trails</u>		<u>Fire Cost Coding</u>	
<u>R</u>	<u>Score</u>	<u>R</u>	<u>Score</u>	<u>R</u>	<u>Score</u>	<u>R</u>	<u>Score</u>	<u>R</u>	<u>Score</u>
3	4.73a	6	4.83a	3	4.92a	2	4.81a	2	5.00a
1	4.21ab	2	4.81a	6	4.83ab	3	4.79a	5	5.00a
5	4.18ab	3	4.75a	1	4.42abc	1	4.50ab	1	4.96a
6	4.16ab	1	4.71a	2	4.19 bc	5	4.31ab	6	4.92a
2	3.67 b	5	4.33a <sup>1/</sup>	5	3.83 c	6	3.79 b	3	4.83a
F	4.90		4.01		7.66		5.90		1.77
p	0.0038		0.010		0.0002		0.0013		0.1623

<sup>1/</sup> Region 5 was significantly different from regions 2 and 3, but there were no other significant differences among regions for the BMP policy

To determine whether bio-physical differences among regions translated in to differing priorities, respondents were asked to rank-order a set of eight organizational goals. While there were some similarities among the rankings, there were also some distinct differences (Table 9). Supplying raw material from the forest was fairly highly ranked by districts in the northern part of Minnesota (Regions 1, 2, and 3), less important in the southern portion of the state (Region 5), and of almost no importance in the Twin Cities metropolitan region (Region 6). Conversely, increasing the understanding of DNR programs was highly important in the Metro region but of relatively minor importance in the other regions. Interestingly, managing for non-timber values ranked at or near the top for district foresters in all regions. Of equal importance in Region 5, where the forests are intermixed with agricultural land, was working with other agencies.

Table 9. Rankings of organizational goals by district foresters in different administrative regions.

<u>Goal</u>	<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>	<u>Region 5</u>	<u>Region 6</u>
Biodiversity	8	8	7	8	5
PFM	7	6	2	3	2
Supply raw material	2	2	3	4	8
Manage for non-timber values	1	3	1	1	3
Cooperate with local fire depts.	3	1	5	7	4
Work with other agencies	6	7	8	1	6
Manage trust fund land	4	4	6	5	7
Increase understanding of DNR programs	4	5	4	6	1

Spearman rank correlations of organization goals helped quantify the similarities and distinctions among regions (Table 10). Relationships between regions with respect to organizational goals varied in a fashion similar to the bio-physical relationships. Regions with similar bio-physical characteristics had similar goal rankings, those with less similar characteristics generally had less

similar rankings. Thus, rankings in Region 1 were quite similar to Region 2 ( $r = 0.87$ ), less similar with Region 3 ( $r = 0.55$ ), even less similar with Region 5 ( $r = 0.28$ ), and showed essentially no similarity with Region 6 ( $r = -0.12$ ). The same pattern is true for Region 2. Rankings of organizational goals in Region 6 were generally quite dissimilar to rankings in the other regions. This is likely a reflection of the much different emphasis (urban forestry) in the Metro region than in the other four regions.

Table 10. Spearman rank correlations for district forester ranking of organizational goals among regions.

	<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>	<u>Region 5</u>
Region 2	0.87			
Region 3	0.55	0.48		
Region 5	0.29	0.00	0.35	
Region 6	-0.12	-0.14	0.42	-0.04

Another method of evaluating the differences in the environment in which districts operate was to rank external stakeholders in terms of the amount of influence they had on the district's work. The five stakeholders with the most influence in each region are shown in Table 11.

In all, district foresters listed thirteen different organizations or groups of people who have some direct influence on the work they do. Private land owners, the general public, and the Wildlife Section (DNR Division of Fisheries and Wildlife) appeared as important external stakeholders in all regions. Loggers and the forest industry were seen as more important in the northern part of the state (Regions 1, 2, and 3) than in the two southern regions (5 and 6). In these two regions, local agencies (e.g., local communities, tree boards, schools, county government, etc.), and to some extent federal agencies other than the USDA Forest Service (e.g., Soil Conservation Service) were more important.

Table 11. External stakeholders with the greatest direct influence on work of units among administrative regions. "Tie" indicates a tie ranking with stakeholder directly above.

<u>Rank</u>	<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>	<u>Region 5</u>	<u>Region 6</u>
1	loggers	priv. land own.	priv. land own.	priv. land own.	priv. land own.
2	priv. land own.	Wildlife Sec.(tie)	general public	general public	local agencies
3	general public	loggers	loggers	Wildlife Sec.	other federal agencies
4	Wildlife Sec.	general public	Wildlife Sec.	local agencies	general public
5	forest industry	forest industry	legislators	legislators	Wildlife Sec. (tie)

### Finding

Depending on the policy, there was some evidence that the extent of implementation was dependent on the geographic environment in which a district operated. In general, districts in various parts of the state were influenced by the same external stakeholders. However, if the ranking of organizational goals by district foresters was any indication, the issues of importance to the stakeholders varied considerably among regions.

*Proposition 3.* Policy implementation will be lower in districts with separate office locations than in those co-located with the area office, which will be lower than those co-located with the area and regional offices.

District offices fell in one of five office location categories designed to indicate the relative closeness of district offices to their respective area and regional offices. The variable LOCATION was not a direct measure of absolute physical distance between offices, but was more a measure of organization configuration and relationships. Thus, districts which shared office space with the area and regional offices were assigned a value of 1 while those where the district, area, and regional offices were all separate were assigned a value of 5. Intermediate office configurations, where two of the three units shared office space but the third unit was separate, were assigned intermediate values (see page 16).

One-way analysis of variance indicated significant differences in the level of policy implementation among office locations ( $F = 4.27, p = 0.01$ ). Districts which were co-located with both the area and regional office had the highest overall level of implementation (DISTRICT-SCORE = 4.87). Districts which were separate from the area office and where the area and regional offices were also separate had the lowest overall level of implementation (DISTRICT-SCORE = 4.49). In general, overall policy implementation was higher in situations where either the area office or the district office (or both) was co-located with the regional office. Implementation was lower where the regional office was separate from the area and district offices (Table 12).

Table 12. Overall policy implementation (DISTRICT-SCORE) and standard deviation (SD) for districts in five different LOCATION categories.

	<u>Category</u>	<u>DISTRICT-SCORE</u>	<u>SD</u>	<u>N</u>
Region, area, and district offices co-located	1	4.87	0.09	2
Region and area offices co-located, district separate	4	4.83	0.14	2
Region and district offices co-located, area separate	2	4.61	0.20	4
Area and district offices co-located, region separate	3	4.58	0.19	6
Region, area, and district offices all separate	5	4.49	0.25	20

The specific proposition that districts with separate office locations would implement policies at a lower level than those which were co-located with the area office, and those would be lower than districts which were co-located with both the area and regional office, was fully supported. However, the implicit assumption behind assigning values to the LOCATION variable was that level of policy implementation would correspond exactly to the LOCATION values, which it did not. Either districts in LOCATION category 4 (region and area offices co-located, district office separate) were an anomaly, or the assumptions behind how values were assigned were faulty.

