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UNDERSTANDING RECREATIONAL USES
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PROGRESS AND PRELIMINARY
RESEARCH REPORT

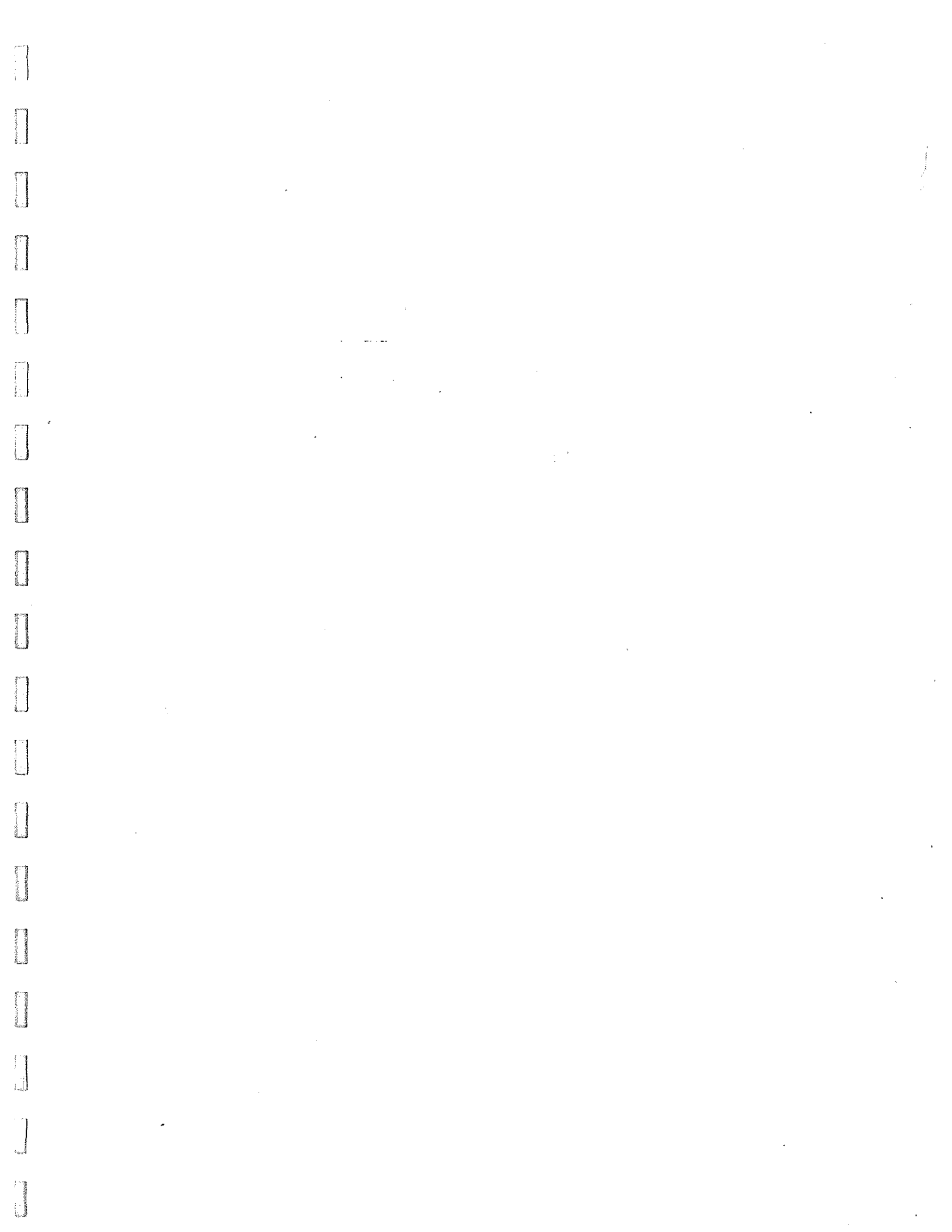
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1995

This project has been made possible
through funding from
Western Newfoundland Model Forest Inc.

Original Report
for/By Western NF
Model Forest

Project No: 8-102-001



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Project Summary:

Participation in outdoor recreation activities has grown rapidly over the past several years (Vining 1990; Filion et al. 1993). Accompanying this growth has been an increasing awareness that the socio-economic benefits of the recreational uses of an area must be measured. While socio-economic research has occurred in some of the model forests across Canada, such research has not taken place in the Western Newfoundland Model Forest (WNMF). In addition, such socio-economic information has not been assembled in any form that could be useful in the Western Newfoundland Model Forest IRM decision-making process.

The purpose of this project is three-fold. First, a comprehensive review of existing socio-economic literature on recreation and provincial data bases will be completed and presented in a format that will allow the identification of research and information gaps. Second, a research instrument, research design, and methodology will be developed to identify, document, and analyze the characteristics, motivations, knowledge, expenditures, and participation patterns of users of the model forest. Third, this survey will then be implemented using a random sample of residents in the communities near the model forest. The three parts of the project are integrated and together will provide a better understanding of the whole, being in this case socio-economic recreation-related issues on forest lands and in the WNMF. As a whole, this research project will provide data to the WNMF which will help justify decisions regarding the allocation of resources.

Identifying current recreational uses of the model forest is an integral part of successful integrated resource management. Learning more about the users of the forest and public knowledge of the model forest will also serve as a means of public involvement, and will allow future educational efforts to be better targeted to public weaknesses in knowledge. Finally, understanding all the socio-economic benefits of the model forest (of which recreation may be a large part) will enable the WNMF to manage the forest for the highest benefits.

Project Goals:

To provide a compendium of socio-economic recreational information that can be used by the WNMF to identify the best uses of the forest and to identify the current recreational uses of the forest by the residents in the surrounding communities.

Project Objectives:

The project can be divided into three parts: review of existing material, design of the research instrument, and implementation including data collection and analysis. Each part has its own specific objectives which are outlined below.

Part 1:

1. Conduct a detailed inventory and review of the recreation-related literature as it pertains to forest lands. This review will include both attitudinal and economic material.
2. Identify and provide a synthesis of what data bases exist in the province, which contain recreational information regarding forest lands. For example, the Newfoundland data from the national survey on the importance of wildlife to Canadians will be examined. Other sources of data might be available from Provincial Tourism, Wildlife, Canadian Forest Service, Provincial Parks, and federal and provincial fisheries departments.
3. Upon completion of the above objectives, research and data gaps will be identified, and recommendations for future research will be made.

Part 2:

1. Design a survey, research design and appropriate methodology to collect data on current recreational uses of the Western Newfoundland Model Forest by residents of surrounding communities. The objective of this aspect of the project will be to identify, document, and analyze the characteristics, motivations, participation patterns, and expenditures of those users of the model forest.
2. A secondary objective will be to include items in the survey which will identify, document, and allow for the analysis of public knowledge of the model forest and its uses.

Part 3:

1. Upon designing and pretesting the survey, the data will be collected and analyzed. Random samples of residents from communities in the immediate area of the model forest will be selected to participate in the study.

Progress and Preliminary Research Update

This preliminary report presents the research completed to date. More specifically, it provides information on Part 1 of the project objectives. An initial bibliography of recreational literature is provided (Appendix A). Much of this literature has been examined and annotated. A detailed inventory of the literature is an ongoing process and additional annotated references will be included in the final report.

Topics covered in the literature are quite diverse, and include economic valuation of particular recreation experiences, as well as rates of participation. In addition, quality of the recreation experience is becoming increasingly important.

Through a series of telephone interviews with various management agencies within the province the identification of existing data banks and appropriate contacts is underway. To date, initial contacts have been made with provincial and federal fisheries, Tourism and Culture, Provincial Parks, and the Wildlife Division (Appendix B). A preliminary examination of the data suggests that little research directly pertaining to the socio-economic issues of the model forest has been completed. Thus there is a need for the type of research proposed in this study.

