

University of Montana

ScholarWorks at University of Montana

Graduate Student Theses, Dissertations, &
Professional Papers

Graduate School

2008

Human Bonds with Public Wildland Places: Segmenting Communities to Inform Natural Resource Management

Neal A. Christensen

The University of Montana

Follow this and additional works at: <https://scholarworks.umt.edu/etd>

Let us know how access to this document benefits you.

Recommended Citation

Christensen, Neal A., "Human Bonds with Public Wildland Places: Segmenting Communities to Inform Natural Resource Management" (2008). *Graduate Student Theses, Dissertations, & Professional Papers*. 531.

<https://scholarworks.umt.edu/etd/531>

This Dissertation is brought to you for free and open access by the Graduate School at ScholarWorks at University of Montana. It has been accepted for inclusion in Graduate Student Theses, Dissertations, & Professional Papers by an authorized administrator of ScholarWorks at University of Montana. For more information, please contact scholarworks@mso.umt.edu.

**HUMAN BONDS WITH PUBLIC WILDLAND PLACES: SEGMENTING
COMMUNITIES TO INFORM NATURAL RESOURCE MANAGEMENT**

By

Neal Alan Christensen

Master of Science, Texas A&M University, College Station, Texas, 1989
Bachelor of Science, The University of Montana, Missoula, Montana, 1985

Dissertation

presented in partial fulfillment of the requirements
for the degree of

Doctor of Philosophy
in Forestry

The University of Montana
Missoula, MT

Spring 2008

Approved by:

Dr. David A. Strobel, Dean
Graduate School

Dr. James A. Burchfield, Chair
Department of Society and Conservation

Dr. Jill M. Belsky
Department of Society and Conservation

Dr. Rodney L. Brod
Department of Sociology, Emeritus

Dr. Michael E. Patterson
Department of Forest Management

Dr. Daniel R. Williams
USDA Forest Service

Special thanks to my wife Lynette

Human Bonds with Public Wildland Places: Segmenting Communities to Inform Natural Resource Management

Chairperson: James Burchfield

Public land managers must consider a broad range of information to develop effective and equitable plans for addressing contentious management issues. Appropriately designed social science research may contribute to better understanding of public interests regarding resource use, thus reducing conflict and contributing to cooperative solutions. This dissertation describes a social science methodology for developing understanding of human / place bonds using indicators of human expression of behaviors, beliefs, and emotions. The dissertation develops the concept of human / place bonds with a goal to better reflect the public's views and desires for management of public lands. The purpose of the human / place bond segmentation research approach developed in this dissertation is to provide information that may improve consideration of these ties to place in contentious planning decisions.

The research approach focuses on a combination of on-site activity participation, assigned values, and emotional attachment to place to understand human / place bonds. These measures are often considered in recreation management studies, but this methodology goes further in simultaneously considering these three types of indicators of human / place bonds to develop understanding about the public's views on management. In both case studies presented here segmentation of local communities based on multiple components of their human / place bonds identifies groups that statistically differ in their views about planning decisions on local public lands. This research presents evidence suggesting this technique may help improve understanding of attitudes about management of public lands. The dissertation also presents evidence that the human / place bond research approach can be efficiently applied and is flexible in design.

The understanding gained from this process may ultimately bring stakeholders together to increase dialog and develop cooperative solutions. In this way the human / place bond research approach may help to influence policy aimed at resolving conflict among stakeholders in contested public wildland management decisions.

Table of Contents

<u>Section</u>	<u>Page</u>
Abstract	iii
List of Tables	viii
List of Figures	x
INTRODUCTION	1
Public Input to Management Decisions	2
Improving the Effectiveness of Public Input	3
Market Segmentation	5
Application of Human / Place Bond Segmentation	7
Two Case Studies	7
The Research Approach	8
Human / Place Bond Conceptual Model	9
Model Generalizability	12
Model Validity	12
Model Reliability	14
Dissertation Goals	15
LITERATURE ON HUMAN / PLACE BONDS	17
Human / Place Bond Framework	17
Indicators of Conceptual Components	23
On-site Activity Participation	24
Assigned Values	27
Attachment to Place	30
Combining Indicators of Human / Place Bonds	32
Human / Place Bonds and Attitudes about Management	34
Operationalizing Human / Place Bond Research	40
METHODS	43
The Case Study Design	44
Yakutat Case Study	46
Darby Case Study	47
Human / Place Bond Research Process	48
Qualitative Methods	49
Yakutat Qualitative Data	50
Darby Qualitative Data	51
Quantitative Survey Development	52
Activity Participation	53
Assigned Values	53
Attachments to Place	54
Management Options	54
Quantitative Methods	55
Yakutat Quantitative Data	56
Darby Quantitative Data	57
Analyzing Results	59
Qualitative Data Analysis	60
Quantitative Data Analysis	61
Missing Value Imputation	62

Factor Analysis of Bond Indicators	62
Cluster Analysis of Bond Factors	65
Analysis of Variance of Bond Segments' Attitudes	66
Limitations of the Human / Place Bond Research Approach	68
RESULTS	72
Yakutat Study Qualitative Findings	72
Summary of Qualitative Findings	81
Darby Study Qualitative Findings	83
Summary of Qualitative Findings	86
Yakutat Study Quantitative Results	88
Human / Place Bond Segmentation	89
Identifying Indicator Sub-Dimensions	89
Activity Participation	91
Assigned Values	93
Attachments to Place	94
Identifying Community Segments	95
Community Segment Characteristics	98
Dropped Variables	102
Implications of Human / Place Bond Segmentation	103
Conditions, Impacts, and Interference from Others	103
Evaluation of Current Management, Services, and Facilities	105
Amount of Use	108
Preferences for Management Options	111
Yakutat Segment Profiles	117
Segment One	117
Segment Two	118
Segment Three	119
Segment Four	121
Segment Five	122
Summary of Management Concerns	123
Evaluation of the Application	125
Darby Study Quantitative Results	127
Human / Place Bond Segmentation	127
Identifying Indicator Sub-Dimensions	128
Activity Participation	129
Assigned Values	130
Attachments to Place	131
Identifying Community Segments	133
Community Segment Characteristics	133
Implications of Human / Place Bond Segmentation	138
Conditions, Impacts, and Interference from Others	138
Current Levels of Management, Services, and Facilities	142
Preferences for Management Options	144
Darby Segment Profiles	156
Segment One	156
Segment Two	157

Segment Three	158
Segment Four	159
Segment Five	160
Segment Six	161
Summary of Management Concerns	162
DISCUSSION	167
Evaluating the Human / Place Bond Research Approach	168
Applying Understanding of Human / Place Bonds	168
Assessing the Application	174
Cost Efficiency	175
Conclusions	176
Implementing Human / Place Bond Research	177
Influence on the planning process	179
Additional Research Needs	180
Final Considerations	183
References	185
Appendix A – Yakutat Case Study Qualitative Interview Guide	193
Appendix B – Yakutat Case Study Quantitative Questionnaire	195
Appendix C – Darby Case Study Quantitative Questionnaire	205
Appendix D – Yakutat Case Study Tabulated Quantitative Results	216
Q1: Activity participation	217
Q2: Situk impacted?	220
Q3: Others’ interfere?	221
Q4: Importance of Situk values	223
Q5: Amount of current facilities and management	226
Q6: Preference for activity amounts	230
Q7: Attachments to place	232
Q8: Trust in management agencies	236
Q9: Preferred level of government authority	242
Q10: View on limiting use in general	243
Q13: Preference for management approaches	244
Q14: Respondent’s age	248
Q15: Respondent’s sex	250
Q16: Respondent’s Tlingit identity	251
Q17: Months per year currently living in Yakutat	252
Q18: History in Yakutat	253
Appendix E – Darby Case Study Tabulated Quantitative Results	259
Q1: Activity Participation	259
Q2: Importance of BRF Values	267
Q3: Attachment to Place on the BRF	271
Q4a: BRF Negatively Impacted	275
Q5a: Sources of Interference with RTP on the BRF	275
Q6: Evaluation of Current Levels of Management, Services, and Facilities	278
Q7: Evaluation of Current Recreation Opportunities on the BRF	281
Q8: Level of Support for Travel Management Options on the BRF	284
Q9: Level of Trust in BRF Management	288