Differences in the frequency of communication between districts and people in units above the district were generally not significant among the various location categories. The one exception was the frequency of meetings, in which case significant differences were found ( $F = 17.47, p = 0.00$ ). Districts in LOCATION category 4 (region and area offices co-located, district office separate) reported significantly more ( $p \leq 0.05$ ) meetings than districts in the other LOCATION categories (Table 13). No significant differences were found among districts in different LOCATION categories with respect to feedback from the area forester or the area staff.

Table 13. Tukey pairwise comparison of mean frequency of meetings with people in units above the district among districts in five LOCATION categories. Means followed by the same letter are not significantly different from one another ( $p \leq 0.05$ ).

<u>LOCATION Category</u>	<u>Mean</u>
(4) Region and area co-located, district separate	3.00a
(5) Region, area, and district all separate	2.05 b
(1) Region, area, and district all co-located	2.00 b
(2) Region and district co-located, area separate	2.00 b
(3) Area and district co-located, region separate	2.00 b

### **Finding**

Overall, the analysis of variance, combined with a correlation between the variable LOCATION and DISTRICT-SCORE of -0.34, provided some evidence for the proposition that districts in physical proximity to their supervisory offices would implement policies better than districts which were not physically co-located with supervisory offices. The distinction is quite clear between districts that were co-located with both the area and regional offices and those where all three offices were separate. The distinctions were less clear in the location categories between these two extremes. However, there was no strong evidence that the differences were strongly related to the frequency of communication with supervisors or the amount of feedback from them.

*Proposition 4.* Participation in the policy development process by district foresters will lead to higher levels of implementation than if district foresters do not participate.

Participation was measured by asking how involved respondents were in development of the specific policies (INVOLVED), how well they understood all the issues related to development of the policy (UNDERSTAND), and to what level they agreed with the policy (AGREE). None of the three measures were significantly correlated with implementation of specific policies (POLICY-SCORE) ( $r_{\text{involved}} = 0.0$ ,  $r_{\text{understand}} = 0.11$ ,  $r_{\text{agree}} = 0.03$ ).

### **Finding**

There was little evidence that any level of participation in the policy-making process led to better policy implementation. However, direct involvement (INVOLVED) in policy development was generally low across the organization. Of those surveyed, including district foresters, area foresters, regional foresters, and section managers, only one or two people were "very involved" and two to four people were "involved quite a bit" in development of each of the five policies. There was more involvement by individuals at the top of the organization, and generally it was the same people involved in development of all five policies. Out of fifty individuals surveyed, only nine different people indicated they were involved "very much" or "quite a bit" in development of at least one policy.

Using data collected in the survey, it was possible to estimate the average number of district foresters, area foresters, regional foresters, and section managers who were substantially involved ("quite a bit" or "very much") in development of the five policies. For each level in the organization, Table 14 shows the number of individuals surveyed, the number who reported they were involved quite a bit or very much in developing the policy, and the total number in that position across the



DOF. Using a multiplication factor (number in position/number surveyed), the average number of individuals across the DOF involved in developing the policies was estimated.

Table 14. Involvement of individuals in development of five policies, by organizational level.

	No. surveyed/ no. in position	No. involved "quite a bit" or "very much"	Avg. no. involved per policy	Approx. no. involved per policy in entire DOF	% of policy team	% of position repre- sented
District Forester	34 / 68	1	0.2	0.4	7	1
Area Forester	8 / 16	5	1.0	2.0	33	13
Reg. Forester	5 / 5	11	2.2	2.2	37	44
<u>Sec. Manager</u>	<u>3 / 3</u>	<u>7</u>	<u>1.4</u>	<u>1.4</u>	<u>23</u>	<u>47</u>
Total	50 / 92	24	4.8	6.0	100	

On average, regional foresters comprised approximately 37 percent of a policy team (just over two people), area foresters 33 percent (two people per team), section managers about 23 percent (about one and half people per team), and district foresters about 7 percent (or one person involved in about half the policies). However, as a percentage of the people in a position, the numbers are more disparate. Approximately 47 percent of all section managers were on an average policy development team, 44 percent of all regional foresters participated, 13 percent of all area foresters, and one percent of all district foresters.

*Proposition 5.* Districts in which there is a higher level of communication with other units in the DOF, particularly direct contact, will implement policies better than districts with less communication.

Correlations between levels of communication and overall policy implementation (DISTRICT-SCORE) were generally low (Table 15). Only the correlation between the variable which measured the number of meetings with people in units above the district (MEETING-ABOVE) was significantly correlated with DISTRICT-SCORE ( $r = .31, p < 0.05$ ).

Table 15. Pearson correlations (r) between overall level of implementation (DISTRICT-SCORE) and communication variables.

	<u>ABOVE</u>	<u>PEERS</u>
WRITTEN COMMUNICATION RECEIVED	-.03	.05
WRITTEN COMMUNICATION SENT	-.04	.09
DISCUSSIONS WITH	.18	-.14
MEETINGS WITH	.31	.10

### Finding

The proposition was only partially supported by the data collected. Increasing frequency of communication generally was not indicative of increasing policy implementation. However, it appears that meetings, at least with people in units above the district, did have some positive influence on policy implementation. Based on the evaluation of internal stakeholders (Table 21), meetings were most likely with the area forester, area staff specialists, or the assistant area forester. These were all individuals who have some oversight for policy implementation at the district level.

*Proposition 6.* Districts which interact more with the institutional environment will implement policies at a lower level than districts which interact little with the environment.

Several variables were considered as measures of interaction with the environment. Since regional differences were earlier shown to have some influence on policy implementation, partial correlations between the variables and DISTRICT-SCORE were calculated, controlling for region. The partial correlations are shown in Table 16.

Table 16. Partial correlations (r) between environmental interaction variables and DISTRICT-SCORE, controlling for region.

	<u>DNR</u>	<u>OUTSIDE</u>
WRITTEN RECEIVED	.19	-.03
WRITTEN SENT	-.07	-.05
DISCUSSIONS	-.54	-.17
MEETINGS	.05	-.19
INFLUENCE-KIND-	-.29	.05
INFLUENCE-HOW-	-.18	-.06
RELY-	.00	.01
DEPEND-	-.27	-.14

Most of the partial correlations were relatively small, and interestingly, nearly all negative. The number of discussions with people in other DNR units was most negatively correlated with the overall extent of policy implementation ( $r = -0.54$ ), and had the highest correlation of any variable tested. Perceived influence by people in other DNR units on the kind of work done in the district was also negatively correlated with policy implementation ( $r = -0.29$ ), as was dependence on these same people to fulfill work responsibilities ( $r = -0.27$ ). Partial correlations between other variables that measured interaction with DNR units and DISTRICT-SCORE were all smaller. Partial correlations between variables that measured interaction with people outside the DNR and DISTRICT-SCORE were all very small, ranging from 0.05 to -0.19.