Most of the data available does not provide a large amount of detail, consisting mainly of information on issues such as numbers of licenses sold, or nights spent in provincial parks. One of the more detailed information sources is the Survey on the Importance of Wildlife to Canadians. This survey is conducted approximately every five years by the Canadian Wildlife Service, and contains participation, attitudinal, and economic information on wildlife related recreation by province and for the nation as a whole. Unfortunately, this survey does not provide data for sub-provincial areas such as the Western Newfoundland Model Forest.

On-site Interviews and Field Logistics Assessment Trip

During the week of July 3-9 1995, a research trip to the site occurred and interviews were conducted with key individuals. The purpose of this trip was to identify specific subjects to be included in the questionnaire, as well as specific information that potential users of the data require. In addition, the trip allowed the research team to gather available literature, identify key recreational access points, and examine the locations of communities and surrounding areas. A list of some of the relevant literature collected during the trip can be found in Appendix C.

Activities:

Monday, July 3 1995

8:00 a.m.: Departure for site

4:30 p.m.: Arrival at Pasadena field station

6:00 p.m.: Telephone contacts to confirm the week's meetings

Tuesday, July 4 1995

9:30-11:30 a.m.: Meeting with Martin von Mirbach, Steven Hodgett, and Louis MacDonald. Issues brought up in the meeting: inclusion/exclusion of Stephenville in the study; lack of interpretive signage in the model forest; attitudes toward land as a common property resource and their effect on attitudes toward the model forest; domestic woodcutting from a recreational perspective, and cabin development issues.

12:30-2:00 p.m.: Meeting with Tracey Freeman, who is undertaking an economic opportunities study in the model forest.

Outcome of the meeting: There is little if any overlap between our study and Ms. Freeman's. However, an exchange of literature did prove informative to both parties.

2:30-5:00 p.m.: Meeting with Kevin Sutton of Forest Management District 15, and Tom O'Keefe of the Public Awareness and Involvement working group for the model forest. Issues brought up in the meeting: activities of the Public Awareness and Involvement working group deal mostly with the communities inside the model forest boundary. Some areas of interest of both Mr. O'Keefe and Mr. Sutton were whether people in the area actually realize the model forest exists and reasons for its existence. Mr. Sutton also identified clear cutting and silviculture as important issues for inclusion in the research instrument. We obtained a map of the study area which showed access points and wood roads into the study area from Mr. Sutton.

5:30-9:00 p.m.: Meeting with Keith Nicol, who is doing a study concerning canoeing, hiking, mountain biking, and cross-country skiing in the model forest. Issues brought up in the meeting: Differences between the two studies are great, and include the methods of data collection as well as the recreational activities under study.

Wednesday, July 5 1995

8:00-12:00 a.m.: Drive to and study of the Blow Me Down Mountains Hiking Trail and the surrounding area. An examination of the recreational potential of the area indicated that the first section of the trail was suitable for family-oriented recreation, while the trail up the Blow Me Down Mountain itself was more suitable for experienced hikers.

1:00-4:00 p.m.: Blow Me Down Provincial Park and surrounding area. Examination of trail system, campgrounds, and other recreational facilities in the area.

Thursday, July 6 1995

8:30-9:15 a.m.: Meeting with Kevin Sutton to obtain relevant literature and information on access points and important wood roads in the study area. Mr. Sutton provided local names for many of the roads and recreation areas in the Model Forest.

9:30-11:30 a.m.: Meeting with Brian Bonnell of the Western Newfoundland Model Forest. Information gathered during the meeting: relevant literature about the Model Forest, and information on the international aspect of the model forest system. Also, we determined the type of information Mr. Bonnell deceminates during presentations on the model forest. This information is essential in the development of the knowledge section of the survey.

11:30-12:00 a.m.: Meeting with Mr. Stan Piedad, who gives bus tours of the model forest for the public. Arranged to go on the tour the following day.

1:00-5:30 p.m.: Little Port area. Meeting with Austin Sheppard, a local resident who has developed several trails in the area. Determined the extent of recreational activities in the area.

Friday, July 7 1995

7:30-11:30 a.m.: Drove to McKays for meeting with John Macpherson about program for community management of salmon rivers in that area. Obtained reports and a copy of survey used to measure the behaviour and attitudes of anglers. Obtained anecdotal information on recreational patterns of residents south of the Model Forest. As recreational opportunities are plentiful in the immediate area it was believed that most residents stay in the local area rather than travel into the model forest.

11:30-1:00 p.m.: Drove back to Corner Brook.

1:30-5:30 p.m.: Went on Model Forest Tour with Stan Pidea. In essence, received the same (although slightly longer) tour as the general public, in order to determine the information that people receive about the model forest. Also received a copy of the survey filled out by people who take the tour, and copies of tour reports for 1993 and 1994.

Saturday, July 8 1995

Drove to Trout River area. A logistics assessment determined that in-person interviews might be useful in this area. Examined recreation opportunities, such as camping and cabin development, in the area.

Sunday, July 9 1995

8:00 a.m-4:00 p.m.: Drove back to St. John's.

Future Activities Relating to the Research Project

- The project is currently on schedule with the recent signing of the contract between the Western Newfoundland Model Forest Inc. and Dr. Alistair Bath.
- Designing of the survey is ongoing, with an anticipated completion date of August 25, 1995.
- Random sample selection will occur from August 27 to September 1, 1995.
- Surveys will be distributed during the first week of September.

References

- Vining, J. (1990). "Preface." in J. Vining, ed. **Social Science and Natural Resource Recreation Management**. Boulder: Westview Press.
- Filion, F. L.; E. DuWors; P. Boxall; P. Bouchard; R. Reid; P. A. Gray; A. Bath; A. Jacquemot; and G. Legare (1993). **The importance of wildlife to Canadians: highlights of the 1991 survey**. Ottawa: Minister of Supply and Services Canada.

APPENDIX A
ANNOTATED BIBLIOGRAPHY

Introduction

The following annotated bibliography of outdoor recreation literature illustrates the amount and variety of articles and books on the subject that have appeared in the last decade. Topics of interest in this field range from economics to participation to satisfaction with the recreation experience. Following a division that is apparent in the literature, this bibliography is divided into two parts, one dealing with economics and willingness to pay, the other devoted to participation/satisfaction literature. In addition, these two topics will be further subdivided into theoretical and applied articles.

An area of recreational economics that has become increasingly important in the last decade is economic valuation methods. Traditional economic methods will often underestimate the value of recreation resources, as they are often free or nearly so; not being bought and sold in the market, they do not have an economic dollar value. Economic valuation methods, such as the travel cost method (TCM), contingent valuation method (CVM), and hedonic pricing method (HPM) try to solve this problem by considering such things as what consumers are willing to pay and by using travel costs as a proxy for price. Adamowicz has coauthored many articles on these issues (Fletcher, Adamowicz, and Graham-Tomasi 1990; Adamowicz, Phillips, and Pattison 1986; Coyne and Adamowicz 1992; Adamowicz and Graham-Tomasi 1991).

Within the realm of participation/satisfaction literature, emphasis is increasingly being placed on ensuring that recreationists have very satisfying experiences. The past emphasis on increasing the quantity of recreation facilities and services has been replaced by attempts to improve the experience itself.

The economic section of this bibliography is classified into theoretical and applied articles. In addition, the applied section is separated into consumptive/nonconsumptive activities, water based activities, and so on. The participation/satisfaction literature is organized in a similar fashion; theoretical literature is considered first, followed by applied articles arranged by activity type. In addition, selected articles have been annotated. Selection of articles to be annotated was based on reputation of the author as well as relevance and generalizability of the article itself.

Economics of Outdoor Recreation

Theoretical Articles

Adamowicz, W. L. and T. Graham-Tomasi (1991). "Revealed Preference Tests of Nonmarket Valuation Methods." *Journal of Environmental Economics and Management* 20(1): 29-45.

Benson, J. F. (1993). "A Technique for Valuing Nonpriced Recreational Features of Commercial Forests." *Leisure Sciences* 15(2): 149-158.