Q10: Representation by Stakeholder Groups in BRF Management Decisions	289
Q13 – Q19: Respondent Characteristics	291

List of Tables

<u>Table</u>	<u>Page</u>
Table 1: Survey Sample Characteristics; Darby Case Study, 2007.	59
Table 2: Activity Item (Survey Q1) Factor Score Coefficients; Yakutat Case Study, 2006.	92
Table 3: Assigned Value Item (Q4) Factor Score Coefficients; Yakutat Case Study, 2006.	94
Table 4: Attachment Item (Q7) Factor Score Coefficients; Yakutat Case Study, 2006.	95
Table 5: Relationship Indicator Factor Scores and Sample Characteristics by Community Segment; Yakutat Case Study, 2006.	96
Table 6: Demographic Characteristics and Fishing Participation Rates by Community Segment; Yakutat Case Study, 2006.	99
Table 7: Characteristics of Items Not Included in the Human / Place Bond Factor and Cluster (segment) Models by Community Segment; Yakutat Case Study, 2006.	103
Table 8: Sources of Interference with Residents' Bonds with the Situk River by Community Segment; Yakutat Case Study, 2006.	104
Table 9: Preferences for Amounts of Management and Development on the Situk River by Community Segment; Yakutat Case Study, 2006.	106
Table 10: Preferences for Use Levels of Fishing and Motorized Use on the Situk River by Community Segment; Yakutat Case Study, 2006.	109
Table 11: Opinions about General Limits on Use (Q10) by Community Segment; Yakutat Case Study, 2006.	111
Table 12: Support for Management Options (Q13) by Community Segment; Yakutat Case Study, 2006.	113
Table 13: Significant Support or Opposition for Management Options (Q13) by Community Segment; Yakutat Case Study, 2006.	115
Table 14: Managers' Evaluation of Human / Place Bond Research Effectiveness as a Form of Public Input; Yakutat Case Study, 2006.	126
Table 15: Activity Item (Survey Q1) Factor Score Coefficients; Darby Case Study, 2007.	130
Table 16: Value Item (Survey Q2) Factor Score Coefficients; Darby Case Study, 2007.	131
Table 17: Attachment Item (Q3) Factor Score Coefficients; Darby Case Study, 2007.	132
Table 18: Sample Distribution, Overall Bond Intensity, and Strength of Indicator Factor Scores by Community Segment; Darby Case Study, 2007.	134
Table 19: Demographics by Community Segment; Darby Case Study, 2007.	137
Table 20: Activity Participation Rates by Community Segment; Darby Case Study, 2007.	138
Table 21: Negative Impacts by Community Segment; Darby Case Study, 2007.	140
Table 22: Types of Interference and Problems by Community Segment; Darby Case Study, 2007.	142

Table 23: Views on the Level of Management Services and Facilities by Community Segment; Darby Case Study, 2007.	143
Table 24: Views on the Level of Current Recreation Opportunities by Community Segment; Darby Case Study, 2007.	144
Table 25: Opinions about Bitterroot National Forest Management Options by Community Segment; Darby Case Study, 2007.	147
Table 26: Categories of Responses to Written Opinions about Improving the Management of the Bitterroot National Forest by Community Segment; Darby Case Study, 2007.	153
Table 27: Categories of Responses to Written Opinions Regarding what is Special about Darby and Conner by Community Segment; Darby Case Study, 2007.	155

List of Figures

<u>Figure</u>	<u>Page</u>
Figure 1: Human / Place Bond Research Approach Schematic.	11
Figure 2: Human / Place Bond Factors and Indicator Components; Yakutat Case Study, 2006.	90
Figure 3: Percent Distributions of Human / Place Bond Overall Intensity Index Scores for Each Community Segment; Yakutat Case Study, 2006.	97
Figure 4: Percent Distribution of Age for Each Community Segment; Yakutat Case Study, 2006.	98
Figure 5: Comparison across Human / Place Bond Segments of Preferences for Amount of Enforcement of Sport Fishing Regulations (Q5c) by Community Segment; Yakutat Case Study, 2006.	107
Figure 6: Comparison across Human / Place Bond Segments of Preferences for Amount of Agency Patrols (Q5h) by Community Segment; Yakutat Case Study, 2006.	107
Figure 7: Comparison of Preferences for Amount of Subsistence Fishing (Q6b) by Community Segment; Yakutat Case Study, 2006.	110
Figure 8: Comparison of Preferences for Amount of Private Sport Fishing (Q6e) by Community Segment; Yakutat Case Study, 2006.	110
Figure 9: Ranked Support for Management Options (Q13) across all Respondents; Yakutat Case Study, 2006.	112
Figure 10: Quad Plots of Bond Sub-Components and Management Preference Comparison Example; Yakutat Case Study, 2006.	116
Figure 11: Support for a Decrease in Sport Fishing Bag Limits (Q13) by Community Segment; Yakutat Case Study, 2006.	117
Figure 12: Segmentation Indicator Dimensions, Sub-dimension Factors, and Factor Items; Darby Case Study, 2007.	128
Figure 13: Percent Distribution of Bond Intensity Index Scores for Each Community Segment; Darby Case Study, 2007.	135
Figure 14: Percent Distribution of Respondent Age for Each Community Segment; Darby Case Study, 2007.	136
Figure 15: Overall Level of Support for Management Options; Darby Case Study, 2007.	145
Figure 16: Quad Plots of Bond Sub-Components and Management Preference Comparison Example; Darby Case Study, 2007.	149
Figure 17: Level of Support for Removing Illegal User-Created Motorized Routes by Community Segment; Darby Case Study, 2007.	150
Figure 18: Level of Support for Opening More Gated Roads during Summer Months by Community Segment; Darby Case Study, 2007.	151

INTRODUCTION

Management decisions about use of public wildlands are often contentious and reflect larger societal struggles over the government's role of providing for the public good. These decisions are now increasingly made in an environment of collaboration and greater consideration of public views (Wondolleck and Yaffee 2000). Although managers search for meaningful public involvement in these decisions, they often find it difficult to reach agreement among diverse stakeholders (Wondolleck and Yaffee 2000). Current trends in land uses in the American West suggest that population growth will continue and this changing landscape could result in conflicts becoming even more contentious (Riebsame 2001). Many people are moving to the rural Western US, with its large areas of public lands, in search of high amenity lifestyles. Tourists from other areas also increasingly travel to the rural West seeking wildland recreational opportunities. At the same time timber harvesting and other traditional uses of these public lands have declined dramatically and have become more controversial. The economies and cultures of small rural communities in the West are changing to reflect new lifestyles and societal values, as people become less dependent on public lands for industrial purposes and more dependent on them for high amenity lifestyles and other non-commodity values (Rasker 2001).

This dissertation develops an applied social science methodology to improve consideration of public input in the contentious public wildland management issues that are developing in the face of a rapidly changing western landscape. The approach is conceptually based on the bonds that people form with public wildland places and the influence those bonds have on attitudes about their management. This dissertation defines human / place bonds simply as the ties people develop with a specific place. However, while this is a straightforward definition, human / place bonds are multi-dimensional in their expression and difficult to observe directly. The research method follows a conceptual model that considers three types of indirect indicators of human ties to place. Measurements of these indicators are used to develop understanding about the bonds between citizens and the public lands that they live near. Understanding about the nature of local residents' human / place bonds is then tied to their attitudes about management of these places.

The analysis of human / place bond indicator data is similar to business market segmentation, in that it divides the population into groups by types and intensities of bonds to the public lands in the planning area. These human / place bond segments are then compared to develop understanding of differences in opinions about management, with the goal of improving public input and understanding among stakeholders and managers involved in public wildland planning efforts. A case study design is used to evaluate the human / place bond research approach in two communities closely associated with nearby national forest wildland planning efforts. The potential effectiveness of this method in applied public wildland management planning situations is evaluated based on two criteria, including 1) the ability to identify meaningful community segments that differ significantly in their opinions about management options, and 2) evaluations by managers and stakeholders involved in the case studies about the ability of the technique to improve the public wildland planning process.