### **Finding**

The results provided only limited support for the proposition. It appears that certain kinds of interaction with the environment reduced policy implementation while others did not. From the information generated by ranking the importance of external stakeholders, it is likely that most of the interaction with other DNR units outside the DOF were with people in the Wildlife Section. From these data, it appears that increased interaction with people in the Wildlife Section had a tendency to reduce overall policy implementation. Reasons for this relationship are explored in the discussion section.

*Proposition 7.* Policy implementation will be lower in districts where the district forester has a high level of work autonomy than in districts where the autonomy is lower.

Several variables were used to measure the level of autonomy district foresters had in doing their jobs. Correlations were calculated between these variables and overall policy implementation (DISTRICT-SCORE) to determine if any variables were highly correlated. The correlations are

shown in Table 17. None of the variables were highly correlated with overall policy implementation, ranging in value from 0.24 to -0.18.

Table 17. Pearson correlations (r) between variables measuring district forester autonomy and overall policy implementation (DISTRICT-SCORE).

	<u>ABOVE</u>	<u>SELF</u>	<u>PEERS</u>		
INFLUENCE-KIND-	.08	.01	.00	AUTHORITY-TASK	.11
INFLUENCE-HOW-	.09	.02	-.08	AUTHORITY-QUOTA	.09
RELY-	.24		.18	AUTHORITY-EXCEPTION	-.18
DEPEND-	.06		.01		

Two additional analyses were done to better understand authority relationships in the DOF. Rankings of individuals or units within the DOF with the most influence over the work in districts were calculated (Table 18), and the relative amounts of influence were calculated for each level in the DOF.

Table 18. Rankings of individuals or units inside the Division of Forestry with the most influence over the district's work, as ranked by district foresters.

<u>Region 1</u>	<u>Region 2</u>	<u>Region 3</u>	<u>Region 5</u>	<u>Region 6</u>
Area forester	Area forester	Asst. area for.	Area forester	Regional forester
Area staff	Area staff	Area forester	Regional forester	Regional staff
Asst. area for.	Asst. area for.	Area staff	Director	Dist. foresters
Dist. foresters	Dist. foresters	Director	Regional staff (tie)	res. mgt. sec.
Regional forester	Director (tie)	Dist. foresters	Dist foresters (tie)	nurseries (tie)

Across the organization, the greatest influence was exerted on districts by the people directly above the district. Generally this was the area forester, assistant area forester, and area staff people. In Region 5, where there was relatively little area staff and no assistant area foresters, the regional forester and director were listed as having high levels of influence. In Region 6, where there were no areas, the regional forester and regional staff, which were directly above the district foresters, were listed as having the most influence. In all cases, other district foresters in the same area (or region in the case of Region 6), were perceived to have less influence than people above the district.

The relative amounts of perceived influence varied among levels in the DOF. Influence of the section managers (4.18) was perceived to be greater than influence of the regional foresters (3.62), area foresters (3.65), or district foresters (3.76).

### **Finding**

There was little evidence supporting the proposition that district foresters with a high level of work autonomy would implement policies at a lower level than those with lower work autonomy. However, it is fairly clear that much of the authority in the DOF resided with section managers and lesser, but approximately equal amounts with regional, area, and district foresters.

*Proposition 8.* Districts which are subject to higher levels of feedback and evaluation will implement policies to a higher degree than those which are subject to lower levels of feedback and evaluation.

Two variables were used to measure feedback, feedback to the district forester from the area forester (regional forester in Region 6) (FEEDBACK-AREA FORESTER) and feedback from area staff (regional staff in Region 6) (FEEDBACK-AREA STAFF). The correlation between DISTRICT-SCORE and FEEDBACK-AREA FORESTER was low ( $r = -.02$ ), but the correlation with FEEDBACK-AREA STAFF was fairly high ( $r = 0.40$ ).

### **Finding**

There was too little evidence to clearly support this proposition, although the high correlation with FEEDBACK-STAFF did support the concept that higher levels of feedback were related to higher levels of policy implementation. Since area staff were often closely involved with overseeing the implementation of policies in their area of specialization (perhaps even more than the area forester), it is logical that feedback from them would be related to policy implementation.

### **CRITICAL FACTORS**

Of the 44 independent variables which were measured, four had correlations or partial correlations with the overall policy implementation score (DISTRICT-SCORE) with absolute  $r$  values greater than or equal to 0.31 ( $p \leq 0.06$ ). They were discussions with people in other DNR units outside the DOF ( $r_{\text{partial}} = -0.54$ ), feedback from area staff, ( $r = 0.40$ ), physical location of the district office ( $r = -0.34$ ), and meetings with people in units above the district ( $r = 0.31$ ). In addition, the administrative region also appeared to be a critical factor.

In general, more frequent discussions with people in other DNR units outside the DOF (most likely people in the Wildlife section) had a negative impact on policy implementation. Conversely, more frequent meetings with people in units above the district (usually area-level personnel) and more frequent feedback from Area staff specialists had positive impacts on policy implementation.

Two factors related to the physical location of the district offices also appeared to influence the extent of policy implementation. The first was the geographic location in which the district was located. In general, districts in the northern regions implemented the five policies which were studied to a greater extent than did the southern regions. Second, districts which did not share office space with supervisory offices, and particularly with the regional office, implemented these five policies less than districts which did share office space.

### **DISCUSSION**

Across all policies, the average policy implementation score reported by district, area, and regional foresters was 4.56. Based on the scale used, this equates to an overall implementation level of 85 to 90 percent. However, nearly thirty percent of the respondents reported implementation of a given policy in a given district at or below 75 percent.

Significant differences were found in the extent of policy implementation among districts, individual policies, and administrative regions. There were several factors which appeared to account for some of the variation in implementation, although not all the variation could be explained by any given set of factors measured in this study.

### **REGIONAL EFFECTS**

The implementation of individual policies varied significantly among regions for four of the five policies, probably due in part to region-based factors. For example, the policy related to private forest management (PFM) was implemented best in Regions 3 (Brainerd) and 6 (Metro). Within those regions, respondents ranked private forest land owners (the beneficiaries of PFM activities) as their most important stakeholder. Respondents in those regions also ranked the organizational goal

"assist private woodland owners to achieve their objectives" as their second highest goal, higher than any other regions. Conversely, Region 2 scored significantly lower on implementation of the PFM policy and ranked the PFM goal only sixth (out of eight), although they ranked private land owners as their third most important stakeholder.

In a similar fashion, district foresters in Region 1 ranked loggers as their most important external stakeholder, supplying raw material as the second most important goal, and on average had the lowest implementation level for the old growth policy (identification and removal of old growth stands from timber harvesting activities).