This article considered an innovative valuation technique for forest-based recreation activities. Not an economic valuation technique per se, it involved the use of imaginary "tokens" which visitors used to illustrate the relative values of such things as wildlife, landscape, and visitor centres. It was hoped that this method could overcome some of the biases inherent in some contingent valuation studies, such as payment vehicle bias or protest bids. It was further postulated that the method might improve upon travel cost techniques, as it could be used to value the attributes of a site rather than the site as a whole, without the heavy data requirements of a multiple-site travel cost model. Fourteen districts on Great Britain were surveyed in 1987 and again in 1988 to check for possible bias (none was found). Results indicated that in most districts wildlife was valued more highly than landscape, special recreation, or visitor centers. This pattern was true for all visitors.

Bergstrom, J. C. and H.K. Cordell (1991). "An Analysis of the Demand for and Value of Outdoor Recreation in the United States." *Journal of Leisure Research* 23(1): 67-86.

Boyle, K. J. (1989). "Commodity Specification and the Framing of Contingent Valuation Questions." *Land Economics* 65(1): 57-63.

Boyle, K. J.; R. C. Bishop; and M. P. Welsh (1985). "Starting Point Bias in Contingent Valuation Bidding Games." *Land Economics* 61(2): 188-194.

Boyle, K. J.; M. P. Welsh; and R. C. Bishop (1993). "The Role of Question Order and Respondent Experience In Contingent Valuation Studies." *Journal of Environmental Economics and Management* 25(1): S-88 - S-99.

Cameron, T. A. and D. D. Huppert (1989). "OLS versus ML Estimation of Nonmarket Resource Values with Payment Card Interval Data." *Journal of Environmental Economics and Management* 17(3): 230-246.

Canham, H. O. (1986). "Comparable Valuation of Timber and Recreation for Forest Planning." *Journal of Environmental Management* 23(4): 335-339.

Having stated that developing comparable values for timber and forest recreation was essential, Canham expressed the opinion that traditional nonmarket valuation techniques for recreation should not be used. Several reasons were given, including theoretical weaknesses of the methods, and weaknesses in the assumption of consumer surplus for national forest recreation. The author proposed that either actual expenditures or the regional economic impact approach, or both, be used when comparing the values of timber and recreation.

Caulkins, P. P.; R. C. Bishop; and N. W. Bouves, Sr. (1986). "The Travel Cost Model for Lake Recreation: A Comparison of Two Methods for Incorporating Site Quality and Substitution Effects." *American Journal of Agricultural Economics* 68(2): 291-297.

Clawson, M. and J. L. Knetsch (1971). Economics of Outdoor Recreation. Baltimore: Johns Hopkins University Press.

Clough, P. W. J. and A. D. Meister (1991). "Allowing for Multiple Site Visitors in Travel Cost Analysis." *Journal of Environmental Management* 32(2): 115-125.

Fesenmaier, D.R. and S. R. Lieber (1987). "Outdoor Recreation Expenditures and the Effects of Spatial Structure." *Leisure Sciences* 9(1): 27-40.

Fletcher, J. J.; W. L. Adamowicz; and T. Graham-Tomasi (1990). "The Travel Cost Model of Recreation Demand: Theoretical and Empirical Issues." *Leisure Sciences* 12(1): 119-147.

Forster, B. A. (1989). "Valuing Outdoor Recreational Activity: A Methodological Survey." *Journal of Leisure Research* 21(3): 181-201.

Hellerstein, D. (1992). "The Treatment of Nonparticipants in Travel Cost Analysis and Other Demand Models." *Water Resources Research* 28(8): 1999-2004.

Hof, J. G. and D. H. Rosenthal (1987). "Valuing the Opportunity Cost of Travel Time in Recreation Demand Models: An Application to Aggregate Data." *Journal of Leisure Research* 19(3): 174-188.

Kerr, G. N. and M. J. Manfredo (1991). "An Attitudinal Based Model of Pricing for Recreation Services." *Journal of Leisure Research* 23(1): 37-50.

As implementation of user fees for recreational activities had been on the rise, the question of how services should be priced had become increasingly important. The authors developed a model for pricing strategies that considered not only the traditional

Connelly, N. A. and T. L. Brown (1992). "Item Response Bias in Angler Expenditures." *Journal of Leisure Research* 24(3): 288-294.

Coyne, A. G. and W. L. Adamowicz (1992). "Modelling Choice of Site for Hunting Bighorn Sheep." *Wildlife Society Bulletin* 20(1): 26-33.

Donnelly, D. M.; C. Sorg-Swanson; J. B. Loomis; and J. J. Nelson (1990). "Net Economic Value of Hunting and Fishing in Idaho" in J. Vining, ed. Social Science and Natural Resource Recreation Management. Boulder: Westview Press, pp. 257-279.

Goodwin, B. K.; L. A. Offenbach; T. T. Cable; and P. S. Cook (1993). "Discrete/Continuous Valuation of Private Hunting Access in Kansas." *Journal of Environmental Management* 39(1): 1-12.

Heinrich, J. W. and S. R. Craven (1992). "The Economic Impact of Canada Geese at the Horicon Marsh, Wisconsin." *Wildlife Society Bulletin* 20(4): 364-371.

Johanson, P. O.; B. Kristrom; and L. Mattsson (1988). "How is the Willingness to Pay for Moose Hunting Affected by the Stock of Moose? An Empirical Study of Moose-Hunters in the County of Vasterbotten." *Journal of Environmental Management* 26(2): 163-171.

Johnson, N. S. and R. M. Adams (1988). "Benefits of Increased Streamflow: the Case of the John Day River Steelhead Fishery." *Water Resources Research* 24(11): 1839-1846.

Loomis, J. B. (1989). "Estimation of and Variation in Site Specific Marginal Values for Recreational Fisheries." *Journal of Environmental Management* 29(2): 183-191.

As the focus of resource managers had been shifting toward improvements in the quality of recreation experiences and away from building new sites, it was becoming necessary to calculate marginal values for activities such as fishing. The author used a travel cost model to estimate the marginal value of recreational steelhead fisheries at 21 rivers in Oregon. Rather than being a constant value, marginal value at the rivers was shown to be positively related to population and negatively related to distance. It was suggested that this phenomenon should be considered by resource managers, rather than relying on traditional constant marginal values.

Luzar, E. J.; J. E. Hotvedt; and C. Gan (1992). "Economic Valuation of Deer Hunting on Louisiana Public Land: A Travel Cost Analysis." *Journal of Leisure Research* 24(2): 99-113.

Olsen, A. (1989). "The Economic Value of Hunting and Fishing in Montana." *Transactions of the North American Wildlife and Natural Resources Conference* 54: 239-246.

Sorg, C. F. and J. B. Loomis (1985). "An Introduction to Wildlife Valuation Techniques." *Wildlife Society Bulletin* 13(1): 38-46.

Application to Consumptive Activities

Adamowicz, W. L.; W.E. Phillips; and W. S. Pattison (1986). "The Distribution of Economic Benefits from Alberta Duck Production." *Wildlife Society Bulletin* 14(4): 396-398.

Adams, R. M.; O. Bergland; W. N. Musser; S. L. Johnson; and L. M. Musser (1989). "User Fees and Equity Issues in Public Hunting Expenditures: The Case of Ring-Necked Pheasant in Oregon." *Land Economics* 65(4): 376-385.

Anderson, L. G. (1993). "Towards a Complete Economic Theory of the Utilization and Management of Recreational Fisheries." *Journal of Environmental Economics and Management* 24(3): 272-295.

Berrens, R.; O. Bergland; and R. M. Adams (1993). "Valuation Issues in an Urban Recreational Fishery: Spring Chinook Salmon in Portland Oregon." *Journal of Leisure Research* 25(1): 70-83.

The contingent valuation method (CVM), using a payment card format, was applied to recreational demand for spring chinook salmon fishing in Portland, Oregon. The recreational fishery in that area was highly congested, and split between commercial and recreational fisheries. Congestion was not found to be an issue, and the marginal value of each additional fish was not very high. It was suggested that as this was an easily accessible fishery near a large urban population, the process itself might have been valued more than the actual number of fish caught. It was also suggested that higher marginal values might have been noticed if the percentage changes for congestion (10% and 20%) had been larger. Nonetheless, the authors felt the conclusion that resources should not be diverted to recreational anglers was justified.