Public Input to Management Decisions

The contention surrounding motorized recreation use of public lands is a good example of the type of planning problem that may benefit from increased mutual understanding about conflicts and concerns over management. Nationwide, US Forest Service managers are challenged to plan for increasing recreation use on national forests and the conflicts that arise over the types and locations of that use. Motorized use of public lands is currently one of the most contentious planning issues faced by managers in agencies like the US Forest Service and the Bureau of Land Management (Christensen and Watson 2006a). Off-highway vehicle (OHV) use is the fastest growing type of use on many national forests in the US (Christensen and Watson 2006a). Former Forest Service chief Dale Bosworth cited unmanaged recreation, a term he used to refer primarily to illegal OHV use, as one of the four major current threats to the nation's public forests and grasslands (Bosworth 2004). In this contentious planning environment OHV users pressure managers to provide more legal opportunities for their activity while environmentalists and wildland / urban interface residents counter with their concerns about resource and social impacts from over-use and illegal behaviors. Public land managers must weigh these competing perspectives to determine an appropriate balance

that can be provided within limited and declining budgets and within the public purpose of the lands they manage.

Public land managers must consider a broad range of information along with involving the public in meaningful ways to develop effective and equitable plans for addressing these types of contentious management issues. Organized stakeholder groups are often the most effective way available to the public to provide input and articulate their interests in planning situations - through lobbying, organized letter-writing, attending public meetings, or in collaborative decision-making processes. However, individual needs may be poorly represented by stakeholder groups. Special interest stakeholder groups are usually focused on a narrow set of objectives while their constituents are unique individuals with varied concerns, values, and life stages. Many collaborative planning processes fail to find solutions to contentious issues. This is because it is often difficult for stakeholder groups to agree with each other, and it may also be difficult for these groups to agree internally on acceptable management options (e.g., Marston 2001; Moseley 2001; Snow 2001). This dissertation argues that studying human / place bonds along with corresponding opinions about management options improves the effectiveness of public input by developing better understanding of mutual interests and concerns, thereby enabling more creative and cooperative solutions to develop among managers and the public involved in contentious wildland planning efforts.

Improving the Effectiveness of Public Input

A place-based research method may improve the process of identifying management solutions by developing a thorough understanding of local residents' views. Shindler and Neburka (1997, p. 19) found that for "local people, natural resource planning success is largely measured by the extent to which their own ideas and concerns are given serious consideration and the agenda is not driven by federal agency politics or national debates." McCool and Guthrie (2001) identified seven dimensions across two major categories (product oriented and process oriented) to be important for successful public participation in messy natural resource planning situations where there are conflicting goals and scientific disagreement. On the product side, these include the

development of a plan and measures of the social and political acceptability of the plan. Elements of process-oriented success include opportunities for learning, building a sense of ownership in the solution, building interpersonal relationships, and feelings of being heard. This set of criteria are supported by others who have described the benefits of public participation in natural resources decisions, especially within social assessments and collaborative planning (e.g., Cortner and Moote 1999; Haynes 2005; Kruger and Shannon 2000; Shindler and Neburka 1997). This place-based social science technique may significantly contribute to enhancing these criteria for successful public contributions to natural resources planning by developing a base of relationships between stakeholders and managers that is necessary prerequisite for cooperation.

There are many potential benefits from improving consideration of interactions between local people and public wildland place in planning efforts. It may not be possible to adequately represent the bonds that are formed between people and public wildland places in single-issue stakeholder groups typically involved in collaborative processes. This matters when these bonds are influential in the formation of opinions about management. There is growing agreement that increased understanding of public views and desires will enhance honest and meaningful involvement of the public and contribute to more balanced, integrated and equitable management decisions (Kruger, 2003). The challenge is to organize understanding of widely varied interests in meaningful ways; to develop the best balance between the impossible task of considering each individual's views and the ineffectiveness of over-generalizing that often leads to misunderstanding in collaborative planning. Segmentation of the public, using a marketing research-type cluster analysis (Parasuraman 1986), provides a potentially powerful method for identifying and understanding important concerns of stakeholder representatives, *and their constituents*, based on human / place bonds with public wildland places.

Market segmentation may provide a tool for public wildland planners to identify less obvious groups of citizens with more internally consistent opinions about appropriate management solutions. This method could improve typical planning efforts that tend to group stakeholders into rather polarized categories surrounding a contentious management issue. For example, a collaborative planning effort for motorized recreation

use may invite a group of stakeholders to the planning table that includes ‘motorized recreation users,’ ‘nonmotorized recreationists,’ and ‘local homeowners.’ A typical local resident, however, might easily fit all of those categories to some degree, with no single stakeholder group adequately representing their interests or concerns. Planners using a more sophisticated market segmentation methodology might find that a local community includes several different types of motorized users, such as young motorcycle riders and family-oriented ATV’ers, each with different motivations, use patterns, and concerns about management. They might also find that some homeowners in the area ride horses and are concerned about the safety of encounters, while the same homeowners also participate in motorized recreation and have concerns about maintaining access to the public lands in their backyard. This type of improved understanding of public views may lead to progress in difficult planning efforts in need of creative and accommodating management solutions.

Market Segmentation

While social science applications are widespread in natural resource planning, an effective technique for understanding diverse public interests in contentious recreation planning situations, like those involving motorized recreation use, has not been widely adopted. Business marketers often use social science methods to identify their target customers, and these methods may also work in the application of social science to natural resource management. Market segmentation targets customers based on characteristics like demographics, lifestyle, or past purchase behaviors (Weinstein 1987, 2004), and has also been applied as a tool in public land management research to better understand and target constituents (Borrie, Christensen, Watson, Miller, and McCollum 2002).

Marketers employ segmentation to identify the best fit between products and customers. While it is important, for example, for automotive manufacturers to identify potential car buyers, they must also understand the varying tastes of these potential customers in order to develop products (and advertising messages) that do a better job of matching customers with products than their competition. Market segmentation seeks to identify subgroups of the population that have similar consumer tastes and desires

(Weinstein 2004). The technique identifies these subgroups in the population based on a set of measurable indicators. The goal of market segmentation using the statistical technique of cluster analysis is to identify subgroups that are more internally consistent in their future consumer behavior than the overall population they came from (Parasuraman 1986). These subgroups are identified by assessing indicators of more abstract characteristics like values, lifestyles, and motivations. Segmentation based on demographics (e.g., age, gender, and income) is usually supplemented by measures of lifestyle characteristics and interests more likely related to future purchase behavior in order to identify meaningful subgroups of the population (Weinstein 2004).

Following the marketing example, a successful application of segmentation in public wildland planning requires investigators to develop relevant measures of constructs that will identify real and meaningful subgroups of the public having more internally consistent views on appropriate management than the general population. This dissertation describes a methodology that segments the public based on their bonds to wildland places. This approach, for example, might help managers understand opinions about motorized use by identifying segments of OHV users based on their bonds to a public place that have more consistent opinions about management than OHV users as a whole. The concept of human / place bonds is a broad term for the interaction between people and specific places, and is limited in its application in this dissertation to the interaction between people and local public wildland places. The research in this dissertation considers three types of indicators of bonds between people and public wildland places for the purpose of segmentation: 1) activity participation, 2) assigned values, and 3) attachment to place. The approach applies market segmentation-type methods based on these three indicators of human / place bonds to inform wildland recreation use planning efforts. The dissertation develops this concept of human / place bonds with a goal to better reflect the publics' views and desires for management of these public places, and a hope to provide a social science tool that will reduce conflict by developing broader understanding and improving the ability to consider a wide variety of public interests in resource planning decisions.

Application of Human / Place Bond Segmentation

Developing this applied research approach will allow land managers to improve public input by considering their bonds to specific places in land use planning decisions, to inform collaborative efforts, and to ultimately make better, less contentious recreation resource management decisions. The human / place bond research approach accommodates the multi-dimensionality of ties to place, and by utilizing a combination of methods, recognizes the limitations of understanding these bonds only through quantitative survey research. However, this work also describes a practical system for using mixed methods to measure a relevant set of indicators of bonds to improve understanding of attitudes about the public's desires for management of these places. The focus in this research is to combine measures of three types indicators of human bonds with a specific place that have commonly been considered in past recreation resource management studies: activity participation, assigned values, and attachment to place. These indicators measure human / place bonds within the behavioral, cognitive, and affective, components of expression, respectively. The study analysis attempts to identify differences in attitudes about management problems and solutions across community segments based on the types and intensities of bonds people form with public wildland places.

