Understanding self-evaluations of effectiveness by forestry advisory committee members: A case of Ontario’s Local Citizens Committee members

Len M. Hunt\textsuperscript{a,}\textsuperscript{*}, Bonita L. McFarlane\textsuperscript{b}

\textsuperscript{a}Centre for Northern Forest Ecosystem Research, Ontario Ministry of Natural Resources, 955 Oliver Road, Thunder Bay, Ont., Canada P7B 5E1
\textsuperscript{b}Natural Resources Canada, Canadian Forest Service, 5320-122 Street, Edmonton, Alta., Canada T6H 3S3

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Abstract

Researchers have devised many criteria that could assist with the development of an effective public participation process. Few studies, however, have linked these criteria to the effectiveness of decision-making resulting from these processes. We assess whether several criteria postulated by others for designing an effective decision-making process are associated with evaluations of the effectiveness of decision-making by advisory group members from a forest management planning process in Ontario, Canada. Data were collected by written questionnaires from 197 advisory group members in 2001. Four criteria were linked to the effectiveness evaluations including process control (influence), trust in decision-makers, information credibility, and process efficiency. The criterion of knowledge along with contextual variables related to experience, economic dependence on forestry, and geographical residence were not associated with evaluations of effectiveness.

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1. Introduction

Public participation is extensively used in resource management decision-making such as forest management. While public participation may be used to inform, solicit input, then ignore (as cited by Shindler and Neburka, 1997), increasingly attention is being paid to ensure that public participation is meaningful (e.g., Canadian Council of Forest Ministers, 2003). Meaningful public participation can help meet the goals of deliberative democracy that include political equality, accountability, and participatory democracy (Mascarenhas and Scarce, 2004).

Researchers have devised many complementary sets of criteria that should assist in designing aspects related to an effective decision-making process. These criteria have been developed from both expert opinion and literature reviews (e.g., Moote et al., 1997; Rowe and Frewer, 2000; Sheppard, 2005; Sheppard and Meitner, 2005) and from interviews with participants of decision-making processes (e.g., Mascarenhas and Scarce, 2004; Shindler and Neburka, 1997; Tuler and Webler, 1999).

There are few examples whereby researchers have evaluated the alignment of these or other criteria with the effectiveness of decision-making. Without such evidentiary support, researchers and resource managers are left to question, which criteria are most important when designing a public participation process. Evaluative research offers an ideal opportunity to assess the importance of the various criteria suggested by experts or participants.

Researchers have primarily taken two approaches to evaluate the effectiveness of a decision-making process or the decisions from that process.\textsuperscript{1} First, some researchers assess whether criteria deemed important for an effective...
public participation process are present. This assessment approach has been used to examine the quality of different public participation methods (Carr and Halvorsen, 2001; Rowe and Frewer, 2000) or to assess whether a decision-making process reflected the qualities of deliberative democracy (Moote et al., 1997). Second, researchers may ask participants to self-evaluate: the quality of the public participation process and/or the effectiveness of their public participation efforts. This self-evaluation approach is typically conducted from responses to quantitative surveys (Charnley and Engelbert, 2005; Lauber and Knuth, 1999).

For example, Lauber and Knuth used this self-evaluation approach² for the case of a decision to reintroduce moose (Alces alces) into New York state. They investigated whether criteria such as fairness, efficiency, stability, and wisdom were aligned with participants’ evaluations of the fairness of the decisions and satisfaction with the decision-making process and with the resource management agency.

Self-evaluations for items such as the effectiveness of decision-making are partially affected by the unique context surrounding the process, the decision, and the individuals. This contextualization of self-evaluations complicates the ability of researchers to identify meaningful associations among the various criteria for effective public participation processes and/or effective decision-making. Even when one focuses on a single method for public participation (e.g., information session, advisory committee, opinion survey), it is likely that many contextual factors will affect self-evaluations of effectiveness (Rowe and Frewer, 2000).

We used a quantitative survey to explore whether various criteria help to explain participants’ evaluations of the effectiveness of their public participation efforts at influencing local forest management decision-making. Additionally, we attempted to control for the effects of some contextual variables that may affect these self-evaluations.