Bowker, J. M. and J. R. Stoll (1988). "Use of Dichotomous Choice Nonmarket Methods to Value the Whooping Crane Resource." *American Journal of Agricultural Economics* 70(2): 372-381.

Boyle, K. J.; S. D. Reiling; and M. L. Phillips (1990). "Species Substitution and Question Sequencing in Contingent Valuation Surveys Evaluating the Hunting of Several Types of Wildlife." *Leisure Sciences* 12(1): 103-118.

Charbonneau, J. J. and M. J. Hay (1978). "Determinants and economic values of hunting and fishing." *Transactions of the North American Wildlife and Natural Resources Conference* 43: 391-403.

economic pricing model, but also the influence of attitudes toward paying intentions. The model was tested on backcountry hut users in two parks in New Zealand. Results indicated that future paying intent could be well predicted by considering past use and particularly attitudes toward paying. It was also found that price had no direct impact on intentions to pay fees. The model showed different patterns for the two parks tested, reflecting the fact that paying increased fees is different from paying newly implemented fees. The authors suggested their model would be useful for targeting information campaigns about proposed fee increases.

- Loomis, J. B. (1988). "Contingent Valuation Using Dichotomous Choice Models." *Journal of Leisure Research* 20(1): 46-56.
- Loomis, J. B.; C. F. Sorg; and D. M. Donnelly (1986). "Evaluating Regional Demand Models for Estimating Recreation Use and Economic Benefits: A Case Study." *Water Resources Research* 22(4): 431-438.
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- Morey, E. R.; W. D. Shaw; and R. D. Rowe (1991). "A Discrete Choice Model of Recreational Participation, Site Choice, and Activity Valuation When Complete Trip Data are Not Available." *Journal of Environmental Economics and Management* 20(2): 181-201.
- Prince, R. and E. Ahmed (1989). "Estimating Individual Recreation Benefits Under Congestion and Uncertainty." *Journal of Leisure Research* 21(1): 61-76.
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- Smith, J. L. D.; A. H. Berner; F. J. Cuthbert; and J. A. Kitts (1992). "Interest in Fee Hunting by Minnesota Small-Game Hunters." *Wildlife Society Bulletin* 20(1): 20-26.
- Wallace, M. S.; H. L. Stribling; and H. A. Clonts (1991). "Effect of Hunter Expenditure Distribution on Community Economies." *Wildlife Society Bulletin* 19(1): 7-14.
- Walsh, R. G.; K. H. John; J. R. McKean; and J. G. Hof (1992). "Effect of Price on Forecasts of Participation in Fish and Wildlife Recreation: An Aggregate Demand Model." *Journal of Leisure Research* 24(2): 140-156.

Application to Water-Based Activities

- Batie, S. S. and C. C. Mobbs-Zeno (1985). "Opportunity Costs of Preserving Coastal Wetlands: A Case Study of a Recreational Housing Development." *Land Economics* 61(1): 1-9.
- Bergstrom, J. C. and J. R. Stoll (1993). "Value Estimation Models for Wetlands-Based Recreational Use Values." *Land Economics* 69(2): 132-137.
- Cordell, H. K. and J. C. Bergstrom (1993). "Comparison of Recreation Use Values Among Alternative Reservoir Water Level Management Scenarios." *Water Resources Research* 29(2): 247-258.
- Creel, M. and J. Loomis (1992). "Recreation Value of Wetlands in the San Joaquin Valley: Linked Multinomial Logit and Count Data Trip Frequency Models." *Water Resources Research* 28(10): 2597-2606.
- Desvougues, W. H.; V. K. Smith; and A. Fisher (1987). "Option Price Estimates for Water Quality Improvements: A Contingent Valuation Study for the Monongahela River." *Journal of Environmental Economics and Management* 14(3): 248-267.
- Duffield, J. W.; C. J. Neher; and T. C. Brown (1992). "Recreation Benefits of Instream Flow: Application to Montana's Big Hole and Bitterroot Rivers." *Water Resources Research* 28(9): 2169-2181.
- Farber, S. (1988). "The Value of Coastal Wetlands for Recreation: An Application of Travel Cost and Contingent Valuation Methodologies." *Journal of Environmental Management* 26(4): 299-312.

An information gap was identified with respect to the value of coastal wetlands' recreation services, as most wetland research was shown to have focussed on such things as commercial harvests. Farber attempted a valuation of a major wetlands area in Louisiana, using both contingent valuation and travel cost methods. The sampling method for the survey consisted of placing self-addressed, stamped questionnaires on the

windshields of all vehicles parked at twenty-seven boat launch facilities in the wetlands, a method which resulted in a response rate of 14.4%. Contingent valuation and travel cost resulted in similar values, the average of which ranged from \$36 to \$111 per acre, or from \$23.6 million to \$72.7 million annually as the value of travel time in the travel cost model was increased.

Gren, I.-M.; C. Folke; K. Turner; and I. Bateman (1994). "Primary and Secondary Values of Wetlands Ecosystems." *Environmental and Resource Economics* 4(1): 55-74.

Hansen, L. T. and A. Hallam (1991). "National Estimates of the Recreational Value of Streamflow." *Water Resources Research* 27(2): 167-175.

Loomis, J. (1987). "The Economic Value of Instream Flow: Methodology and Benefit Estimates for Optimum Flows." *Journal of Environmental Economics and Management* 24(2): 169-179.

In this article, Loomis reviewed the assumptions and theoretical requirements underlying techniques that could be used to value instream flow. In addition, the results of several studies that used these techniques were presented. Three economic valuation techniques, the travel cost method (TCM), hedonic pricing method (HPM), and contingent valuation method (CVM) were examined. TCM and HPM were shown to be quite useful in situations where users lived at varying distances from the river, and different flow levels were known prior to the trip. Unfortunately, both techniques underestimated option and existence values. The CV method was suggested to be more flexible. An examination of several studies indicated that for several recreational activities, such as fishing and rafting, instream flow provided equal or greater economic benefits than uses such as irrigation.

Narayanan, R. (1986). "Evaluation of Recreational Benefits Of Instream Flows." *Journal of Leisure Research* 18(2): 116-128.

Pomeroy, R. S.; M. Uysal; and A. Lamberte (1988). "A Input-Output Analysis of South Carolina's Economy: With Special Reference to Coastal Tourism and Recreation." *Leisure Sciences* 10: 281-288.

Robertson, R. A. and R. J. Burdge (1993). "The Interface Between Commercial and Industrial Development and Recreational Use in an Urban River Corridor." *Journal of Leisure Research* 25(1): 53-69.

A self-administered questionnaire was used to discover what types of commercial/industrial activities had a negative impact on recreation in an urban river corridor. In addition, the differing impacts of these activities on recreation was considered. Results indicated that commercial/industrial activities did have an adverse impact on users' recreation experience. In particular, water-based activities such as

fishing and water skiing suffered more than "water-enhanced" activities such as camping and hiking. Implications for the development of comprehensive management plans were discussed.

- Sanders, L. D.; R. G. Walsh; and J. R. McKean (1991). "Comparable Estimates of the Recreational Value of Rivers." *Water Resources Research* 27(7): 1387-1394.
- Stevens, T.; T. More; and P. G. Allen (1989). "Pricing Policies for Public Day-Use Outdoor Recreation Facilities." *Journal of Environmental Management* 28(1): 43-52.
- Stoll, J. R.; J. C. Bergstrom; and L. L. Jones (1988). "Recreational Boating and Its Economic Impact in Texas." *Leisure Sciences* 10: 51-67.
- Willis, K. G. and G. D. Garrod (1993). "Valuing Landscape: A Contingent Valuation Approach." *Journal of Environmental Management* 37(1): 1-22.