Two Case Studies

To develop, refine and test the human / place bond research approach this dissertation considers two case studies, conducted in sequence, involving contentious recreation planning situations on public lands managed by the US Forest Service in the Western US. The two studies were chosen because they offer unique examples of the formation of human / place bonds with public places while they also share similar contentious land management planning difficulties. Each of the two studies involves an interested and divided public and a controversial recreation planning effort attempting to balance competing interests on a national forest ranger district with diverse opposition from local residents. The case studies are similar to each other in design. However, the second evolved from the first, and each is tailored to local conditions by using qualitative

methods to inform the design of survey questionnaires and the interpretation of quantitative results.

The first case study was conducted in a small community with strong ties to a local river on the Tongass National Forest in Southeast Alaska. The Yakutat case study assesses human / place bonds between Yakutat residents and the Situk River and how those bonds are related to attitudes about motorized boating and sport fishing on the river. The second case study focuses on place bonds of local residents with recreation lands on the Darby Ranger District of the Bitterroot National Forest in Southwestern Montana. The Darby case study looks for connections between human / place bonds and local attitudes about recreational use of OHV's on those lands. Conducting sequential case studies provides an opportunity to replicate and refine the human / place bond research approach while testing it across diverse situations. Although the case study communities vary considerably, both geographically and culturally, they are typical examples of the ongoing struggles over a changing Western American landscape: they both involve small, local communities of residents with strong, long-term, and evolving ties to nearby federal public lands, that are experiencing changes in land use priorities, population growth, and ongoing contentious planning issues about management of conflicting uses.

The Research Approach

The human / place bond research approach allows appropriate consideration of ties between people and places formed on the basis of experience as well as on the basis of values, regardless of whether or not one actually visits the place. Unlike, traditional recreation research models, it allows the consideration of the importance of existence values of special places on an equal footing with the importance of on-site recreation activity values. A more complete place perspective allows us to recognize that the values and meanings of places that are special to people are greater than the sum of their attributes – it acknowledges that human bonds with special places may not have ready substitutes or be based primarily on economic values (Brown, Reed, and Harris, 2002). This research follows a conceptual model that considers three forms of expression of human / place bonds, including behavioral, cognitive, and affective. The dissertation case studies combine indicators of these forms of expressions, including activity

participation behaviors, assigned values, and attachments, as a way to improve understanding of human / place bonds in natural resource management by accounting for their multiple components of expression and complex, individually unique ways of development.

Human / Place Bond Conceptual Model

The following outline presents the conceptual basis for the research approach in five levels from the general level of abstraction to the more specific component level, the indicator level, the measurement level, and finally the analysis level of the model.

- I. Construct: human / place bonds refer to the ties people develop with specific places. The primary purpose of the human / place bond research approach is to inform management decisions about public expectations influenced by ties people develop with specific public wildland places.
- II. Components: human / place bonds may theoretically be expressed in three ways
 - a. behaviors and conations (behavioral intentions)
 - b. cognitive beliefs
 - c. affective emotions
- III. Indicator Types: indicators in survey research measure the components of expression of human / place bonds
 - a. on-site activity participation histories represent human / place bond behaviors
 - b. assigned value importance evaluations represent cognitive beliefs
 - c. attachment to place psychometric indicators represent affective emotions
- IV. Indicator Items: multiple indicator items are used in survey research to assess each of the three indicator types. Quantitative measures of the items are developed from theory, previous research, and background investigation of local conditions. Measures of attitudes about management are developed using the same process and are included in the survey along with the bond indicators. The following examples paraphrase each of the types of indicator items included in the survey instruments used in the model.

- a. Attachment to place example:
On a five-point scale from 'strongly disagree' to 'strongly agree' how much do you agree with the statement 'I identify strongly with the Bitterroot National Forest?'
- b. Assigned values example:
On a four-point scale from 'not at all' to 'very important' how important to you, is the Situk River for spiritual values?
- c. Activity participation example:
Have you participated in walking or hiking along the Situk River in the past year?.....or in your lifetime? (answer yes or no to each)
- d. Attitudes about management example:
On a five-point scale from 'strongly oppose' to 'strongly support' tell us how you feel about opening more currently gated roads to year around motorized access on the Bitterroot National Forest.

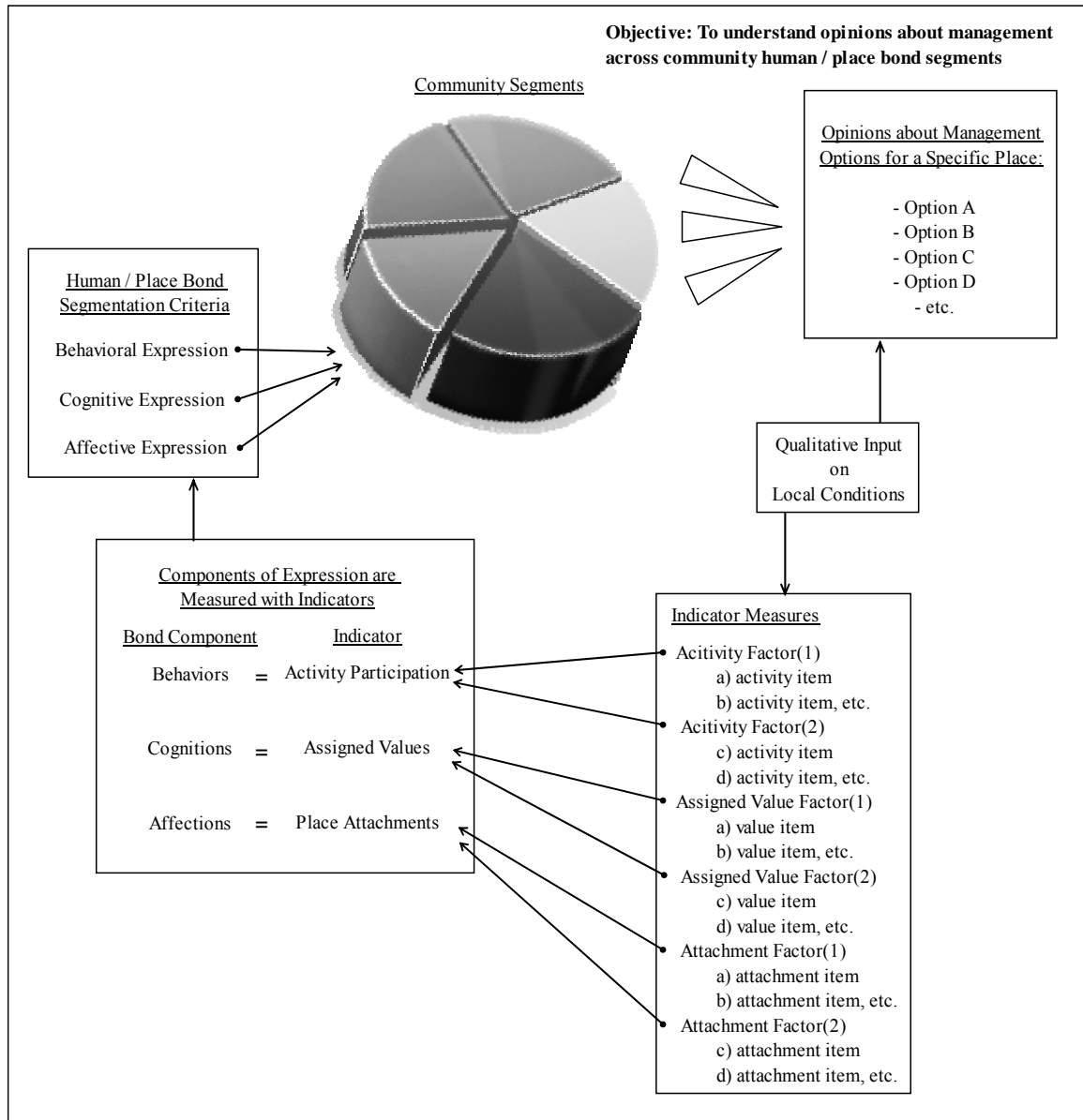
V. Statistical Analysis: the research model follows a consistent process to analyze the quantitative survey data to meet the goal of developing understanding about management attitudes related to the expression of human / place bonds.