The study focuses on advisory group members (i.e., Local Citizen’s Committee (LCC) members) in Ontario’s forest management planning process. These LCCs are legally established advisory committees (Ontario Government, 1994) whose responsibilities are to provide formal input into the creation and development of forest management plans, attend information sessions held for the public, and monitor the implementation of a forest management plan (Ontario Ministry of Natural Resources (OMNR), 1996). The LCC members consist of stakeholder representatives that are chosen by a District Manager from the OMNR. The stakeholders typically include: local community businesses, the forest industry, forestry employees, tourist outfitters, recreationists, trappers, environmentalists, and the general public (OMNR, 1996). Approximately, 40 LCCs assist with the development of forest management plans for 50 areas that range from a few hundred thousand to over 2 million ha. Operational forest management plans are prepared every 5 years resulting in a constant level of involvement of LCC members in forest management planning. Information is primarily provided to LCC members from OMNR and forest industry sources. Final decision-making authority for forest management plans rests with the OMNR with representatives from the forest industry acting as plan authors.

Two reasons led to our focus on self-evaluations of general effectiveness by LCC members rather than evaluations about a specific decision. First, general evaluations are likely affected less by contextual factors than evaluations about specific outcomes from the decision-making process. Second, given the ongoing role that LCC members play in developing forest management plans, it would be difficult to find a common decision that would provide comparable results over the different geographies and possibly different time frames.

While other avenues for public participation exist in Ontario, we focus solely on LCC members because: (i) these advisory committees are extensively used in forest management; (ii) the population of LCC members is easy to determine; (iii) LCC members have strong familiarity with Ontario’s forest management planning process; and (iv) the use of participants from one public participation method greatly reduces the degree of contextualization among the self-evaluations.

Readers are forewarned that LCC members hold more anthropocentric forest value orientations than do other northern and southern Ontarians (Hunt and McFarlane, 2003). While this fact suggests that LCC members are not representative of citizens from their communities, Parkins (2002) found that forest advisory group members in Alberta, Canada engaged in role playing (e.g., representing other stakeholder groups than for which they were appointed) that may help to offset the issue of representation. Since it is an empirical question whether Ontario LCC members engage in this role playing, we caution readers about transferring our findings to the larger population of Ontarians.

The paper is organized as follows. Section 2 draws from past research to assemble a list of criteria that may influence the effectiveness of LCCs at affecting local forest decision-making. As well, attempts are made to identify some variables that may help to capture contextual factors that may affect the evaluations. Section 3 describes the methods and data collection. Section 4 describes the results of the study. Finally, Sections 5 and 6 identify advancements that the paper provides and discuss the important findings for resource managers.

2. Aspects influencing the effectiveness of public participation

Past literature and anecdotal expectations are important for identifying a set of criteria that may explain variation in
self-evaluations for the effectiveness of an LCC in decision-making. Attention is drawn to four papers that assembled criteria for a desirable, effective or successful decision-making process. Two papers (Rowe and Frewer, 2000; Sheppard and Meitner, 2005) used expert opinion and reviews of relevant literature to identify the criteria. The other papers drew their criteria from interviews with participants of public participation processes in resource management (Mascarenhas and Scarce, 2004; Tuler and Webler, 1999). Although these sets of criteria were not explicitly developed for advisory groups in forest management, some criteria are likely relevant at producing an effective decision-making process and consequently should be aligned with effective decision-making.

A summary of some criteria identified in the four research papers is presented in Table 1. Since the labels for the criteria in the papers differed, we decided to develop a set of criteria and assess whether the various papers addressed any of these criteria. The criteria that are implicitly present in at least three of the four papers include representativeness, influence, transparency/access to process, access to information, and a clear mandate. Obviously, an effective public participation process should attract a wide range of people to the process, allow participants to influence decisions and ensure that the entire process is open and that decisions from the process are transparent. Additionally, participants of the process should have clear instructions about their role and should have the resources and information available to assist with informed decision-making.

Other criteria that are less frequently cited by the four papers include: credible information; trust in decision-makers; opportunities for mutual learning; independence; cost; and consensus-based decision-making. The fact that these criteria were not common among the different papers suggests that there is still no consensus about appropriate criteria for designing public participation processes.