Application to Forest-Based and Other Nonconsumptive Recreation

- Bamford, T. E.; R. E. Manning; L. K. Forcier; and E. J. Koenemann (1988). "Differential Campsite Pricing: An Experiment." *Journal of Leisure Research* 20(4): 324-342.

The authors showed that interest in user fees for recreational activities had been increasing as government funding had declined. How to implement these user fees was identified as an important issue. An experiment involving differential campsite fees was conducted in 14 Vermont state parks, to determine if this method of pricing could adjust for uneven patterns of use over space and time. Least squares regression showed that demand for the campsites could be explained by the price differential. Revenues were also increased from 4 to 22 percent. However, as campers with lower incomes tended to choose lower priced campsites, the possibility of discrimination existed. The authors recommended proceeding with caution when implementing any pricing policy.

- Clayton, C. and R. Mendelsohn (1993). "The Value of Watchable Wildlife: A Case Study of McNeil River." *Journal of Environmental Management* 39(2): 101-106.

Having concluded that economic valuation of nonconsumptive wildlife use had been sadly neglected in the literature, the authors designed a study to measure the value of watchable wildlife at McNeil River, a game sanctuary in Alaska in which unique opportunities exist to watch grizzly bears. The goal of the authors was to extend the wildlife valuation literature to include nonconsumptive activities through the use of a concrete example. With this goal in mind, the survey used contained both open-ended and discrete choice questions, in order to confirm that the valuation of McNeil River was robust, and not specific to the wording or format chosen. Results indicated that once protest bids and outliers were adjusted for, the means for discrete choice questions were slightly higher

than for open-ended questions, but the difference was quite small. WTP averaged between \$228 and \$277 per person to visit McNeil River, and the authors concluded that watchable wildlife could be used to raise revenue and provide support for conservation.

Daniel, T. C.; T. C. Brown; D. A. King; M. T. Richards; and W. P. Stewart (1989). "Perceived Scenic Beauty and Contingent Valuation of Forest Campgrounds." *Forest Science* 35(1): 76-90.

Englin, J. and R. Mendelsohn (1991). "A Hedonic Travel Cost Analysis for Valuation of Multiple Components of Site Quality: the Recreation Value of Forest Management." *Journal of Environmental Economics and Management* 21(3): 275-290.

In an attempt to value forest management practices, the authors used a hedonic travel cost model to estimate the value of changes in site quality. The model was developed and applied to permit data from Washington state wilderness areas. Some site characteristics that were found to be significant were campgrounds, dirt roads, clear cuts, views, and large trees. Results indicated that the average wilderness user had a marginal value of \$2.61 for a trail with a mile of old growth, \$7.10 for a campground, and \$6.27 for a view. Consumer surplus was considerably higher. Assuming that the sample was representative, the consumer surplus for old growth would total \$9 million per year, and the loss of all campgrounds would be worth \$22.4 million per year. Implications for management were discussed.

Hanley, N. D. and R. J. Ruffell (1993). "The Contingent Valuation of Forest Characteristics." *Journal of Agricultural Economics* 44(2): 218-229.

As most efforts at valuation of the recreational benefits of public forests resulted in estimates of consumer surplus per visit, the authors attempted to use contingent valuation to place a value on actual characteristics of forests, such as height diversity and the proportion of open space. The relationship between the levels of many characteristics and the option value was weak, indicating that there might be interactions among characteristics, or alternatively that most visitors just were not concerned about the physical characteristics. The authors suggested that the study might have been improved through the use of other methods such as travel cost in addition to contingent valuation.

Maxwell, S. (1994). "Valuation of Rural Environmental Improvements Using Contingent Valuation Methodology: A Case Study of the Marston Vale Community Forest Project." *Journal of Environmental Management* 41(4): 385-399.

This study derived a valuation for Marston Vale Community Forest in Bedfordshire, using contingent valuation, and then examined the validity of the result. Contingent valuation was deemed the best tool available as travel cost measures only the benefits of a particular resource or site, while hedonic pricing measures only benefits that are reflected in existing market prices. A review of the literature showed that the construct

validity of British CVM surveys had been consistently lower than similar American work; the current study was an attempt to rectify that situation. One hundred households were sampled in the area from 4 to 6 km from the boundary of the Forest. Respondents were asked to assign levels of importance to aspects of the Community Forest Plan, and were asked their maximum willingness to pay for various activities: hiring a row boat, visiting a nature trail, paying an entrance fee for the forest, and making an annual payment to a trust fund. Willingness to pay per year was then calculated by multiplying the WTP per visit by the expected number of trips per year. Mean WTP ranged from 3.03 pounds (approximately \$6) for the nature trail to 6.00 pounds (approximately \$12) for payment to a trust fund.

McCollum, D. W.; A. H. Gilbert; and G. L. Peterson (1990). "The Net Economic Value of Day Use Cross Country Skiing in Vermont: A Dichotomous Choice Contingent Valuation Approach." *Journal of Leisure Research* 22(4): 341-352.

Through the use of a mail survey, the authors measured the net economic value of cross country skiing at several sites in Vermont. This value was estimated using dichotomous choice contingent valuation, and results indicated that sites in or near the Green Mountain National Forest had higher values for cross country skiers. The authors suggested that substitution among ski sites due to cost increases should be examined.

Noe, F. P.; C. D. McDonald; and W. E. Hammitt (1986). "Exchange Satisfaction for Fees: Willingness to Pay for a Park Environment." *Journal of Environmental Systems* 16(2): 119-122.

Richards, M. T. and T. C. Brown (1992). "Economic Value of Campground Visits in Arizona." USDA Forest Service Rocky Mountain Forest and Range Experiment Station Research Paper NRM-3 pp. 1-23.

Rockel, M. L. and M. J. Kealy (1991). "The Value of Nonconsumptive Wildlife Recreation in the United States." *Land Economics* 67(4): 422-433.

Schafer, E. L.; R. Carline; R. W. Guldin; and H. K. Cordell (1993). "Economic Amenity Values of Wildlife - 6 Case Studies in Pennsylvania." *Environmental Management* 17(5): 669-682.

Walsh, R. G.; R. D. Bjonback; R. A. Aiken; and D. H. Rosenthal (1990). "Estimating the Public Benefits of Protecting Forest Quality." *Journal of Environmental Management* 30:175-189.

Contingent valuation was used to estimate the public benefits from protecting forest quality. Respondents to interview questions indicated their willingness to pay for use, option, existence, and bequest values of several national forest lands in Colorado that had suffered insect damage. Results indicated average public benefits of \$47 per household,

with forest quality valued equally by people of different income, age, and education levels. The authors suggested that psychological and ecological values of protecting forest quality should also be considered.

Participation/Satisfaction Aspects of Outdoor Recreation

Theoretical Articles

- Allen, L. R. and M. A. Donnelly (1985). "An Analysis of the Social Unit of Participation and the Perceived Psychological Outcomes Associated with Most Enjoyable Recreation Activities." *Leisure Sciences* 7(4): 421-441.
- Bixler, R. D.; F. P. Noe; and W. E. Hammitt (1992). "Restrictive and Nonrestrictive Management of Park Visitors." *Journal of Environmental Systems* 21(4): 335-348.
- Bockstael, N. E.; I. E. Strand, Jr.; K. E. McConnell; and F. Arsanjani (1990). "Sample Selection Bias in the Estimation of Recreation Demand Functions: An Adaptation to Sportfishing." *Land Economics* 66(1); 40-49.
- Bright, A. D.; M. Fishbein; M. J. Manfredo; and A. Bath (1993). "Application of the Theory of Reasoned Action to the National Park Service's Controlled Burn Policy." *Journal of Leisure Research* 25(3): 263-280.
- Cahill, M.J. (1993). "Modelling Regional Recreational Travel Behaviour in Newfoundland." MSc. Thesis, Memorial University of Newfoundland.
- Choi, S. D. K. Loomis; and R. B. Ditton (1994). "Effect of Social Group, Activity, and Specialization on Recreation Substitution Decisions." *Leisure Sciences* 16(3): 143-159.
- Cordell, H. K. and J. C. Bergstrom (1991). "A Methodology for Assessing National Outdoor Recreation Demand and Supply Trends." *Leisure Sciences* 13(1): 1-20.
- Creel, M. E. and J. B. Loomis (1992). "Modelling Hunting Demand in the Presence of a Bag Limit, With Tests of Alternative Specifications." *Journal of Environmental Economics and Management* 22(2): 99-113.
- Douglas, A. J. and R. L. Johnson (1992). "Congestion and Recreation Site Demand: A Model of Demand-Induced Quality Effects." *Journal of Environmental Management* 36(3): 201-213.
- Ewert, A. and S. Hollenurst (1989). "Testing the Adventure Model: Empirical Support for a Model of Risk Recreation Participation." *Journal of Leisure Research* 21(2): 124-139.