The problem with these comparisons is that they do not hold true across every combination of policy, organizational goal, and external stakeholder. None the less, there was a general sense among district foresters that conditions vary from one region to the next, and that policies should reflect those differences. The following quotes were taken from comments written on the questionnaires.

I do not believe a blanket policy can reflect the various situations encountered. I like the word "guidelines" instead of policy. (Written about the timber harvesting/recreational trails policy)

Difficult to set a statewide standard. (Written about the PFM policy)

#### PHYSICAL OFFICE LOCATION

The physical location of district offices in relation to area and regional offices also appeared to play a role in implementation of policies. As expected, the level of implementation was highest in situations where the region, area, and district offices were all co-located. The lowest levels of implementation occurred when the region, area, and district offices were all separate (the most common configuration across the DOF). Implementation was intermediate where at least two levels of offices were co-located.

These results point out the difficulty in coordinating work when the work and supervisory units are separated from one another. Written communication is possible under such circumstances, and in fact was essentially uniform among districts in different LOCATION categories. However, written communication is less effective for coordination than direct contact. Direct contact, especially group meetings, was positively related to policy implementation. However, it is more difficult and expensive to accomplish when units are separated.

LOCATION values were assigned based on an assumed "closeness" between the district and other offices. Thus, districts co-located with either the regional office or the area office were expected to implement policy at a higher level than districts where the area and regional office were co-located and the district office was separate. However, this was not the case. Instead, having either the district or area (or both) co-located with the regional office resulted in higher levels of implementation, perhaps confounded by the significantly more frequent meetings reported by districts in LOCATION category four. What remains to be explored in future work are the dimensions that measure organizational "closeness" in a geographically dispersed organization and whether continuous access to a policy maker (i.e., co-location with the regional office by the area office, even if the district is separate) is more important than co-location at lower levels (district co-located with the area office), or whether simply meeting often is enough to overcome physical separation of offices.

#### PARTICIPATION

There was no strong evidence linking participation in the policy development process to the level of policy implementation. The findings seem to undermine the notion that participation in the policy-making process and the resultant understanding of and agreement with policies by field level personnel is necessary to insure implementation (Ellefson 1992:145). However, organizations can use a number of techniques other than participation to insure job performance, including persuasion, threats or promises, written and verbal communication, socialization (Tannenbaum et al 1974:7, Kaufman 1967:130), and legitimacy (compliance based on law, legal norms, and social values) (Kaufman 1967:92, Katz and Kahn 1978:301). Thus some level of implementation is likely to occur regardless of the level of involvement by implementers in their development. As one district forester stated:

I try to follow policies even if I may not entirely agree.

However, it may be in this case that participation by district foresters in policy development was so low that it was not possible to accurately measure its influence on implementation. Only one district forester was involved to a considerable extent in development of one policy, and almost three-fourths of the district foresters reported they were not involved at all in development of a policy. Several respondents referred to this lack of participation in their written comments. For example:

...I believe that not enough attention has been paid to the opinions of and the impact on the districts when developing policy. More attention is paid to external groups than to internal opinion at a field level. The impression I get from senior staff is "like it or not, this is the way it will be." Also, the impact on district workloads is ignored. If there is a gap between policy and performance, that is why. Their imperial command, "Just do it," doesn't cut it when there are not enough resources to go around.

"Field input" as far as St. Paul is concerned means asking the Region level. Way too much policy and directives are politically derived with no field input. Everything from uniform options to fire fighting apparatus is surveyed and studied and always comes out contrary to how everybody I've ever talked to says they responded.

As usual, there wasn't any field input into drawing up this [old growth] policy.

The field level worker...should always be given an opportunity to contribute to policy development. Even if it's just an opportunity for providing comments. I recommend "reality checks" for managers/supervisors to come back down to earth and visit the task doer's perspective.

A second possible explanation for the relative lack of relationship between participation and implementation is the professional standards brought to the DOF by district foresters. In general, professionals tend to identify more with their profession than with the organization in which they practice it (Mintzberg 1979:357). Thus, even though district foresters did not participate in policy development, they may still have implemented them because of their professional standards. District foresters wrote:

I have always found my job to be very interesting and satisfying. The "people service" that is the main part of what I do is the most important to me. The "bureaucratic" portion I find irritating!

## COMMUNICATION

Within the DOF, district foresters reported their work was most influenced by people in the area office. As anticipated, written communication served as a poor coordinating tool. Perhaps that was because district personnel reported they received more written communication than the area foresters reported they sent to the districts. In fact, the same phenomenon was reported at every level in the organization. Thus, rather than helping with coordination, district foresters may have felt overwhelmed, rather than helped, by the amount of written material received. In addition, the quality of the written material relating to various policies may also have been a problem. Respondents wrote:

There seems to be much confusion within the Division on what the specific policies are for a given issue. Although there are policies written, the understanding and application of them varies greatly across the state.

Many times "policy" comes to us in the form of a memo rather than an updated circular letter. [It] is sometimes hard to keep track of new policy - where to reference.

Direct contact (conversations and meetings) provided a higher level of linkage and higher levels of implementation. As opposed to written communication, district foresters generally thought they had fewer discussions with people above their district than those people thought they had with the district foresters. The value of direct communication with district foresters was captured by a respondent who wrote:

In order to implement a new policy, the people affected have to understand it. The best way to do this is to have the person developing it explain it. The purpose of a new policy is often lost in interpretation as the duty of training is passed on down the line.

## INTERACTION WITH THE ENVIRONMENT

A key factor related to the level of policy implementation in this study was the frequency of discussions with people in other DNR units. Based on analysis of external stakeholders, these people were most likely in the Wildlife section of the DNR, and the impact of more frequent discussions with them on policy implementation was negative. At least two explanations for this phenomenon are possible.

Inter-organizational relationships (in this case, relationships with units or groups external to the DOF) are complicated and can produce both consensus, usually on general goals, and conflict, usually on specific means or methods for conducting transactions (Van de Ven and Walker 1984:619). As an example of such conflict on detail, one respondent wrote this about the timber harvesting/recreational trails policy:

Sounds great on paper, obviously written by St. Paul with no idea of implementation problems. Very vague wording, etc.! Who has priority? Both according to this wishy-washy statement.

Discussions with other units may be for the purposes of articulating and exploring those conflicts. If they are unsuccessful at resolving the conflicts, implementation could suffer.

On the other hand, discussions with people in other DNR units may be leading to new ideas by field personnel on how to handle certain situations. So, rather than follow policies to the letter, field personnel may improvise in a manner which they think is more appropriate given the circumstances. Although appropriate work may be getting done, the "official" policies may not be

getting implemented. This follows the pattern of behavior described by Mintzberg in a professional bureaucracy. As an example, one forester wrote:

Don't follow all policy requirements. District judgement with some Area approval.

Based on discussions with DOF foresters, both as a part of this study and on other occasions, it is likely that their desires to implement policies are at times thwarted by interactions with Wildlife personnel, and at other times (although probably less frequently) new ideas are formulated and implemented while "official" policy is disregarded.