- a. Factor analysis is used to reduce the number of indicator items (sections IVa - IVc) to a smaller set of place-relevant sub-dimensions of related items within each indicator type. Membership of survey items within indicator types is pre-determined (e.g., activity items are only included in activity factors), while the factor analysis sub-dimensions are organic and place-specific, with item membership empirically determined in the analysis.
- b. Cluster analysis is used to segment the quantitative sample based on the simultaneous consideration of factor scores across all human / place bond indicator sub-dimensions identified in section Va. The resulting segments are characterized by average factor scores for each sub-dimension as well as by an overall human / place bond intensity index calculated from the combined factor scores.

- c. Multiple analysis of variance (MANOVA) identifies statistically significant relationships between segment membership and attitudes about conditions and management options.

This model outline is consistently followed in each case study application. The flow of steps is illustrated in figure 1 below.

Figure 1: Human / Place Bond Research Approach Schematic.



Model Generalizability The specific design of the dissertation research is a multiple embedded case study (Yin 2003). This study design has dual goals for generalizability. The first goal is at the contextual level, where it is the intent to develop understanding of local human / place bonds to inform local management decisions for a particular recreation planning effort. This is the embedded part of the study, and random sampling with statistical generalization to the finite population of individuals in the local community is appropriate. At the abstract level, this dissertation may contribute to an understanding of how public land managers can consider the mix of local community human / place bonds and their influence on attitudes about conditions and management in planning decisions. This second, more significant goal for the dissertation is not to generalize to a larger population of individuals, but to infer to the larger set of similar planning situations. This would be a generalization to policy implications or to theory, as described by Yin (2003, p. 32). These dual goals are satisfied by an embedded case study design in which the study of community residents is embedded in the larger unit of analysis - the connection between community bonds to place and preferences for management and conditions of local public wildlands. With the human / place bond research approach embedded in a larger multi-case study design, the process of developing and applying understanding of local human / place bonds and preferences for management decisions can analytically (and theoretically) be generalized from these case studies to the larger set of planning situations involving consideration of local communities with strong ties to local public wildlands.

Model Validity The extent to which this model reflects the real meaning of the concept of human / place bonds as it relates to the goal of this study to inform natural resources management is assessed in several ways within the contextual and abstract levels of generalizability. Three types of validity are commonly considered in assessing a research study design, including construct, criterion, and content (Babbie 2004). Construct validity is the most general type and reflects the ability of the overall concept to relate theoretically to other variables. Construct validity is especially relevant at the abstract level of generalizability and is assessed at the highest level of the conceptual model. It is evaluated by considering human / place bonds' statistical relations to

attitudes about management. A significant result in the multiple analysis of variance (MANOVA) showing statistical differences in attitudes about management across human / place bond community segments provides an indicator of the model's construct validity. A significant finding shows that the hypothesized set of indicators together represent complex forms of expressing human / place bonds that relate to concerns about management of those places as indicated in the conceptual model. The construct validity of human / place bonds is strengthened in level II of the conceptual model through the consideration of multiple components of expression rather than focusing only on one component, such as activity participation behaviors. Theoretical arguments provided in the literature establish the appropriateness of considering these multiple components of expression within the construct of human / place bonds. If the model has construct validity the research results should identify community segments with statistically different attitudes about management. The data analysis described in level V of the outline offers evidence of construct validity if the analysis of variance finds significant differences in attitudes across human / place bond community segments.

Criterion validity is established according to some external standard and it generally refers to a measure's ability to reflect the phenomenon that it is supposed to indicate (Babbie 2004). For example, do measures of encounters predict feelings of crowding? In the human / place bond conceptual model criterion validity is evaluated at a more specific level than construct validity and refers most closely to the ability of level III indicators to reflect level II components of expression. The chapter on literature reviews theoretical perspectives and past research to argue (along with the criterion of face validity, Babbie 2004) that the indicator types of activity participation, assigned values, and place attachment used in the research approach adequately reflect the behavioral, cognitive, and affective components of bond expression, respectively.

Considering the full range of meanings is important for establishing the content validity of a research model (Babbie 2004), and content validity would be threatened by neglecting to include important aspects of a concept. In the contextualized human / place bond model, content validity is guided by general theory and experience as well as by the local context of the case study. Content validity is assessed at level IV of the conceptual model as the ability of the indicator items to reflect the indicator types. We cannot

adequately understand recreation activity participation on a national forest, for example, if the list of activity items on a questionnaire does not include all of the recreation activities that commonly occur in that specific place. The content validity in this research approach is improved through the review of previous research examples as well as through qualitative background investigation in the local community prior to the design of each case study quantitative questionnaire. Because of the localized nature of human / place bonds the quantitative survey instruments must be re-designed and their content validity reassessed for each application of the research approach. As content validity is assessed at the disaggregate level of the conceptual model it represents a necessary requirement for obtaining overall construct and criterion validity as well.

Model Reliability Reliability is determined by the ability to apply a research method repeatedly and obtain the same results (Babbie 2004). The human / place bond research approach is place-based and the study results are generalizable to a local population. The case study approach utilizes both qualitative and quantitative methods and adapts those methods to the local situation. The qualitative research step in this approach increases the overall validity of a case study by developing deeper understanding and guiding the development of the quantitative instrument. Increased validity can come at the cost of reliability. The same survey instrument could not be reliably applied in a different place and situation. A new contextual understanding must be developed to accurately measure the elements of the model. Indicators may have different terminology or interpretation and important items in the new location may need to be added while irrelevant items are dropped.

The model reliability for a particular case study is enhanced by the sampling and statistical methods used in the research approach. The survey research is conducted on a randomly chosen, statistically representative, and adequately large sample of the local population of the case study. Second to sampling reliability, is the measurement reliability of the survey instrument. The measurement reliability is enhanced through the use of multiple indicators of each indicator type chosen to represent the expression of human / place bonds. The reliability of these measures is also enhanced in the statistical analysis. The use of factor analysis and the resulting factor score coefficients to represent

a reduced set of indicator sub-dimensions is generally more reliable than other scale development approaches, and is particularly suited to the situated, case study approach, where generalizability and replication is limited to a local population (Babbie 2004). The assessment of the reliability of these organic sub-dimensions of activity, value, and attachment indicators identified through factor analysis is enhanced by the consideration of the Cronbach's alpha measure of the reliability of summated scales of the items comprising the factor solutions. Satisfactory scores on this index indicate that the factor solutions identified internally consistent sets of items to represent the indicator sub-dimensions (Hair et al. 2006).

Dissertation Goals

Most researchers in recreation and natural resource management have tended to study human / place bonds through one specific process involved in their formation (most often measured as attachment to place), but many of the same researchers have also recommended broader consideration of the components of human / place bonds in future studies (Williams et al. 1992, Giuliani and Feldman 1993, Beckley 2003, Williams and Vaske 2003, Stedman 2003b). Williams et al. (1992) critiqued typical natural resource planning that considers traditional economic values, along with a growing awareness for ecological values, while still failing to recognize the full range of values associated with places, including emotional, symbolic and spiritual ties to place. Beckley (2003) concludes that both community attachment and recreation-site attachment studies have been too narrowly defined to clarify factors of influence, and calls for understanding types and intensity of attachments to place with consideration for the broad spectrum of users who live, work, and play in a geographic place. Williams and Vaske (2003) identify a paradigm shift from traditional resource management policies that emphasize commodity values toward a greater emphasis on understanding subjective, emotional, and symbolic meanings of specific places or landscapes. Developing shared understanding about contested places based on multiple meanings may provide direction for stakeholders and managers interested in reducing interpersonal conflicts over public land resource decisions. Understanding these processes will allow managers to better recognize and account for human / place bonds among competing stakeholders. With this

understanding they will be able to employ management options that protect and enhance the publics' bonds with public places that are appropriate within the established purpose of those places, as determined by the political process.

The primary goals of this dissertation are to develop the human / place bond research approach in two ways:

1. Develop understanding of how human / place bonds can be conceptualized and identified, and how these bonds influence opinions about appropriate management of public wildlands; and
2. Evaluate and improve the application of this kind of understanding about human ties to place to inform planning efforts.