- Garcia, F. J. G. L. and J. V. de Lucio Fernandez (1994). "Recreational Use Model in a Wilderness Area." *Journal of Environmental Management* 40(2): 161-171.
- Godbey, G. (1985). "Nonuse of Public Leisure Services: A Model." *Journal of Park and Recreation Administration* 3:1-12.
- Ivy, M. I.; W. P. Stewart; and C. C. Lue (1992). "Exploring the Role of Tolerance in Recreational Conflict." *Journal of Leisure Research* 24(4): 348-360.
- Jendrek, M. P. (1988). "Outdoor Recreational Needs Assessment: The Importance of Drawing Two Samples from the Community." *Journal of Leisure Research* 20(2): 154-161.
- Kellert, S. R. and M. D. Westervelt (1982). "Historical Trends in American Animal Use and Perception." *Transactions of the North American Wildlife and Natural Resources Conference* 47: 649-664.
- Knopf, R. C. and M. E. Harvey (1985). "A Methodology for Analyzing Relations Among Higher Order Concepts in Forest Recreation Models." *Forest Science* 31(4): 1018-1034.
- Kuentzel, W. E. and T. A. Heberlein (1992). "Cognitive and Behavioural Adaptations to Perceived Crowding: A Panel Study of Coping and Displacement." *Journal of Leisure Research* 24(4): 377-393.
- Manfredo, M. J. (1989). "Human Dimensions of Wildlife Management." *Wildlife Society Bulletin* 17(4): 447-449.
- Manfredo, M. J. (1989). "An Investigation of the Basis for External Information Search in Recreation and Tourism." *Leisure Sciences* 11(1): 29-46.
- Manfredo, M. J. and A. D. Bright (1991). "A Model for Assessing the Effects of Communication on Recreationists." *Journal of Leisure Research* 23(1): 1-20.

Having suggested that informational techniques were a relatively unobtrusive way to influence recreation behaviour, and thus might be preferable to direct management control, the authors proposed that persuasion and attitude change theory from cognitive psychology could provide important insights for persuasive communication studies. A model was developed in which behaviour change was proposed to be a function of message elaboration. Elaboration, in turn, was measured by the number of thoughts generated, forming new beliefs, or changing former beliefs. Through a study involving information packets sent to recreationists at the Boundary Waters Canoe Area Wilderness, the model was empirically examined. Results indicated that prior knowledge and source credibility had a direct effect on the persuasion process and behavioural intent. The authors pointed out that information provided should be targeted to the

knowledge level of the visitors. They also suggested that further research should consider actual behaviour change, as they had considered only changes in behavioural intent.

- Mills, A. S. (1985). "Participation Motivation for Outdoor Recreation: A Test of Maslow's Theory." *Journal of Leisure Research* 17(3): 184-199.
- Purdy, K. G. and D. J. Decker (1989). "Applying Wildlife Values Information in Management: the Wildlife Attitudes and Values Scale." *Wildlife Society Bulletin* 17(4): 494-500.
- Robinson, D. W. (1992). "A Descriptive Model of Enduring Risk Recreation Involvement." *Journal of Leisure Research* 24(1): 52-63.
- Roggenbuck, J. W.; D. R. Williams; S. P. Bange; and D. J. Dean (1991). "River Float Trip Encounter Norms: Questioning the Use of the Social Norms Concept." *Journal of Leisure Research* 23(2): 133-153.
- Scherl, L. M. (1989). "Self in Wilderness: Understanding the Psychological Benefits of Individual-Wilderness Interaction Through Self-Control." *Leisure Sciences* 11(2): 123-136.
- Searle, M. S. and E. L. Jackson (1985). "Socioeconomic Variations in Perceived Barriers to Recreation Participation Among Would-Be Participants." *Leisure Sciences* 7(2): 227-249.
- Shelby, B.; J. J. Vaske; and T. A. Heberlein (1989). "Comparative Analysis of Crowding in Multiple Locations: Results From Fifteen Years of Research." *Leisure Sciences* 11(4): 269-292.
- Smith, V. K. (1990). "Estimating Recreation Demand Using the Properties of the Implied Consumer Surplus." *Land Economics* 66(2): 111-120.
- Smith, V. K. (1988). "Selection and Recreation Demand." *American Journal of Agricultural Economics* 70(1): 29-36.
- Stewart, W. P. and E. H. Carpenter (1989). "Solitude at Grand Canyon: An Application of Expectancy Theory." *Journal of Leisure Research* 21(1): 4-17.
- Vaske, J. J.; M. P. Donnelly; and B. Shelby (1990). "Comparing Two Approaches for Identifying Recreation Activity Substitutes." *Leisure Sciences* 12(3): 289-302.
- Vining, J. and L. Fishwick (1991). "An Exploratory Study of Outdoor Recreation Site Choices." *Journal of Leisure Research* 23(2): 114-132.
- Whittaker, D. and B. Shelby (1988). "Types of Norms for Recreation Impacts: Extending the Social Norms Concept." *Journal of Leisure Research* 20(4): 261-273.

Williams, D. R.; J. W. Roggenbuck; and S. Bange (1991). "The Effect of Norm-Encounter Compatibility on Crowding Perceptions, Experience, and Behaviour in River Recreation Settings." *Journal of Leisure Research* 23(2): 154-172.

Young, R. A. and A. T. Kent (1985). "Using the Theory of Reasoned Action to Improve the Understanding of Recreation Behaviour." *Journal of Leisure Research* 17(2): 90-106.

Application to Consumptive Activities

Boyle, K. J.; R. L. Dressler; A. G. Clark; and M. F. Teisl; (1993). "Moose Hunter Preferences and Setting Season Timings." *Wildlife Society Bulletin* 21(4): 498-504.

Brown, T. L. and N. A. Connelly (1994). "Predicting Demand for Big Game and Small Game Hunting Licenses: the New York Experience." *Wildlife Society Bulletin* 22(2): 172-178.

Decker, D. J. and T. L. Brown (1979). "Hunting in New York: Participation, Demand and Land Access." *New York Fish and Game Journal* 26: 101-131.

Decker, D. J. and N. A. Connelly (1989). "Motivations for Deer Hunting: Implications for Antlerless Deer Harvest as a Management Tool." *Wildlife Society Bulletin* 17(4):

Decker, D. J. and K. G. Purdy (1986). "Becoming a Hunter: Identifying Stages of Hunting Involvement for Improving Hunter Education Programs." *Wildlife Society Bulletin* 14(4): 474-479.

Enck, J. W.; B. L. Swift; and D. J. Decker (1993). "Reasons for Decline in Duck Hunting: Insights from New York." *Wildlife Society Bulletin* 21(1): 10-21.

Glass, R. J. and T.A. More (1992). "Equity Preferences in the Allocation of Goose Hunting Opportunities." *Journal of Environmental Management* 35(4): 271-279.

Graefe, A. R. and A. J. Fedler (1986). "Situational and Subjective Determinants of Satisfaction in Marine Recreational Fishing." *Leisure Sciences* 8(3): 275-296.

Hammitt, W. E.; C. D. McDonald; and M. E. Patterson (1990). "Determinants of Multiple Satisfaction for Deer Hunting." *Wildlife Society Bulletin* 18(3): 331-337.