We did not employ all of the above criteria since our forest advisory groups do not exhibit sufficient variability in their design and function. By focusing only upon legally mandated forest advisory groups from one political jurisdiction, criteria such as transparency, independence, a clearly defined task, and consensus-based decision-making will be very similar among these groups. Even representation should be similar among LCCs since planning manuals provide lists about stakeholders that should be part of LCC committees (OMNR, 1996).

The five criteria that are employed by this study include process control (influence), information credibility, trust in decision-makers, knowledge, and efficiency. With the exception of knowledge, these five criteria are better measured through self-evaluations by the LCC members than many of the excluded criteria. Knowledge is a variable that will likely differ among the LCC members.

Criteria related to process control, information credibility, and trust in decision-makers are supported by Table 1 and research on procedural justice. The large amount of literature on the fair process effect (Folger et al., 1979; Greenberg and Folger, 1983) has found that evaluations of outcomes from processes are higher when individuals believe the process used to arrive at the decisions is fair (e.g., Knopp and Caldbeck, 1990; Lauber and Knuth, 1999; Lind et al., 1990; Tyler, 1990; Tyler and Rasinski, 1991; Van den Bos et al., 1998a, b). An important contributor to perceptions of a fair process is process control of which the ability to voice one’s opinions during the process is often used as a proxy measure (Barrett-Howard and Tyler, 1986). When individuals are given an opportunity to voice their opinions during a process, their evaluations of the fairness of the process are higher than situations when the individual cannot voice his/her concerns.

Despite the seemingly simple relationship between process control and favourable evaluations of processes and outcomes, there are factors that may mitigate the strength of the fair process effect. Most researchers would agree that impartiality of decision-makers and trust are important elements within a process (Baxter et al., 1999; Lind et al., 1997; Shindler et al., 2002; Van den Bos et al., 1998b; Winter et al., 2004). If participants of a process have little trust in the decision-makers or the information provided to them, it is likely that the evaluations of the effectiveness of the process and outcomes from the process will suffer. While only Sheppard and Meitner (2005) considered trust in decision-makers and information credibility as important criteria for an effective decision-making process, Mascarenhas and Scarce (2004) state that trust is an over-riding element of their criteria. Shindler and Neburka (1997) also note that credible information is a

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**Table 1**

Sets of criteria for effective public participation

<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>Representation</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Influence</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
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<tr>
<td>Transparency</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Access to information</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Clear mandate</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Credible information</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Trust in decision-makers</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Learning</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independence</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cost</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Consensus decision-making</td>
<td>X</td>
<td></td>
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</tr>
</tbody>
</table>

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3. Representation may also vary among the perceptions of LCC members. However, we do not have data on these perceptions that would allow us to include this criterion.
key attribute of success in public participation processes in forest management planning.

Efficiency of the process is another potentially important aspect related to evaluations of effectiveness. While this criteria is only present in Table 1 through cost (Rowe and Frewer, 2000), some researchers (e.g., Lauber and Knuth, 1999; Schuett et al., 1998) suggest that efficiency may be important to participants. It is anticipated that when people feel their time is not well used during decision-making processes, individuals are likely to become frustrated with their participation efforts. This frustration effect may mitigate positive effects from voice and process control (Folger et al., 1979).

Knowledge about forestry issues may also affect evaluations of the effectiveness of a forest advisory group. Some researchers view knowledge acquisition, particularly through mutual and shared learning experiences (Diduck, 1999; Margerum, 1999; McLain and Lee, 1996; Schuett et al., 1998; Sinclair and Diduck, 2001; Sheppard and Meitner, 2005), as an important element in a decision-making process. The benefits of increased knowledge can include: (i) a better understanding of the science surrounding decisions; (ii) better opportunities to shape decision-making into appropriate contexts; and (iii) better opportunities to build trust among participating individuals. Therefore, the evaluations of the effectiveness of a stakeholder group should increase with higher levels of knowledge by the participants.

Three other variables that capture different contexts are also explored in this study. First, the experience of the individual with an LCC was included. This variable was introduced to control for selection biases and process control effects. The selection bias issue arises since LCC membership is voluntary and those individuals who have resigned from the LCC may have believed that their efforts and/or the efforts of the LCC were futile. If true, LCC members who have served a longer number of years may on average have better views of the effectiveness of the LCC than would more junior members. Experience with the LCC may also lead to greater process control as the opinions of more senior members may have greater influence over the LCC.