## WORK AUTONOMY

No substantive evidence was found to support any direct connection between the work autonomy of individual district foresters and the level of policy implementation. Two possible explanations exist. First, the variables used may not have properly measured autonomy and thus no relationship with implementation was found. Second, the variables measured autonomy properly, but there was no direct relationship with implementation. This does not seem to be a situation similar to the participation variable, where participation was almost non-existent, since district foresters reported relatively high influence over the kind of work they did ( $\bar{x} = 4.32$ ) and how they accomplished the work ( $\bar{x} = 4.71$ ).

However, it is interesting to note the perceived levels of influence residing in each level of the organization. It appears that district, area, and regional foresters have less influence over the kind of work done and how it is accomplished than do the section managers. On the ratings scales, section managers were perceived to have somewhere between "quite a bit" and "very much" influence, while region, area, and district foresters were perceived to have a level of influence somewhere between "some" and "quite a bit."

## FEEDBACK

Two general observations about feedback and the policies which were studied can be made. First, a review of the six policies used in this study found no wording related to feedback or evaluation. Responsibility for implementation is assigned (or inferred) in all cases, and responsibility for "monitoring and enforcing the policy" is assigned in the PFM policy. However, none of the policies contained specific language related to how implementation would be monitored or measured. The major function of operational monitoring is to provide routine control over operations (Katz and Kahn 1978:457). Without monitoring, control of those operations becomes more difficult. In the case of the DOF, lack of specific feedback and evaluation mechanisms likely reduced the ability to control implementation of these policies.

The second observation is that evaluation of district forester performance by area level staff specialists was positively correlated with policy implementation. The staff specialists, although not directly responsible for implementation activities, often provide the technical expertise necessary for successful implementation. They also provide a coordinating function by interacting with individuals in several units, a much more effective form of coordination than simple written or verbal communication (Galbraith 1973:48). The evaluative information they provide to district foresters apparently plays a positive role in policy implementation.

What was missing from the study were questions about feedback on specific policies. Such information would have been useful to further explore the role of relationship between feedback and implementation.



## INTERPRETATION

There was no one factor that controls the extent of policy implementation in DOF districts. Rather, there were several factors which interacted with one another to influence how well policies were implemented. The organizational factors influencing policy implementation can be conceptualized as shown in Figure 2.

Direct influence was exerted over district foresters by people in administrative units above them, shown by the darker arrows connecting the division (central office), region, area, and district. In particular, it was with the area forester and area staff that district foresters are most closely tied for communications, resources, technical support, and feedback. In many respects, it was also from this office that district foresters were provided permission to exercise discretion in performing their jobs.

Regional foresters and central administrators (section managers) exerted less direct influence on implementation of policies at the district level. Their influence over policy implementation came primarily as a result of the specific policies they developed, their appropriateness, and how they were communicated to district foresters.

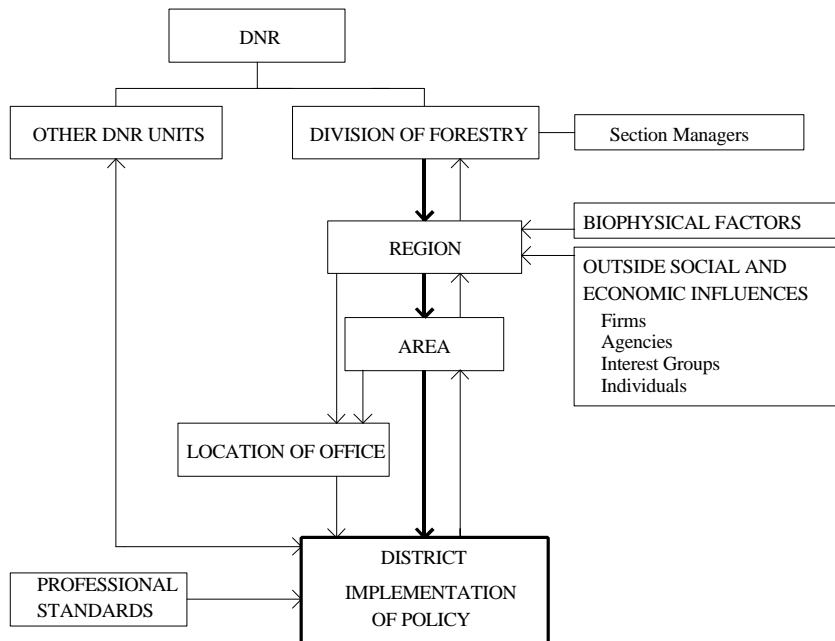


Figure 2. Factors influencing policy implementation at the district level in the Minnesota DNR - Division of Forestry.

Through regular upward communication and minor involvement in the policy development process, as shown by the lighter, upward pointing arrows, district foresters had some influence on decisions made at higher levels in the organization. To the extent this communication and participation conveyed field conditions and altered policies accordingly, district foresters could improve the policy development and implementation process.

A factor which was related to the official reporting relationships in the division was the physical location of the district, area, and regional offices in relation to one another. In most cases,

the three offices were physically separated. Implementation was generally lowest in this configuration, and generally highest when either the district or area office, or both, was co-located with the regional office.

Implementation of policies was also dependent on the geographic region in which a district was located, particularly in the case of statewide policies that did not account for regional differences. Biophysical factors (e.g., forest type, land ownership and use patterns) vary across the state and influence which particular issues are important in a given region. Other social and economic factors, such as population, industry, special interest groups, and concerned individuals vary among regions as well and also influenced the extent to which policies were implemented.

Based on the results of this study, other DNR units, particularly field offices of the Wildlife Section, also had some influence on policy implementation. It appears that the influence of these units was negative (policies implemented to a lesser extent). However, it is unclear whether proper work was not getting done or whether better actions which satisfy both DOF and Wildlife Section needs were occurring. The arrow between DOF districts and other DNR units points in both directions, presuming that DOF units also influenced the actions of the other DNR offices.

Finally, there was a set of professional standards that district foresters brought to the job. On the one hand, such standards reduce the need for many policies aimed at coordinating activities across the organization. On the other hand, such standards can also be at odds with organizational needs or changing cultures and can actually reduce the extent of policy implementation.

The DOF cannot control many of the factors represented in this conceptualization, but several it can. First, and perhaps most important, is recognition of the fact that districts operate in different bio-physical environments and that these differences must be taken into account in the development and implementation of policies. If policies are not structured to accommodate the differences, administrators must be willing to accept inconsistent implementation of policies across the division.

Second, the issue of district office location with respect to supervisory offices should be addressed. Although more study is needed to examine the details, the evidence shows that policy implementation is generally less when the district, area, and regional offices are all separate. Since this is the most common configuration in the DOF, policy implementation is probably less than it would be under other configurations. However, simply co-locating all offices in some fashion is not practical, and is not necessarily the best solution. Factors such as increased feedback, increased direct contact with supervising units, and managing relationships with other DNR units all should be further explored as ways of increasing policy implementation in these districts.