Hazel, K. L.; E. E. Langenau, Jr.; and R. L. Levine (1990). "Dimensions of Hunting Satisfaction: Multiple Satisfactions of Wild Turkey Hunting." *Leisure Sciences* 12(4): 383-394.

Heberlein, T. A. (1992). "Reducing Hunter Perception of Crowding Through Information." *Wildlife Society Bulletin* 20(4): 372-374.

- Huttsman, W. Z.; J. T. Huttsman; and D. R. Black (1989). "Hunting Satisfaction and Reciprocal Exchange: Initial Support from a Lottery-Regulated Hunt." *Leisure Sciences* 11(2): 145-150.
- Milon, J. W. and R. Clemmons (1991). "Hunting Demand for Species Variety." *Land Economics* 67(4): 401-412.
- Nickerson, P. H. (1990). "Demand for the Regulation of Recreation: the Case of Elk and Deer Hunting in Washington State." *Land Economics* 66(4): 437-447.
- O'Leary, J. T.; J. Behrens-Teppe; F. A. McGuire; and F. D. Dottavio (1987). "Age of First Hunting Experience: Results from a Nationwide Recreation Survey." *Leisure Sciences* 9: 225-233.
- Perdue, R. R. (1993). "External Information Search in Marine Recreational Fishing." *Leisure Sciences* 15(3): 169-187.
- Rollins, R. and L. Romano (1989). "Hunter Satisfaction with the Selective Harvest System for Moose Management in Ontario." *Wildlife Society Bulletin* 17(4): 470-475.
- Siemer, W. F.; G. R. Batcheller; R. J. Glass; and T. L. Brown (1994). "Characteristics of Trappers and Trapping Participation in New York." *Wildlife Society Bulletin* 22(1): 100-111.
- Thomas, J. K. and C. E. Adams (1985). "Socioeconomic Factors Affecting Land Access to Hunt White-Tailed Deer." *Wildlife Society Bulletin* 13(4): 388-394.
- Vaske, J. J.; A. J. Fedler; and A. R. Graefe (1986). "Multiple Determinants of Satisfaction from a Specific Waterfowl Hunting Trip." *Leisure Sciences* 8(2): 149-166.

Application to Nonconsumptive Activities

- Applegate, J. E. and K. E. Clarke (1987). "Satisfaction Levels of Birdwatchers: An Observation on the Consumptive-Nonconsumptive Continuum." *Leisure Sciences* 9(2): 129-134.
- Boxall, P. C. and B. L. McFarlane (1993). "Human Dimensions of Christmas Bird Counts: Implications for Nonconsumptive Wildlife Recreation Programs." *Wildlife Society Bulletin* 21(4): 390-396.
- Brown, T. C.; M. T. Richards; T. C. Daniel; and D. A. King (1989). "Recreation Participation and the Validity of Photo-Based Preference Judgements." *Journal of Leisure Research* 21(1): 40-60.

Brunson, M. and B. Shelby (1990). "A Hierarchy of Campsite Attributes in Dispersed Recreation Settings." *Leisure Sciences* 12(2): 197-210.

Connelly, N. A. (1987). "Critical Factors and Their Threshold for Camper Satisfaction at Two Campgrounds." *Journal of Leisure Research* 19(3): 159-173.

Using a mail survey of campers at two campgrounds in the Adirondack Park in New York, the author identified three critical factors for a satisfying camping experience. The three factors, solitude/rejuvenation, nature, and facility characteristics, were critical at both sites, with solitude/rejuvenation being the most important in each case. All three factors exhibited a threshold, below which campers' satisfaction declined.

Connelly, N. A.; D. J. Decker; and T. L. Brown (1985). "New Opportunities With a Familiar Audience: Where Aesthetics and Harvest Overlap." *Wildlife Society Bulletin* 13(4): 399-403.

Cramer, L. A.; J. J. Kennedy; R. S. Krannich; and T. M. Quigley (1993). "Changing Forest Service Values and Their Implications for Land Management Decisions Affecting Resource Dependent Communities." *Rural Sociology* 58(3): 475-491.

U.S. Forest Service employees were shown to choose between many different patterns of resource allocation; these choices in turn could have impacts on communities that are economically dependent on activities such as mining, logging, or tourism. A nationwide survey of USFS employees indicated that the values held by the employees were supportive of non-commodity uses such as recreation, despite the fact that the employees felt the USFS as an agency placed more value on traditional uses, such as logging. The authors suggested that pressure would be exerted on the agency to adjust to the values held by the younger more widely educated employees. Increased emphasis on multiple uses was predicted.

Cullen, R. (1985). "Rationing Recreation Use of Public Land." *Journal of Environmental Management* 21(3): 213-224.

Delucio, J. V. and M. Mugica (1994). "Landscape Preferences and Behaviour of Visitors to Spanish National Parks." *Landscape and Urban Planning* 29(2-3): 145-160.

Englin, J. (1990). "Backcountry Hiking and Optimal Timber Rotation." *Journal of Environmental Management* 31(2): 97-105.

Using theoretical models of timber rotation, the author examined the effect of backcountry hiking on the optimal rotation periods of several species of trees. Results indicated that the recreational component of the social value of tree stands was quite significant. Indeed, in some cases the best use for stands near trails was shown to be recreational, with the trees never being harvested.

- Hammitt, W. E.; J. N. Dulin; and G. R. Wells (1993). "Determinants of Quality Wildlife Viewing in Great Smoky Mountains National Park." *Wildlife Society Bulletin* 21(1): 21-30.
- Hammitt, W. E. and M.E. Patterson (1991). "Coping Behaviour to Avoid Visitor Encounters: Its Relationship to Wildland Privacy." *Journal of Leisure Research* 23(3): 225-237.
- Hammitt, W. E. and M. E. Patterson (1993). "Use Patterns and Solitude Preferences of Shelter Campers in Great Smoky Mountains National Park, USA." *Journal of Environmental Management* 38(1): 43-53.
- Hammitt, W. E.; M. E. Patterson; and F. P. Noe (1994). "Identifying and Predicting Visual Preference of Southern Appalachian Forest Recreation Vistas." *Landscape and Urban Planning* 29(2-3): 171-183.
- Heywood, J. L. (1993). "Behavioural Conventions in Higher Density, Day Use Wildland Urban Recreation Settings: A Preliminary Case Study." *Journal of Leisure Research* 25(1): 39-53.
- The author used on-site interviews at the Apple White picnic area to examine behavioural conventions in a higher density wildland setting. Users were asked if it bothered them if other users walked through their picnic site. Through examination of pen and ink sketches, those interviewed indicated if various groups, such as large groups with stereos and small groups with dogs, would bother them. Responses varied, indicating conventions rather than norms for behaviour. In addition, responses differed for those who completed English language rather than Spanish language questionnaires. Implications of behavioural conventions for management were discussed.
- Hollenhurst, S. J.; S. M. Brock; W. A. Freemund; and M. I. Twery (1993). "Predicting the Effects of Gypsy Moth on Near-View Aesthetic Preferences and Recreation Appeal." *Forest Science* 39(1): 28-40.
- Kruckenber, L. L. (1988). "Wyoming's Wildlife - Worth the Watching: Management in Transition." *Transactions of the North American Wildlife and Natural Resources Conference* 53: 424-430.
- Klenosky, D. B.; C. E. Gengler; and M. S. Mulvey (1993). "Understanding the Factors Influencing Ski Destination Choice: A Means-End Analytical Approach." *Journal of Leisure Research* 25(4): 362-379.

Manfredo, M. J. and R. A. Larson (1993). "Managing for Wildlife Viewing Recreation Experiences: An Application in Colorado." *Wildlife Society Bulletin* 21(3): 226-236.