The economic dependency of the household on forest resources could also influence evaluations. Those individuals who have some direct economic connection with the decisions considered by the LCC may have different evaluations of the effectiveness of the LCCs than would other members. Finally, the evaluations of the LCC members may vary spatially as different LCCs may vary in their effectiveness through efforts of the LCC or the decision-makers. Although economic dependence and residency may affect the evaluations by LCC members, we do not a priori assign a hypothesized sign for the effect.

3. Methods

Written questionnaires were administered to committee members at over 20 scheduled LCC meetings during the spring of 2001. The sessions, which never involved the same LCC, were chosen to sample from the entire geography where LCCs exist in Ontario while minimizing data collection costs. The time required to complete the survey was included in the agendas of the sampled LCCs, and all LCC attendees on the interview day were asked to complete the survey. A total of 197 LCC members provided responses to the survey request. Although LCC members were informed of the voluntary nature of the survey request, no LCC members refused to respond to the survey.

Since little was known about the sociodemographic characteristics of LCC members, it was not possible to assess the representativeness of our sample. The LCC respondents were primarily 50-year-old (average 51, standard deviation 12) males (92.7%) with an equal percentage with and without some university education (47% and 53%, respectively).

The survey consisted of sections relating to forest values, forest attitudes, forest knowledge, forest use, and evaluations of the forest management planning process and outcomes from the process. Many of these sections were taken from a survey conducted on Albertans and forest advisory group members from Alberta (McFarlane and Boxall, 2003). Hunt and McFarlane (2003) provide a detailed summary of the results from this survey and surveys with other northern and southern Ontarians.

The evaluation questions were expanded from the items used by Floyd et al. (1996) and Hunt and Haider (2001). The expansion of the evaluative questions was completed to capture multiple measures for the latent themes of information credibility, trust of decision-makers, process control, and efficiency that were previously discussed. The use of multiple items is a standard practice (e.g., Driver, 1977) that helps to increase the reliability of measures related to the latent themes.

The items developed for these themes were pre-tested with academics, resource management agency staff and LCC members who were not part of the sampled population. Problems with expected relationships among the criteria and the items, led us to reduce our initial set of items. These analytical problems arose from the items relating to fairness and effectiveness of the process and outcomes from the process.

A measure of the self-reported effectiveness of the LCC at influencing local forest management decision-making was also included. Respondents rated the statement “The LCC is effective at influencing local forest decision-making” on a five-point scale ranging from 1 = strongly disagree to 5 = strongly agree. This measure, which is the dependent variable for this study, was one measure used to report on the effectiveness of decision-making processes in Ontario (OMNR, 2002).

Knowledge was measured through a series of true or false questions that stated facts about forestry and forest management in Ontario. The scale was developed with the assistance of resource management agency staff and was
pre-tested on many individuals. Measures relating to economic dependence of a member’s household on natural resources and years of experience with LCC were asked directly within the questionnaire. Finally, the sample size and concern about confidentiality of responses led us to use coarse administrative regions to categorize the LCC members into either northwestern or northeastern Ontario locations.

Since the evaluation of the effectiveness of the LCC was based on a five-point, strongly disagree to strongly agree scale, a standard ordinary least-squares regression analysis would be inappropriate. To account for the censoring of the dependent variable at values of one and five, a tobit model was used to estimate the model. This tobit model accounts for the fact that the true evaluations of the effectiveness of the LCC are latent to the researcher and that the observed ratings artificially censor the true range of evaluations. The interpretation of parameter estimates for the tobit and ordinary least-squares regression models are similar (i.e., increasing values to independent variables that have positive parameter estimates will lead to increases to the dependent variable in both models). A tobit differs from the standard regression model by forcing all predictions to lie within the range of censored values (see Eq. (1) from Greene, 2002, p. E21-10):

\[ \hat{Y} = X\beta + \sigma \left( \frac{\phi(L - X\beta/\sigma) - \phi(U - X\beta/\sigma)}{\Phi(L - X\beta/\sigma) - \Phi(U - X\beta/\sigma)} \right). \]  

Eq. (1) shows the relationship between the predicted dependent variable \( \hat{Y} \) and the independent variables \( X \). While a set of parameters \( \beta \) are estimated from the model, the relationship of the independent variables to the dependent variable is affected by an estimate of variability \( \sigma \) and by transformations based on the normal cumulative (\( \Phi \)) and probability (\( \phi \)) density functions. The additional variables \( L \) and \( U \) refer to the lower and upper levels permitted for the estimation of \( \hat{Y} \). This transformation ensures that the predicted values of the dependent variable lie between \( L \) and \( U \) (in our case between one and five).