Following this chapter the dissertation develops the details of the human / place bond research approach. Chapter two presents the body of supporting literature that guides the research. It explores the foundations of human / place bond theory, describes studies that have considered this concept in natural resource management, and develops a framework for the choice of indicators to measure these bonds. Chapter three presents the methodology used to conduct the two case studies considered in the dissertation. Chapter four describes the results of the two case studies. The application of this research to improve consideration of human / place bonds in public land management decision-making is a primary purpose of this dissertation. To improve the application, a formal evaluation by managers and stakeholders following the criteria for successful public participation described by McCool and Guthrie (2001), was conducted for the first case study. The procedure and results of the evaluation are included in chapter four. Chapter five revisits the dual goals of the dissertation stated above and explores the conclusions that can be drawn from this combination of literature and case studies. It discusses what has been learned about researching human / place bonds, how the information from that research can be applied to management decisions, and how the methodology can be further improved through additional studies.

LITERATURE ON HUMAN / PLACE BONDS

There is growing evidence that people's bonds with public places influence their views about conflict and appropriate management solutions in natural resource management decisions (e.g., Brown, Reed, and Harris, 2002; Cheng, Kruger, and Daniels, 2003; Davenport and Anderson, 2005). This chapter develops a conceptual basis for the application of the human / place bond research approach to inform these contentious management decisions. The first section describes the history of social science efforts to develop the concept of human / place bonds along with its application in recreation and natural resource management. This background develops the conceptual description of the term 'human / place bonds' used in this dissertation. The remainder of the chapter describes the choice of indicators to measure human / place bonds along with previous findings that suggest their relationships to attitudes about public wildland management.

The human / place bond research approach developed in this dissertation is based on the assumptions that people's ties with public wildlands are difficult to observe directly, are expressed in multiple ways, and are related to attitudes about management of those places. This is an applied design, and its success is based on its ability to provide useful information to managers, stakeholders, their constituents, and all interested citizens in contentious planning situations. The purpose of this chapter is to describe the base of literature that supports this research. This chapter describes the work of scientists who have applied a variety of perspectives to the study of humans and place. These varied perspectives are combined to guide the theoretical foundation of the model. The final section of the chapter reviews the evidence of the potential effectiveness of the human / place bond research approach to inform natural resource planning about citizens' attitudes about management.

Human / Place Bond Framework

The original and ongoing study of human ties to place is multidisciplinary (Low and Altman 1992), with contributions from a number of basic social sciences, including sociology (Gieryn 2000; Gustafson 2001), anthropology (Steward 1955; Helms 1978, Orlove 1998, Little 1999), and geography (Grossman 1977; Relph 1976; Tuan 1976).

This multi-disciplinary origin has also led to various theoretical influences on current conceptual understanding of humans and place. Much of the human / place bond research related to the field of natural resource management has been influenced by the work of Yi-fu Tuan's experiential perspective (e.g., Hammitt, Backlund, and Bixler, 2004; Kyle, Graefe, Manning, and Bacon, 2004; Stedman, 2003a; Williams and Vaske, 2003; Eisenhauer, Krannich, and Blahna, 2000; Schreyer, Jacob, and White, 1981). In *Space and Place* (1977) Tuan describes the processes people engage in to ascribe meanings to their important places – the process of transposing 'space into place.' From his perspective this process of constructing meanings about places is dynamic and influenced by the human ability to learn from experiences. In Tuan's view of the transformation of space to place, construction of meanings begins in childhood and progresses throughout life, as both an idiosyncratic and cultural experience (Tuan, 1977). Tuan describes this experience-based connection between humans and their environment as 'topophilia' (1974, p. 93).

Low and Altman (1992) offer a conceptual framework compiled from a number of authors, across many disciplines, engaged in developing understanding of humans and place. They use the term "place attachment" for the concept of human ties to place, as well as for the title of the edited volume from which they developed much of their framework (Altman and Low 1992), and define it simply as: "the bonding of people to places (Low and Altman 1992, p. 2)." Hinting at the numerous perspectives on the concept of humans and place, they say that place attachment "subsumes or is subsumed by" other terms in the literature including topophilia, sense of place, and place identity, among others. Their view of place attachment involves an interaction between practice, cognitive, and affective components of expression, but they say that studies (as well as the term, itself) tend to emphasize the affective, emotional component. They describe the practice component as actions and behavior, the cognitive component to include thought, knowledge and beliefs, and the affective component as emotional attachment.

Schreyer, Jacob, and White (1981) studied the symbolic and functional aspects of place meanings in recreation. Following Tuan, they describe space and place as a symbolic and functional dichotomy, with the environment as the space for a particular activity, or the environment as the focal place. Williams references Tuan's experiential

influence in his application of place to recreation in saying that people form bonds with leisure places through a unique set of histories, rituals, and meanings, just as they might form relationships with other people (Williams 2002). Williams and Vaske (2003) describe place identity and place dependence as two sub-dimensions of place attachment that have been applied to the study of human / place bonds within recreation research. Earlier work by Williams, Patterson, Roggenbuck, and Watson (1992) describe place identity and place dependence as expressions of emotional bonds, suggesting firm rooting in Low and Altman's affective component of place attachment. Williams and Vaske (2003) describe place identity as an emotional form of expression and place dependence as a functional form, although they still considered both to be sub-dimensions of the overall concept of place attachment. They describe functional, place dependence, attachment as being based on a place's physical environment and its ability to support specific goals and meet instrumental values. This form of attachment requires an ongoing interaction for its maintenance. They describe place identity as an emotional bond that emphasizes the symbolic importance of a place. It contributes to ones own identity and increases the feeling of belonging. Unlike dependence, place identity does not require direct, ongoing experience for its maintenance, but does tend to change over time. They see place identity as an important contributor to views on environmental values and policies.

Proshansky, Fabian, and Kaminoff (1983) focus on the concept of place identity as a sub-domain of self identity, and they maintain that place identity is the source of place meanings that indicate what should happen, what the setting is supposed to be like, and how the individual and others should behave in it. They agree with Williams and Vaske (2003) that place identity evolves over time and is not dependent on ongoing experiences for its maintenance. They point out that as time after direct experience passes, place meanings tend to become over-simplified and idealized. Like Williams and Vaske, they see important connections between place identity and environmental views. The formation of a place meaning establishes the purpose and properties of that place and its appropriate uses. Groups with different place identities will perceive and attempt to solve problems associated with those places differently. A group with stronger place identity, for example, would be more likely to develop opinions about management based

on emotional rather than rational thought processes, and they would be less likely to evaluate tradeoffs in monetary terms than a group with weaker place identity. Thus, there may be a direct connection between place identity, potential for conflict between user groups with different types of human / place bonds, and views on management solutions.

Using Low and Altman's framework of human / place bond components, Jorgensen and Stedman (2001) tested a three-part model of human / place bonds that includes measures of conative (behavioral intention), cognitive, and affective expression. They use the term "sense of place" to describe a general concept that is characterized as an attitudinal response to the spatial setting. Their work differs from the three-component conceptual foundation of Low and Altman (1992) in limiting their consideration to attitude responses, as Low and Altman's framework considered actual behavior rather than behavioral intention. Similar to Low and Altman, Jorgensen and Stedman describe sense of place as a single dimension that includes conative, cognitive, and affective observable response components. These response components are different types of expression rather than separate domains of attitude. The three components of the conceptual model of sense of place are operationalized using Likert five-point agreement scales from the pool described by Williams and Vaske (2003) to measure place identity as an indicator of the cognitive component (belief that the self is invested in a particular place) and place dependence to represent the conative component (the perceived behavioral advantage of a setting). They included a third set of indicators, labeled place attachment, to represent the affective component (emotional connection to the setting). They tested their hypothesized model using structural equation modeling on survey data from lakeshore property owners in Northern Wisconsin. Their findings do not support three separate attitude domains. Their measures of attachment appear to be redundant with dependence and identity, and the best explanation of the data comes from a combined, overall measure of sense of place. They found place dependence to be problematic as an indicator of the conative component and recommend consideration of measures more directly related to behavior. The research approach in this dissertation improves on their model by considering onsite activity participation history as a direct indicator of behavior.