The purpose of the study described in this article was to develop a typology of wildlife viewing experiences. This goal was to be achieved through the use of an experience-based approach, identifying preferred recreation opportunities according to the mix of psychological outcomes, recreational activities that occur, and types of settings that are needed to achieve the activity and experience. A combined telephone/mail survey of Denver metropolitan residents was conducted, and indicated that respondents could be divided into four distinct groups. Type 1 (High Involvement Experience) respondents placed greater importance on all experience preferences than did Type 2 (Creativity Experience) respondents. Type 2 placed greater importance than Type 3 (Generalist Experience) respondents, who in turn placed greater importance than Type 4 (Occasionalist Experience) respondents. Suggested implications of the findings included allocation of resources, selection of types of developments, facilities, interpretation and education for wildlife-viewing recreation, and guidance in establishing cooperative strategies with land management agencies.

McCloskie, S. L.; T. L. Napier; and J. E. Christensen (1986). "Factors Influencing Outdoor Recreation Participation: A State Study." *Journal of Leisure Research* 18(3): 190-205.

McFarlane, B. L. (1994). "Specialization and Motivations of Birdwatchers." *Wildlife Society Bulletin* 22(3): 361-370.

Moore, R. L. and A. R. Graefe (1994). "Attachments to Recreation Settings: The Case of Rail-Trail Users." *Leisure Sciences* 16(1): 17-31.

Patterson, M. E. and W. E. Hammitt (1990). "Backcountry Encounter Norms, Actual Reported Encounters, and Their Relationship to Wilderness Solitude." *Journal of Leisure Research* 22(3): 259-275.

Reiling, S. D. and M. W. Anderson (1985). "Equity and Efficiency in Public Provision of Forest-Based Recreation Opportunities." *Journal of Environmental Management* 20(2): 149-161.

As little attention had been paid to the costs of providing public recreation facilities such as campgrounds and hiking trails, the authors performed a "cost of provision" study for campgrounds and other facilities at two sites in Maine. Results indicated that for the most part the fees charged by the public agencies providing these facilities did not cover the costs of provision. Consequences of this inefficiency, such as decreased benefits for users, and difficulties in determining the economically optimal capacity of a facility were discussed.

Rosenthal, D. H. and R. G. Walsh (1986). "Hiking Values and the Recreation Opportunity Spectrum." *Forest Science* 32(2): 405-415.

Schroeder, H. W. and B. Orland (1994). "Viewer Preference for Spatial Arrangement of Park Trees: An Application of Video-Imaging Technology." *Environmental Management* 18(1): 119-128.

Schreyer, R. and J. T. Beaulieu (1986). "Attribute Preferences for Wildland Recreation Settings." *Journal of Leisure Research* 18(4): 231-247.

Shelby, B.; J. J. Vaske; and R. Harris (1988). "User Standards for Ecological Impacts at Wilderness Campsites." *Journal of Leisure Research* 20(3): 245-256.

The authors developed a framework for analyzing norms for ecological impacts of recreation activities. Having shown that managers often value issues such as site degradation differently than users do, the authors used data collected in the Mt. Jefferson Wilderness to illustrate that users were willing and able to evaluate campsite conditions in terms of acceptability. Three normative characteristics, range of tolerable conditions, norm intensity, and norm crystallization, were measured by the framework. Results indicated that norms varied by location, many users preferred low to moderate impact to no impact at all, and there was considerable agreement about the amount of impact that was acceptable. While acknowledging that issues such as legal mandates and management objectives were of great concern, the authors maintained that information about visitor standards would improve management decisions.

Spotts, D. M. and D. J. Stynes (1985). "Measuring the Public's Familiarity With Recreation Areas." *Journal of Leisure Research* 17(4): 253-265.

The authors suggested that the information people have about recreation areas would influence their leisure choices. Various approaches to measuring familiarity were examined, and an empirical test conducted. A personal interview survey of Lansing, Michigan residents was conducted to measure people's familiarity with urban parks. Knowledge of park locations, features, and facilities for 19 urban parks. People were aware of an average of 11.2 out of 19 parks. Some groups had either inflated or deflated perceptions of their familiarity with the urban park system, which the authors suggested was a cause for special efforts to inform them about recreation areas.

Stewart, W. P. (1989). "Fixed Itinerary Systems in Backcountry Management." *Journal of Environmental Management* 29(2): 163-172.

Stewart, W. P. (1992). "Influence of the Onsite Experience on Recreation Experience Preference Judgements." *Journal of Leisure Research* 24(2): 185-198.

Walsh, R. G.; F. A. Ward; and J. P. Olienyk (1988). "Recreational Demand for Trees in National Forests." *Journal of Environmental Management* 28(3): 255-268.

The purpose of this study was to test the contingent valuation method (CVM), and the travel cost method (TCM), to see if CVM, which is based on behavioural intentions, gives different results than TCM, which is based on actual behaviour. The authors accomplished this through on-site interviews in four national forests in Colorado. Respondents answered questions regarding changes in recreational demand and benefits due to changes in tree density caused by pine beetle damage. Results indicated that no significant difference existed between the recreation benefit functions for tree density calculated using CVM and TCM.

Watson, A. E.; J. W. Roggenbuck; and D. R. Williams (1991). "The Influence of Past Experience on Wilderness Choice." *Journal of Leisure Research* 23(1): 21-36.

The hypothesis tested in this study was that recreationists with high experience levels would differentiate more between various aspects of a site than would less experienced individuals when making recreation choices. The hypothesis was tested in a laboratory experiment involving Southern Appalachian backcountry hikers. Differentiation was determined by asking each subject to indicate how much satisfaction would be derived from each level or value of an attribute such as required permits or the size of the area. Contrary to expectations, more experienced hikers actually showed less differentiation between attribute levels than less experienced hikers did. The explanation suggested by the authors was that more experienced recreationists saw the attributes in "black and white" - attribute levels far from the person's own preference were grouped together, resulting in attribute levels being either satisfactory or unsatisfactory, with few categories in between.

West, P. C. (1982). "Effects of User Behaviour on the Perception of Crowding in Backcountry Forest Recreation." *Forest Science* 28(1):95-105.

Through the use of interviews in the Sylvania Recreation area in the Ottawa National Forest, the author showed that the perception of crowding was influenced by the behaviour of other users. "Inappropriate" behaviour such as littering or noise resulted in an increase in perception of crowding. The author suggested that behavioural zoning and silviculture management could reduce conflict between recreationists.

Westover, T. N. and J. R. Collins, Jr. (1987). "Perceived Crowding in Recreation Settings: An Urban Case Study." *Leisure Sciences* 9(1): 87-99.

Yuan, M. S. and D. McEwan (1989). "Test for Campers' Experience Preference Differences Among 3 ROS Classes." *Leisure Sciences* 11(3): 177-186.

Application to Water-Based Activities

- Bell, F. W. and V. R. Leeworthy (1990). "Recreational Demand by Tourists for Saltwater Beach Days." *Journal of Environmental Economics and Management* 18(3): 189-205.
- Ditton, R. B. and M. L. Miller (1986). "Coastal Recreation: An Emerging Area of Managerial Concern and Research Opportunity." *Leisure Sciences* 8(3): 222-239.
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APPENDIX B
RECREATION-RELATED DATA IN NEWFOUNDLAND

Figure 1: Recreation-Related Data in Newfoundland

Department	Contact Person	Date(s) of Data Collection	Type of Information
Wildlife Division	Michael Strapp	Annually	License Sales - Moose and Caribou by year, type, and management area - Fish by year and type - Bear by year and type - Trapping by year Caribou Hunting Success Rates
Provincial Parks	Roger Hanes	Annually	Visitation Statistics at Provincial Parks
Tourism and Culture	Juanita Keel-Ryan	Biannually	Auto/Air Exit Surveys of Visitors -origin/destination information -length of stay
Provincial Fisheries	Kim Houston	1990 1995	Economic Impact Study of Commercial and Recreational Salmon Fisheries Recreational Trout Fishing Study
Federal Fisheries		1990 1992	Sport Fishing Survey Economic Impact Study on Sport Fishing
Canadian Forest Service	Peter Trelawny	1993	Survey on the Value of Moose Hunting in Newfoundland
Canadian Wildlife Service	Alistair Bath	1991	Survey on the Importance of Wildlife to Canadians

APPENDIX C
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JULY 3-9 1995

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