### 4. Results

Before estimating the tobit model, it was necessary to estimate the latent constructs of process control, information credibility, trust in decision-makers and efficiency and to create an index for knowledge. Table 2 shows the results of a principal components analysis of the evaluative statements that produced the latent variable measures for process control, information credibility, trust in decision-makers and efficiency. The four components identified from the analysis explained 76.9% of the variation present in the independent variables. The component loadings in Table 2 represent the correlation of the responses between an evaluation statement and each of the four latent constructs employed by this study. All component loadings that were less than |0.40| were suppressed from the table.

Process control was strongly related to statements relating to ability to voice opinions and the belief that the individual can influence LCC decisions. Items relating to the trust of economic, ecological, and social information were related to the information credibility construct. The trust in decision-makers component was highly related to items of trust of the forest industry, trust of the OMNR, and that forest management planning decision-makers consider all viewpoints. The statements related to the individual’s and all other’s efforts and time spent in the process were related to the efficiency of the decision-making. The reliabilities of the components were all good.
with Cronbach’s alpha measures of 0.89, 0.72, 0.68, and 0.66 for the measures of information credibility, trust in decision-makers, process control, and efficiency, respectively.

Table 3 shows the list of 12 knowledge questions asked to respondents and the percentage of respondents who correctly answered the questions. Most LCC members answered ten of the 12 questions correctly. For the two questions that had less than 50% correct responses, these questions focused on provincial level statistics that are unlikely to affect local development of forest management plans.

A knowledge index for each individual was formed by adding the count of all correct responses and subtracting the count of all incorrect responses. This scoring approach limited the range of the index from −12 to 12 with an expectation of zero for an individual who is completely unknowledgeable (i.e., someone who provides guesses to the 12 questions).

Table 4 summarizes the descriptive statistics for the dependent and independent variables employed in the tobit analysis. The mean of 3.59 on the five-point strongly disagree/strongly agree scale suggested that respondents agreed on average that their LCC was effective at influencing local forest decision-making. However, there was much variability in these evaluations as attested by the standard deviation of almost one.

Respondents typically had knowledge of Ontario forestry and forest management issues that was less than perfect (12), but much higher than expected by chance (0). Most LCC members had only been involved on the LCC for a little over 4 years. This low level of experience likely reflects the fact that legal requirements to establish LCCs only occurred in 1994 (Ontario Government, 1994) although some LCCs preceded this date. A higher percentage of LCC members (60.7%) was on committees that resided in northeastern than northwestern Ontario. This fact simply reflects the differences in population and the number of LCCs in these two regions. Almost one-half of LCC members stated that their household had an economic reliance on natural resources through either industry or civil servant employment. Finally, the principal component measures all had identical means and standard deviations since these interval scaled measures were