Kyle, Mowen, and Tarrant (2004) follow Jorgensen and Stedman's approach and test a structural equation model of human bonds to a recreation setting related to outcome preferences for use of natural settings on Cleveland Metropark properties. Rather than the attitudinal theory employed by Jorgensen and Stedman, however, they developed their model based on the motivational theory of Driver's REP scales designed to capture instrumental and spiritual values associated with nature-based settings. They operationalize the affective component of Low and Altman's framework with measures of place attachment similar to those of Jorgensen and Stedman (2001). Also following Jorgensen and Stedman, they adapted items reported by Williams and Vaske (2003) to measure place identity as indicators of the cognitive component, and items measuring place dependence to represent the conative component. They add a fourth set of indicators, measuring social bonding, to strengthen the conative component of their model. Like Jorgensen and Stedman, the model does not support a three-component conceptualization of attachment, but it does validate the place attachment scales described by Williams and Vaske as consisting of the two subcomponents of dependence and identity. Supporting the purpose of this dissertation, their conclusion suggests that a potential benefit of their research is an improvement in conflict negotiations and promotion of compromise through a better understanding of stakeholders' shared bonds to contested places. They conclude that it is often human bonds with public places at the center of issues surrounding resource management.

Central to this dissertation is the argument that human bonds with places are primary influences on attitudes and beliefs about their use. For managers, this means that people's opinions regarding conflict and management of public wildland places may very well be related to their bonds with those places. Managers are beginning to consider human / place bonds in social science assessments used to inform public land management decision makers (Beckley, 2003; Kruger, 2003), and as a way to gain understanding of diverse interests in natural resource conflict and management decisions (Yung, Freimund, and Belsky, 2003). A manager's interest in citizens' bonds with public places would include the nature of the various meanings associated with these places, the history of the people in the place, the resources needed to maintain existing and evolving

human / place bonds, and the conflicts that could arise between competing types of bonds.

Public wildland places that are unique or special in some way (those that are perceived as natural, rare, scenic, historic, etc.) may elicit especially intense feelings from people who care about them (Eisenhauer et al. 2000). Eisenhauer et al. (2000) identify some bonds with special places on public lands as being especially significant and intense. They state that these bonds to special places are unique, involving strong sentiments and heightened concerns about management. A planning situation where people have intense bonds to a special place is especially likely to lead to contention when other people have different types of bonds with the same place. In addition, the conflicts that arise in these special places may include significant barriers to agreeable management solutions because they involve deep emotions and relatively stable value differences. These intense beliefs and emotions reduce the likelihood of collaboration and compromise in the allocation of scarce resources and opportunities. Yellowstone National Park is a familiar example of a special place to most Americans, and it has been the subject of many controversial management issues from predator control to fire policy and infrastructure development. Winter use of the park is the focus of one of these public debates. Snowmobilers and some local business owners want to maintain unlimited access by private machines while other groups contend that the current amount of motorized winter use is too high for Yellowstone. Park managers struggle to address competing values and demands, including not just the types and amounts of access, but also the desires for more intangible values like independence, solitude, wildness, and clean air. The recognition of intangible values within human ties to special places (perhaps that they have not visited) is somewhat counter to Tuan's experiential perspective that has guided the design of many recreation studies, but this consideration broadens the perspective on informing public wildland planning situations. Citizens, and in particular local residents, may hold feelings of great importance toward nearby wildland places that they have not, or no longer visit (Gunderson and Watson 2007).

The design of the research in this dissertation is guided by the theoretical framework described by Low and Altman (1992), and the experience of Schreyer et al.(1981), Jorgensen and Stedman (2001), Williams and Vaske (2003), Kyle, Mowen, and

Tarrant (2004), and others. This research model follows Low and Altman's (1992) framework of behavioral, cognitive, and affective types of expression of human / place bonds. The term 'human / place bonds' is used in this dissertation to describe human interactions with specific places embodying all three of these forms of expression. Low and Altman (1992) refer to the general concept of human interactions with places as 'place attachment,' although they acknowledge that most of the work on place attachment has been focused on the affective component, and that the name itself emphasizes this component. Jorgensen and Stedman (2001) describe the general concept as 'sense of place,' and that name also seems to emphasize a cognitive or affective response. The term 'human / place bonds' is used in this dissertation because it is less restrictive in its implication of form of expression, and is used by Low and Altman to *define* place attachment in their framework. In this dissertation 'human / place bonds' is intended to represent the most general term encompassing all three forms of expression of human interactions with place outlined by Low and Altman (1992).

Indicators of Conceptual Components

Although the concept of human / place bonds is expressed in only three primary ways, it is difficult to observe and measure directly. As a latent concept, researchers typically rely on measuring it indirectly through the use of indicators (Watson, Glaspell, Christensen, Lachapelle, Sahanatien, and Gertsch 2007). Jorgensen and Stedman (2001), Kyle, Mowen, and Tarrant (2004), and Williams and Vaske (2003) use psychometric scale items within survey research to assess place dependence, place identity, and several other sub-components thought to indicate expressions of bonds, although they have not adequately represented the conative and cognitive components in these psychometric measures of place attachment. An appropriate set of indicators can shed light on a latent concept from a number of perspectives, some more directly than others. In an applied context, indicators of a latent concept must be relatively inexpensive to measure and conceptually straightforward to interpret. This presents a tradeoff in the search for indicators to represent a concept. Crowding is an example of a latent concept in recreation management that demonstrates the tradeoff in the choice of indicators. The number of encounters is an indicator that is often used to assess and monitor crowding in

recreation settings. The encounter indicator is relatively easy to measure and monitor over time. However, encounters may not directly translate into a person feeling crowded. Other factors, such as the behavior of the other people they encountered, could be more influential toward the feeling of crowding but also more expensive to measure and monitor, and more difficult to interpret.

The choice of indicators used in this dissertation is guided by the applied goal to improve the consideration of human / place bonds in natural resources management decisions. The chosen set of indicators should be easy to monitor, valid in its representation of the latent concept, have a reliable set of measures based on a history of use in natural resource management research, and be related to opinions about management. To provide a robust set of measures this dissertation uses three general types of indicators in quantitative surveys to assess human / place bonds. These three types of indicators fit the above criteria for applied research and together more fully represent the behavioral, cognitive, and affective forms of expression in Low and Altman's framework. The three types of indicators include: 1) on-site activity participation, measuring the behavioral component; 2) assigned values, representing cognitive beliefs; and 3) place attachment representing the affective component. These concepts have all been previously considered in research applied to recreation and natural resource management and methods have been established for their measurement. This approach is unique in combining these three concepts as the primary indicators of human / place bonds, and in segmenting the public based on these bonds for the purpose of developing understanding about public opinions in contentious planning decisions. Combining these indicators offers a robust and diverse set of measures, each with a history of application in natural resource management studies, to better reflect the multidimensional nature of human / place bonds than a traditional single-focus method. The following sections will describe each of these three types of indicators.

On-site Activity Participation Using on-site activity participation as a measure of behavior indicating human / place bonds certainly conforms to Tuan's experiential theory of bond formations. The experiences of on-site activity participation often lead to feelings of emotional attachment to place (Kyle et al. 2003, Williams and Vaske 2003)

and other expressions of human / place bonds. For example, Hammitt et al. (2004) focused on place bonding in their research on trout anglers, and found that different experience use histories result in different types and degrees of place bonding. Similarly, Kyle, Graefe, Manning, and Bacon (2003), using measures of place dependence and place identity, found that activity involvement predicts the types of attachments to place that develop among hikers on the Appalachian Trail. Stedman (2002) found that attachment to place and place meanings influence visitors' willingness to participate in activities that were perceived as appropriate to maintain or enhance the setting. Eisenhauer et al. (2000) also show that recreation activity participation is of primary importance in developing people's connections to special places.

Activity participation is a practical indicator as it is easy to observe and measure (relative to something like attitudes) and is often already collected within ongoing monitoring efforts of public wildland managers. Recreation management of settings and conflicts has traditionally taken an activity focus in efforts to accommodate visitors to public wildlands. The Recreation Opportunity Spectrum planning framework focuses on providing a range of settings based in part on appropriate types of activities (Manning 1986). The management focus is on substitutability, or the idea that areas with like attributes can provide substitute activity sites (Eisenhauer et al. 2000). Hendee, Stankey, and Lewis (1978) tie activities to the importance of specific places in describing one of their primary principles of wilderness management - favoring activities that are dependent on wilderness settings.