Third, the impact of direct contact with other DNR units outside the DOF, particularly the Wildlife Section, needs to be evaluated to determine whether it is hindering implementation of appropriate policies or whether it is leading to on-site revision of official policies, resulting in better decisions and actions in the field. The current evidence suggests that such interactions have a negative impact on policy implementation. If the goal of the DOF is higher levels of policy implementation, the relationship between DOF personnel and people in other DNR divisions needs to be carefully evaluated and managed.

As opposed to discussions with people in other DNR units, meetings with people in supervisory units (generally the area office) appeared to have a positive impact on policy implementation. Written communication, while necessary in some instances, was not an adequate substitute for group meetings.

Even though participation in the policy making process by district foresters did not show up as a critical factor in this study, the literature is fully in support of such action to increase policy implementation. The benefits are two-fold. First, input received from implementers can be used to

develop policies that fit field conditions. Second, participants "buy into" the product and are more likely to implement it.

## STUDY VALIDITY

Of interest in a study such as this is the validity of the information gathered. The following section addresses three types of validity: content validity (respondents understood the question being asked), intrinsic validity (the instrument measures what it is intended to measure), and extrinsic validity (practical usefulness of the instrument to address the question with which it was intended to deal) (definitions from Van de Ven and Ferry 1980:77)

### **Content validity**

Content validity of the questions was assumed following review of the questionnaire by outside reviewers and substantial pre-testing of the questionnaire prior to its administration. Wording of a number of questions was altered through this process to make them more understandable. Follow-up interviews with individuals participating in the pre-test were used to identify and correct ambiguous language. Finally, questions about the meaning of any items in the questionnaire (of which there were only a few) were answered in-person during its administration. As a result of these procedures, it is fairly certain the respondents understood the questions they were being asked.

### **Intrinsic validity**

Intrinsic validity is more difficult to infer in this study. Many questions were dropped from Van de Ven and Ferry's OAI in order to make it considerably shorter and quicker to complete. The price paid for dropping many of the questions was that there were no internal checks to make sure that respondents provided similar answers to similar questions. It was not possible to combine narrowly defined variables into broader variables (e.g., communication) because there was little correlation between the variables. This may indicate a lack of intrinsic validity, or it may indicate that the variables each measured a distinct factor that was not closely related (and should not have been related) to other variables. In addition, some variables which were expected to be related to policy implementation turned out to be so, indicating that the variables in fact may have measured what they were intended to measure.

On the dependent variable side, even though three respondents (district, area, and regional forester) assessed the same situation (implementation of a given policy in a given district), they each did so from a different perspective and closely correlated answers were not anticipated. Thus, the question of intrinsic validity cannot be fully resolved with the information available. A restructuring of the survey to eliminate some unneeded questions (e.g., the individual characteristic questions, which ended up not being used in any analysis), while adding some questions for internal checking purposes would have been useful.

### **Extrinsic validity**

The question of extrinsic validity is slightly less ambiguous. A major omission in the questionnaire was failure to include appropriate questions to adequately explore the feedback and evaluation aspects of the policy implementation in the DOF. Several questions approached this issue in a tangential method, but more questions should have been directed to this area, particularly on a policy-specific basis.

Area and region level staff specialists were not closely scrutinized, either as respondents or as the object of questions. In Mintzberg's professional bureaucracy structure, he describes the support staff as "fully elaborated" (1979:355), although he was referring primarily to non-

professional personnel. Since the support staff in the DOF consists primarily of professional foresters, it may have been informative to explore more fully their role in policy development and implementation.

There is some question about the applicability of the data collected to the rest of the Division since the districts used in the study were selected rather than being chosen as a random sample. This was done to insure inclusion of districts with uncommon office locations (e.g., co-located with the regional office). In retrospect, it may have been wiser to survey all the districts in the Division to avoid this problem.

Overall, the questionnaire appeared to do an adequate job of providing useable information to address the specific issues related to the study. As with intrinsic validity, a tightening of the contents of the questionnaire to collect pertinent information would help extrinsic validity.

## **RECOMMENDATIONS**

Beyond the formal findings of the study, it was possible to make some recommendations regarding the policy development and implementation process in the DOF. The recommendations which follow reflect the specific analysis done within the DOF, research reported in the literature, and personal communication and observation. Although the recommendations are listed separately one from another, it must be recognized that there are many connections and interactions among them. Changing only a few factors without considering the impact on others may not result in the desired outcome. Recommendations are made in three general areas: policy development, internal linkages, and external relationships.

### **POLICY DEVELOPMENT**

1. *Allow field level personnel greater opportunities to participate in the policy development process.* There was no direct finding in this study that participation in policy development increased implementation. However, it is not certain that a valid measure of participation was obtained since past involvement in policy development has been heavily weighted toward the top of the organization, and generally it has been the same people involved. There is substantial evidence in the literature that participation in decision making improves attitudes, increases motivation, and improves work performance. All these should lead to greater policy implementation. The number of people participating is perhaps not as important as reasonable participation by people from all levels of the organization.
2. *Policies should leave as much discretion to those implementing the policies as possible.* As an organization staffed with professionals, there will be a natural resistance to policies that spell out every detail of what is to be accomplished. Not everyone can actively participate in the policy development process for every policy. However, it is still possible to get the benefits of participation (attitude, motivation, etc.) by leaving as many decisions as possible to the person actually implementing the policy. District forester discretion also permits local conditions to be taken into consideration when necessary and should lead to better outcomes.
3. *Policies should recognize regional differences in conditions and issues of importance.* This study documented that conditions and issues of importance vary across Minnesota. Except in a few instances, blanket policies are not likely to be as effective as policies which acknowledge those differences and take them into account. Broad regional representation on policy development teams should help communication among regions and will help in understanding regional differences.

4. *Policies need to be clearly written, and labeled as such.* One important aspect in job performance is clear communication of expectations. Among the six policies which were considered during this study, there was some confusion among field level people about which were official policies, which were still in the draft stage, and which were just guidelines. Within the constraints noted above, there should be no question among those implementing policies regarding what is expected of them.

#### INTERNAL LINKAGES

5. *All policies should contain formal feedback and evaluation mechanisms.* Feedback and evaluation mechanisms are an absolute must to insure implementation of any decision, and the DOF policies are no exception. It is not enough to identify who is responsible for implementing or even monitoring implementation of a policy. The evaluation mechanism should provide both measurement criteria and time lines for implementation. Development of the evaluation mechanisms should be an integral part of the overall policy development process to insure they match field conditions and capabilities.
6. *Policy content and intent should be communicated directly to the policy implementers.* Sending policies "down through the line" runs the risk of having the message altered as it is interpreted at each level. If the intent is to have it interpreted differently among mid-level units (e.g., to account for regional differences), the policy should be sent through those units. If the intent is to avoid alternative interpretations at mid-level units, policy content and intent should be communicated directly to the level where it will be implemented.
7. *Do not rely solely on written communication to communicate the content and intent of policies.* Although written communication can provide documentation of events or decisions, by itself it is not the most effective method of coordinating actions among units. According to the results of this study, too much written communication may in fact be detrimental. Particularly in the area of policy, it is important that written communication be supplemented with verbal, face-to-face communication. Additional effort may be necessary to accomplish this for districts that are not physically co-located with the area or regional office.