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
<th>Correct (%)</th>
<th>Unsure (%)</th>
<th>Incorrect (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ontario is legally obligated to managing forests in a sustainable fashion</td>
<td>True</td>
<td>95.4</td>
<td>1.5</td>
<td>3.0</td>
</tr>
<tr>
<td>Ontario forest companies are required to follow government guidelines</td>
<td>True</td>
<td>92.9</td>
<td>2.0</td>
<td>5.1</td>
</tr>
<tr>
<td>when harvesting trees on public lands</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>There are no old-growth forests in Ontario</td>
<td>False</td>
<td>90.9</td>
<td>5.6</td>
<td>3.6</td>
</tr>
<tr>
<td>Most of Ontario’s forested land is owned by the provincial government</td>
<td>True</td>
<td>88.3</td>
<td>3.6</td>
<td>8.2</td>
</tr>
<tr>
<td>Forest companies are allowed to spray logged areas with herbicides</td>
<td>True</td>
<td>84.3</td>
<td>7.1</td>
<td>8.6</td>
</tr>
<tr>
<td>that control unwanted vegetation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The Ontario Government pays for the construction of roads needed by</td>
<td>False</td>
<td>82.2</td>
<td>9.6</td>
<td>8.1</td>
</tr>
<tr>
<td>forest companies to harvest new areas</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>All areas where trees are harvested must be replanted in order for the</td>
<td>False</td>
<td>65.0</td>
<td>4.6</td>
<td>30.5</td>
</tr>
<tr>
<td>forest to regrow</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ontario has more deciduous (maple, oak, beech, birch, aspen, poplar, etc.)</td>
<td>False</td>
<td>63.5</td>
<td>21.8</td>
<td>14.7</td>
</tr>
<tr>
<td>trees than coniferous (pine, spruce, fir, etc.) trees</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Clear-cutting is the most common method of harvesting trees in Ontario</td>
<td>True</td>
<td>52.8</td>
<td>10.7</td>
<td>36.5</td>
</tr>
<tr>
<td>Over 25 percent of Ontario’s forests is protected by legislation from</td>
<td>False</td>
<td>39.6</td>
<td>23.9</td>
<td>36.5</td>
</tr>
<tr>
<td>resource extraction such as forestry and mining</td>
<td></td>
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</tr>
<tr>
<td>In Ontario, the annual loss of forests due to fire, insects, and disease</td>
<td>False</td>
<td>29.9</td>
<td>31.0</td>
<td>39.1</td>
</tr>
<tr>
<td>is less than the annual amount of forest harvested by forest companies</td>
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<table>
<thead>
<tr>
<th>Variable</th>
<th>Label</th>
<th>Mean</th>
<th>Std. dev.</th>
<th>Valid n</th>
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<tbody>
<tr>
<td>Effectiveness of LCC</td>
<td>KNOWLEDGE</td>
<td>6.14</td>
<td>2.67</td>
<td>197</td>
</tr>
<tr>
<td>Knowledge Index</td>
<td>KNOWLEDGE</td>
<td>6.14</td>
<td>2.67</td>
<td>197</td>
</tr>
<tr>
<td>Years experience on LCC</td>
<td>LCCYEARS</td>
<td>4.36</td>
<td>3.09</td>
<td>191</td>
</tr>
<tr>
<td>Northeastern Ontario LLC</td>
<td>NORTHEAST</td>
<td>60.71%</td>
<td>197</td>
<td></td>
</tr>
<tr>
<td>Economic reliance of household on</td>
<td>DEPEND</td>
<td>47.92%</td>
<td>192</td>
<td></td>
</tr>
<tr>
<td>natural resources (industry or</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>government)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information credibility component</td>
<td>CREDIBLE</td>
<td>0.00</td>
<td>1.00</td>
<td>172</td>
</tr>
<tr>
<td>Trust in decision-makers component</td>
<td>TRUST</td>
<td>0.00</td>
<td>1.00</td>
<td>172</td>
</tr>
<tr>
<td>Process control component</td>
<td>CONTROL</td>
<td>0.00</td>
<td>1.00</td>
<td>172</td>
</tr>
<tr>
<td>Efficiency component</td>
<td>EFFICIENT</td>
<td>0.00</td>
<td>1.00</td>
<td>172</td>
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</table>
standardized to enhance interpretability. The average ratings for the variables that heavily loaded with these components (see Table 2) were 3.46 for information credibility, 3.22 for trust in decision-makers, 3.95 for process control, and 3.58 for efficiency.

The tobit model results are found in Table 5. Unlike ordinary least-squares regression, no $R^2$ measure is available for a tobit model. A decomposition index was used as a measure of model fit since this measure mimics the $R^2$ measure (Greene, 2002, p. E21–E11). The decomposition index value was 0.50.

Only the latent constructs related to process control, information credibility, trust in decision-makers, and efficiency helped to explain the pattern of variation in ratings for the effectiveness of the LCC. The signs of the relationships for all latent constructs followed expectations as higher beliefs of process control, information credibility, trust in decision-makers, and efficiency led to higher evaluations of the effectiveness of the LCC. Since the latent constructs related to process control, information credibility, trust in decision-makers, and efficiency were standardized (i.e., means equal to zero and variances equal to one), one can interpret the size of the coefficients as an indicator of the importance of the criteria to the evaluations. As such, process control was the most important criterion in explaining variations among the evaluations.