#### EXTERNAL RELATIONSHIPS

8. *Interactions with people in other DNR units outside the DOF should be managed to provide benefit to DOF.* The DOF's mission and structure permit few specialized "boundary spanning" units to interact with people and units outside the Division and protect the operating core, and none could ever handle all the external interactions which take place. Thus, all DOF field people must take on some of this role themselves. Relationships with other DNR units, particularly those with the Wildlife Section, appear to be bitter-sweet. Many district foresters understand the need for the relationships but see them as an obstacle to getting work done. As forest resource management broadens to include ever more values and objectives, such relationships will surely only increase. Since they are going to exist no matter how people feel about them, such relationships should be managed in such a way that either they provide positive benefit to the DOF, or negative impacts are minimized.

Handy (1992:61) offers a succinct summary of an organizational model which the DOF may want to pursue. In it, the organization responds to all the internal and external pressures it faces by "...balancing power among those in the center of the organization, those in the centers of expertise, and those in the center of the action."

## LITERATURE CITED

- Bardach, E. 1977. The implementation game: What happens after a bill becomes a law. The MIT Press. Cambridge, MA. 323 pp.
- Brewer, G. D. and P. deLeon. 1983. The foundations of policy analysis. The Dorsey Press. Homewood, IL 476 pp.
- Bunker, D. R. 1972. Policy sciences perspectives on implementation processes. *Policy Sciences* 3(1972):71-80.
- Campbell, J. P. 1976. Psychometric theory. in Dunnette, M. D. (ed.). *Handbook of industrial and organizational psychology*. Rand-McNally. Chicago, IL xx pp.
- Coch, L. and J. R. P. French, Jr. 1948. Overcoming resistance to change. *Human Relations* 4(1):512-533.
- Comstock, D. E. and W. R. Scott. 1977. Technology and the structure of subunits: Distinguishing individual and workgroup effects. *Administrative Sciences Quarterly*, 22:177-202.
- Crozier, M. 1964. The bureaucratic phenomenon. University of Chicago Press. Chicago, IL 320 pp.
- Ellefson, P. V. 1992. Forest resources policy - Process, participants, and programs. McGraw-Hill, Inc. New York. 504 pp.
- Fairweather, G. W., D. H. Sanders, L. G. Tornatzky, and R. N. Harris, Jr. 1974. Creating change in mental health organizations. Pergamon. Elmsford, NY. 219 pp.
- Fox, C. J. 1990. Implementation research: Why and how to transcend positivist methodologies. in Palumbo, D. J. and D. J. Calista (eds.). *Implementation and the policy process: Opening up the black box*. Greenwood Press, Inc. Westport, CT. p. 199-212.
- Galbraith, J. R. 1973. Designing complex organizations. Addison-Wesley. Reading, MA. 150 pp.
- Galbraith, J. R. and D. A. Nathanson. 1979. The role of organizational structure and process in strategy implementation. in D. Schendel and C. Hofer (eds.). *Strategic Management*. Little Brown. Boston. 249-302.
- Goodman, P. 1965. People or personnel: Decentralizing and the mixed system. Random House. New York. 247 pp.
- Hage, J. and M. Aikin. 1967. Relationship of centralization to other structural properties. *Administrative Science Quarterly* 12(June):72-92.
- Hall, R. H. 1968. Professionalization and bureaucratization. *American Sociological Review*, 33:92-104.

- Handy, C. 1992. Balancing corporate power: A new federalist paper. *Harvard Business Review*. 70(6):59-72.
- Hogwood, G. W. and L. A. Gunn. 1984. *Policy analysis for the real world*. Oxford University Press. New York. 289 pp.
- Katz, D. and R. L. Kahn. 1978. *The social psychology of organizations*. 2nd ed. Wiley & Sons. New York. 838 pp.
- Kaufman, H. 1967. *The forest ranger*. Johns Hopkins Press. Baltimore, MD. 259 pp.
- Kerr, S. and J. Slocum. 1981. Controlling the performance of people in organizations. in P. Nystrom and W. Starbuck (eds.) *Handbook of organizational design*. Volume 2. Oxford University Press. pp. 116-134.
- Lawrence, P. R. and J. W. Lorsch. 1967. Differentiation and integration in complex organizations. *Administrative Sciences Quarterly*, 12:1-47.
- Likert, R. 1932. A technique for the measurement of attitudes. *Archives of Psychology*. No. 140. 55 pp.
- Matell, M. S. and J. Jacoby. 1971. Is there an optimal number of alternatives for Likert scale items? Study I: Reliability and validity. *Educational and Psychological Measurement*, 31:657-674.
- Mazmanian, D. and P. Sabatier. 1983. *Implementation and public policy*. Scott, Foresman and Company. Glenview, IL. 299 pp.
- Minnesota Forest Resources Plan. 1991. Department of Natural Resources, Division of Forestry. St. Paul, MN. 91 pp.
- Mintzberg, H. 1979. *The structuring of organizations: A synthesis of the research*. Prentice-Hall, Inc. Englewood Cliffs, NJ. 512 pp.
- Mintzberg, H. 1983. *Power in and around organizations*. Prentice-Hall, Inc. Englewood Cliffs, NJ. 700 pp.
- Palumbo, D. J. and D. J. Calista. Opening up the black box. in Palumbo, D. J. and D. J. Calista (eds.). *Implementation and the policy process: Opening up the black box*. Greenwood Press, Inc. Westport, CT. p. 3-17.
- Perry, J. L. and K. L. Kraemer. 1978. Innovation attributes, policy intervention, and the diffusion of computer applications among local governments. *Policy Sciences* 9(1978):179-205.
- Scheirer, M. A. 1981. *Program implementation: The organizational context*. Sage Publications. Beverly Hills, CA. 232 pp.
- Scott, W. R. 1966. Professionals in bureaucracies - areas of conflict. in H. M. Vollmer and D. L. Mills (eds.). *Professionalization: 265-275*. Prentice-Hall. Englewood Cliffs, NJ.