Knowledge, experience, economic dependence, and geography were not related to these evaluations. The significant sigma parameter, which is essential for forecasting purposes (see Eq. (1)), represents an estimate of the variance of the disturbance term that is estimated as part of the tobit model.

5. Discussion

While researchers have developed many different sets of criteria for designing an effective decision-making process (e.g., Rowe and Frewer, 2000; Sheppard and Meitner, 2005), few attempts (e.g., Lauber and Knuth, 1999) have been made to evaluate whether these criteria are linked with effective decision-making. This evaluation is necessary, however, to demonstrate to resource managers, decision-makers, and researchers that adoption of the criteria will lead to more effective decision-making by the various publics.

While many methods of public participation exist, we chose to focus on the self-evaluations of forest advisory group members from Ontario (i.e., LCC members). Four criteria that are potentially important to design an effective decision-making process were aligned with the perceptions of LCC members about the effectiveness of their LCC at influencing local forest decision-making.

It was found that process control (influence) was positively related to the effectiveness evaluations by the LCC members. This process control criterion was the strongest predictor from the set of independent variables of the evaluations by LCC members for their effectiveness. This result follows the large amount of literature (e.g., Lauber and Knuth, 1999) that suggests evaluations of processes and outcomes of processes partially depend on the fair process effect. The fair process effect suggests that process control leads to more favourable end evaluations of decisions through enhanced views of the fairness of procedures. The result also provides some support that the influence criteria suggested by some researchers (Mascarenhas and Scarce, 2004; Rowe and Frewer, 2000; Tuler and Webler, 1999) for designing effective public participation processes will lead to more effective decision-making by participants such as advisory group members.

We also found that increasing perceptions of the information credibility and trustworthiness of decision-makers were linked to higher evaluations of the effectiveness of the LCC. This finding provides support to the literature (Baxter et al., 1999; Leung and Li, 1990; Lind et al., 1997; Shindler et al., 2002; Smith et al., 1999) that suggests that trust and faith in decision-makers are important components of a public participation process. The results suggest that the criteria of information credibility and trust in decision-maker suggested by Sheppard and Meitner (2005) may help to enhance the effectiveness of decision-making by participants.

Since trust is a rather nebulous concept (Mascarenhas and Scarce, 2001) that likely arises from many other criteria (Winter et al., 2004), we focused on a specific element of trust (i.e., trust in decision-makers). It is believed that this specific element of trust is operational through the self-evaluations by advisory group members.

The final significant criterion was the efficiency of the process. The positive relationship between evaluations of efficiency and effectiveness of the LCC suggest that individuals who do not see their time as squandered in a process have greater beliefs of the effectiveness of their group. While in a different context, the result provides some support for the finding by Schuett et al. (1998) that participants of collaborative processes are frustrated when their time and effort appears squandered by conveners of the process.

The non-significant findings from the tobit analysis were also interesting. The non-significant relationship found
between knowledge and effectiveness evaluations supported Shindler et al. (2002) belief that solely increasing knowledge may be insufficient to increase evaluations of the effectiveness of advisory committees. Although this finding seems contrary to the expected role of learning for creating better public participation processes, this difference may relate to our emphasis on knowledge rather than the form of learning (Sinclair and Diduck, 2001). Shared learning among the participants of a process would increase knowledge levels and may increase levels of trust among the participants and trustworthiness of information employed within the process (Diduck, 1999). Therefore, individuals interested in enhancing public participation by advisory committee members should focus on the method of knowledge acquisition instead of the level or amount of knowledge of the committee members.

None of the context variables included in the analyses was significantly associated with the self-evaluations of effectiveness by LCC members. The experience of the LCC member was included to control for selection bias and greater expected process control for more experienced individuals. The non-significant relationship between experience and effectiveness was encouraging. The non-significance may demonstrate that the attrition of LCC members over time does not lead to differences between senior and junior LCC members. This may indicate that LCC members who resign from LCCs do not view the LCC as less effective than those continuing to participate. One must, however, account for the fact that LCC members are in many ways not representative of the northern Ontario public (Hunt and McFarlane, 2003).

The economic dependence of a member’s household on natural resources and the spatial residency of LCC members were found to be unimportant in this study. Therefore, LCC members who have some financial dependence on the management of the resources do not view the effectiveness of their LCC differently from those individuals who have no financial dependence. While no relationship between geography and effectiveness was found, it is likely that such relationships may exist at finer scales. Our sample sizes and controls designed to maintain the confidentiality of respondents prevented us from using finer spatial scales to examine relationships between geography and LCC effectiveness. At the coarse regional administrative scale, however, there was no evidence to suggest that respondents viewed the effectiveness of their LCCs differently.

### 6. Conclusion

Our analysis identified several important findings that demonstrate a linkage between self-evaluations of effectiveness in decision-making by advisory committee members and perceptions of the quality of criteria that are important for designing an effective decision-making process. First, there is a need to provide participants with control over the process. One form of control is the opportunity to voice information and opinions (Barrett-Howard and Tyler, 1986). With greater process control, participants will likely view the process and the resulting outcomes of the process as fair and efforts of advisory committees as more effective. Other approaches such as collaborative decision-making, ensuring that decisions are based on consensus, multiparty monitoring may also help to enhance the degree of process control and influence by the advisory group members.

Besides providing opportunities for process control, there is a need for decision-makers to ensure that participants have access to credible information and trust the intentions of decision-makers. An important aspect of a public participation process is access to reliable information by participants (Sheppard and Meitner, 2005). One method to help enhance information credibility is to communicate the uncertainties of scientific information presented to the participants (Carpenter, 1995).

If individuals do not trust decision-makers, trust should be viewed as a long-term goal of the decision-making process (Shindler et al., 2002). Opportunities for shared learning may represent one method to assist in developing trust among individuals. If the participants have not yet formed views about trust, processes developed with a high degree of process control can positively affect opinions of trust by the participants (Van den Bos et al., 1998b).

Another important element of a quality process involves the efficiency of the process and decision-making. Members of advisory groups such as LCC members make strong commitments of time and energy to such committees. It is important for all involved to ensure that meetings are productive. Any belief that the time of the committee member is not productive will likely affect the individual’s view of the effectiveness of the advisory committee.

Our evaluative approach is not without limitations. First, the use of a survey instrument to measure the independent and dependent variables created some difficulties. Besides issues related to contextual effects on evaluations, there is concern about the measurement of the concepts. For example, our measures of trust in decision-makers and knowledge may have been better formulated through criteria that lead to trust and knowledge (e.g., shared learning). Second, we asked the respondents to evaluate the various statements in the context of all forest management decisions. A more focused evaluation of specific decisions may have resulted in some changes to our results. Finally, we evaluated only LCC members rather than other individuals of the public. While this narrowed focus was warranted given the difficulty of finding a suitable sample of individuals who have sufficient knowledge to evaluate forest management decisions, the evaluations by LCC members are likely different from other members of the public. While it remains an empirical question whether these differences arise from the formal involvement of the process, a biased recruitment of individuals or both, this expected difference in evaluations by LCC members and others suggests that we cannot
provide a complete evaluation of Ontario’s forest management planning process from the evaluations of LCC members. Furthermore, the perceived effectiveness of the LCCs by their members may differ from the actual effectiveness of the LCCs. This potential discrepancy arises from the reliance of the study on self-evaluations rather than more objective assessments of effectiveness (e.g., the presence of outcome criteria such as less conflict).

Process control, information credibility, trust, and efficiency are not the only criteria that may enhance the public participation efforts of advisory committee members. There are many other elements such as collaborative decision-making, visioning, championing, communication, conflict resolution, comfort and convenience of meetings, representativeness, transparency, and access to resources (Halvorsen, 2001; Rowe and Frewer, 2000; Sheppard, 2005; Sheppard and Meitner, 2005) that are also potentially important. Many of these elements can be cast under the term legitimacy, which some researchers have found as the cornerstone of a successful decision-making processes (e.g., Mascarenhas and Scarce, 2004). The relative homogeneity among the LCCs across Ontario prohibited us from studying these other important aspects of public participation. It is probably best to study the above elements either through carefully designed experiments with random assignment of advisory groups into treatment or base conditions or through a comparative study that employs advisory group members from different political jurisdictions.

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