- Simon, H. A. 1957. *Administrative Behavior*, 2nd ed. Macmillan Co. New York. 295 pp.
- Statistix, Ver. 4.0. 1992. *Analytical Software*. St. Paul, MN.
- Tannenbaum, A. S. 1966. *Social psychology of the work organization*. Wadsworth. California. 136 pp.
- Tannenbaum, A. S., B. Kavcic, M. Rosner, M. Vianello, and G. Wieser. 1974. *Hierarchy in organizations*. Jossey-Bass. San Francisco. 248 pp.
- Thompson, J. D. 1967. *Organizations in action*. McGraw-Hill. New York. 192 pp.
- Tornatzky, L. G., E. O. Fergus, J. W. Avellar, G. W. Fairweather, and M. Fleischer. 1980. *Innovation and social process: A national experiment in implementing social technology*. Pergamon. Elmsford, NY. 225 pp.
- Van de Ven, A. H. and D. L. Ferry. 1980. *Measuring and assessing organizations*. Wiley. New York. 552 pp.
- Van de Ven, A. H. and G. Walker. 1984. *The dynamics of interorganizational coordination*. *Administrative Sciences Quarterly*, 29:598-621.
- Vroom, V. H. and A. G. Jago. 1988. *The new leadership: Managing participation in organizations*. Prentice Hall. Englewood Cliffs, NJ. 244 pp.
- Vroom, V. H. and P. W. Yetton. 1973. *Leadership and decision-making*. University of Pittsburgh Press. Pittsburgh, PA. xx pp.
- Yin, R. K. 1979. *Changing urban bureaucracies: How new practices become routinized*. D. C. Heath. Lexington, MA. 395 pp.



## APPENDIX A

### Organizational Chart Minnesota Department of Natural Resources Division of Forestry

Director

/Administration Section (Assistant Director)

\* . Personnel Development

/Resource Management Section

\* /Resource Management

\* /RC&D Office

\* /Scaling Office

\* /Resource Planning and Information

\* . Resource Assessment

/Resource Protection Section

\* /Resource Protection

\* . MIFCC (fire control)

\*

*	*	*	* *
. Bemidji Region	. Grand Rapids Region	. Brainerd Region *	. Metro Region
/Bemidji Area	/Deer River Area	/Brainerd Area *	/North Metro
* /Bemidji	* /Deer River	* /Brainerd	* /East Metro
* /Cass Lake	* /Effie	* /Little Falls	* . West Metro
* /Guthrie	* /Grand Rapids	* /Pillager	*
* /Roy Lake	* . Northome	* . Long Prairie	. Rochester Region
* /Bagley	/Hibbing Area	/Backus Area	/Lewiston Area
* . Blackduck	* /Hibbing	* /Backus	* /Lewiston
/Warroad Area	* /Side Lake	* /Washburn Lake	* /Caledonia
* /Warroad	* /Virginia	* /Pequot Lakes	* /Preston
* /Wannaska	* /Floodwood	* . Nimrod	* . Lake City
* . Grygla	* . Cotton	/Aitkin Area	. Mankato Area
/Baudette Area	/Orr Area	* /Hill City	/Rochester
* /Baudette	* /Orr/Crane	* /Jacobson	/New Ulm
* /Birchdale	* /Kabetogama	* /Sandy Lake	/Willmar
* /Williams	* /Tower	* /Aitkin	. Faribault
* . Kelliher	* . Cook	* . McGrath	
. Park Rapids Area	/Duluth Area	/Moose Lake Area	
/Park Rapids	* /Cloquet Valley	* /Moose Lake	
/Alexandria	* /Two Harbors	* /Eaglehead	
. Detroit Lakes	* /Finland	* /Hinckley	
	* /Grand Marais	* . Mora	
	* . Cloquet	/Cambridge Area	
	. Littlefork Area	* /Zimmerman	
	/Littlefork	* /St. Cloud	
	/Int'l Falls	* . Onamia	
	. Big Falls	. Nurseries	

**APPENDIX B**  
**Summary of five policies selected for measuring implementation**

1. DNR Old Growth Guidelines

"The purpose of the old growth guidelines is to provide DNR resource managers with a means to identify and reserve candidate old growth forest stands on state lands until an evaluation of the stand's old growth quality can be completed...The guidelines also recommend the identification of potential replacement old growth stands for the oak/central hardwoods, red pine, and white pine forest types in acreage equal to or greater than that certified as old growth for each of these types...Management of candidate and potential replacement old growth stands during the evaluation period specifically excludes harvesting, wildlife opening and browse regeneration developments, road and trail development, any forest development work, and the use of pesticides...Evaluation of candidate and potential replacement old growth stands will be carried out by resource professionals under the direction of the DNR Natural Heritage Program...Recommendations to remove stands from the candidate and potential replacement old growth lists will be referred to Regional Managers. Conflicts will be handled according to the process established in the DNR Wildlife-Forestry Coordination Policy."

2. Best Management Practices (BMP)

"Each state is required by the federal Clean Water Act to develop BMPs to address non-point source pollution from forestry as well as other land use activities...The DOF in concert with other responsible organizations and land managers will take an aggressive role in adopting BMP principals into ongoing forest management programs...All personnel who have responsibilities for planning or executing forest management programs must be familiar with the adopted BMPs...The Division of Forestry will implement them [BMPs] as standard operating procedures beginning November 1, 1990."

3. Private Forest Management (PFM) Service Policy

"To improve the delivery of private forest management services, to provide technical forestry assistance to the maximum number of non-industrial private forest (NIPF) landowners, provide standard operating procedures for the handling of timber sales on non-industrial private forest lands, and to encourage the private sector to become more involved in providing professional assistance to small woodland owners...The Cooperative forest Management Specialist directs the state Private Forest Management (PFM) program and suggests policies to the Director's Management Team. Regional and Area Forest Supervisors are responsible for insuring that this policy is implemented. Regional Forest Supervisors have the latitude to make exemptions to the policy as noted. Area PFM specialists assist the Area Forest Supervisor in monitoring and enforcing the policy. Area PFM specialists, District Foresters, and Technicians implement the policy in their contacts with landowners."

4. Policy on Timber Harvest...on State Lands Adjacent to Recreational Trails

"The intent of this policy is to allow ongoing forest management activities to be conducted while limiting the effects of these operations on recreational trail use and administration...Annual fall planning review will be conducted...in each Area between Forestry, Trails and Waterways and the Trail Sponsors to outline all likely timber permits or extractive operations that may effect [sic] trails during the next winter."

5. DNR Cost Coding System - Forestry Coding on the Biweekly Time Report

"FLSA (Fair Labor Standards Act) and Fire Overtime: If at least 50 percent of a M.A.P.E. employees WORKING TIME is spent in Direct Fire Suppression activities (TASK Code 1131) during a WORK WEEK, and that employee's job duties regularly include fire suppression, then that employee is eligible to earn overtime pay at the rate of 1 and 1/2 hours for each hour of overtime worked during that week...Task Code 1131, Fire Suppression - Direct, includes only the time spent on actions which are taken to directly suppress a fire. Includes time spent performing and/or directing fire suppression activities while actually on the fire line...DOES NOT INCLUDE time spent performing duties normally associated with fire overhead team jobs...Task Code 1141, Fire Suppression - Indirect, includes all time spent on overhead team functions and fire suppression activities which facilitate direct "on-the-line" fire suppression work."