The list of activities that is included in a survey questionnaire of human / place bonds should include the range of locally important activities that occur in the planning area. These are activities, including recreational and economic, that are permitted or monitored by the managing agencies and that are relevant to the current planning situation. The list is developed through consultation with managers and analysis of qualitative data from local residents. The measurement of activities need not be standardized across studies, but greater detail results in more precise indices. In the human / place bond research approach a survey respondent is typically asked to indicate from a list of activities the ones they have participated in at the place in the study. Respondents are also asked to distinguish between those they have participated in

recently (within the past season) or in the past. The following illustration shows the measurement of the first six of 14 activity items on the Yakutat case study questionnaire (Appendix B has the full Yakutat questionnaire and Appendix C has the full version of the Darby case study questionnaire):

Q1. Which of the following activities have you personally done along the Situk River? <i>(Check all that apply)</i>		
	In the past year	or In your lifetime
Walking or hiking	<input type="checkbox"/>	<input type="checkbox"/>
Subsistence fishing	<input type="checkbox"/>	<input type="checkbox"/>
Recreational or personal fishing	<input type="checkbox"/>	<input type="checkbox"/>
Commercial fishing	<input type="checkbox"/>	<input type="checkbox"/>
Guiding or outfitting	<input type="checkbox"/>	<input type="checkbox"/>
ATV riding	<input type="checkbox"/>	<input type="checkbox"/>

This format is somewhat different than might be used to measure activity participation for a typical national forest recreation visitor. Unlike recreation visitors from greater distance, local users of public lands may have difficulty counting the ‘number of total trips in your lifetime’ or even the ‘total number of trips in the past year.’ Many local residents visit these public lands every day or several times each week. There is too great a variation in use rates across the local population to design measures of activity participation that capture the level of detail found in typical onsite recreation visitors studies. The more general approach illustrated above provides adequate detail for conducting a factor analysis of activity types for use in community segmentation analysis in the human / place bond research approach.

Factor analysis of activity items during the analysis phase of the human / place bond research approach reduces the survey list to a more manageable set of groups of similar activities that occur together. As activity participation is an indicator or the expression of human / place bonds one grouping that might emerge from the factor analysis of activities could reflect sources of conflicting behaviors on public lands. While a particular respondent may participate in one or more of these groups of activities,

it seems most likely that conflict, and resulting management concerns, will occur between users that participate exclusively in one group or the other. For example, the factor analysis might identify two main types of recreation activities on a forest that tend to occur together and that are highly variable across the sample of respondents. These groups of activities might be labeled 'motorized' and 'nonmotorized' based on their item makeup. While a particular respondent might participate in both of these general types of activities, managers would likely see conflicts being particularly likely between hard-core participants in each of these activity types.

Assigned Values Cognitive beliefs are the second form of expression considered in the human / place bond research approach. This concept is assessed in survey research through ratings of importance of various assigned values associated with a particular public wildland place. Assigned values are based on a person's belief system and their internally held morals and values. Because values develop from the internal belief system, the cognitive component represents a relatively stable aspect of human / place bond expression. The values one assigns to a place may be more consistent over one's lifetime than the choice of recreation activities or forms of attachments to a particular recreation place. In contrast to activity participation and attachments to place, assigned values are less dependent on direct on-site experiences for their formation, and are more dependent on social interactions to influence the internal belief system (Stokowski 2002). Stokowski suggests that there is a cultural connection in human / place bonds, based on common history, values, and beliefs that are shared across a community and held in memory. This connection develops through language and discourse and is a social rather than intrinsic process. Butz and Eyles' (1997) define places as 'centres of felt value' and 'centres of experience and aspirations of people' that represent a set of shared values. They refer to the shared ties to place among members of a speech community, saying that people who have a common history in a place are likely to share certain orientations toward that place, which are reproduced through communication (1997, p. 6).

Stokols (1990) provides guidance on description of value categories and selection of assigned value indicators in a discussion of three philosophical orientations of people toward the environment, including the minimalist view, the instrumental view, and the

spiritual view. The minimalist view assumes very little interaction between the environment and the people within it. This is not a prevalent view in modern society, newly focused on human impacts to global climate, but it may appropriately describe views held by people with casual bonds to some places at a local scale. The instrumental view is a functionalist perspective that the environment is a means to an end; for example it may be used to fulfill economic objectives necessary to achieve a set of higher goals. The spiritual view looks at the environment as an end in itself. People are drawn to a place by its intangible qualities rather than because they see it as a tool to be used for a material purpose. For these people, the environment takes on symbolic social meanings that are acquired over time through associations, interactions, and activities. These contrasting views can help guide the development of a set of assigned value items that can identify people with these orientations, as well as provide insight to the interpretation of results of opinions about management based on these types of orientations.

Intangible values, such as the existence and bequest values of Yellowstone National Park or the Arctic National Wildlife Refuge, may form in individuals regardless of whether or not they visit on-site. Gunderson and Watson (2007) demonstrated that people form bonds with wildland place regardless of whether or not they visit, but they also found that people assign values to places differently depending on whether or not they visited. Their subjects tend to consider places on the Bitterroot National Forest important even though they have not visited. They are likely to assign intangible, intrinsic, historical and cultural types of values to places they have not visited and to value those places at a broader, landscape scale. Thus, the consideration of assigned values as a component of human / place bonds broadens the consideration of these ties beyond the activity behavior and attachment indicators, which are more dependent on direct experiences for their formation. Kaye describes the effort to protect what is now the Arctic National Wildlife Refuge as emerging around a set of arguments based on assigned values related to wildlife, recreation, science, cultural heritage, and bequest to the future (Kaye 2006, p. 102). He categorizes these values as being based on tangible benefits to self and society as well as intangible “symbolic associations” which are not dependent on actually visiting the refuge for their development. In 1956, Olaus Murie used the term “precious intangible values” during an expedition of the Sheenjak River

Valley (now in the Arctic Refuge) to describe one of the primary reasons to support protection of the area (Kaye 2006, p. 82).

Assigned values can be divided into descriptive categories like economic, non-economic, on-site, off-site, existence, historic, cultural, environmental health, etc. The most general categorization might be as functional/instrumental/tangible on one side and symbolic/intrinsic/spiritual/intangible on the other. Because the formation of assigned values is described as a social process within a community, appropriate descriptive categories vary by place. Therefore the human / place bond research approach develops these categories empirically from responses to items covering a larger range of possible assigned values. The comprehensive list of items is developed from previous studies and refined by the consideration of local qualitative data indicating prominent descriptive terms. Respondents are asked to rate the importance of each listed item on a four-point scale from ‘not important’ to ‘very important.’ The typical set of items included in these ratings covers a range of tangible and intangible values, including recreation, environment, wildlife, economic, spiritual, and cultural. The following illustration shows the measurement of five of the assigned values on the Darby case study questionnaire:

Q2. How **important** to you are each of the following values that may be associated with the Bitterroot National Forest? *(Circle one response for each type of value that best represents the importance you place on it)*

	Not at all Important	Slightly Important	Moderately Important	Very Important
Watershed protection	NI	SI	MI	VI
Economic value of timber resources	NI	SI	MI	VI
Economic value of recreation visitor spending in the area	NI	SI	MI	VI
Spiritual or emotional value	NI	SI	MI	VI
Cultural and historical value	NI	SI	MI	VI

Attachment to Place The term ‘attachment to place’ as used here is most closely associated with the description by Williams and Vaske (2003) of a concept representing a psychometric assessment of a person’s emotional bond to a place. The term place attachment, as used in natural resource management, has been characterized to include the subcomponents of symbolic and functional meanings (Schreyer, Jacob, and White, 1981), or the related subcomponents of place identity and place dependence, respectively (Jurowski, Uysal, and Williams 1997). The consideration of human ties to place in current natural resource management research is commonly operationalized through survey research using psychometric assessments of attachments to place. A reliable set of psychometric scale items has been established to measure the place dependence and place identity subcomponents of attachment to place (Williams and Vaske 2003). These authors tested six place identity and six place dependence items, including the following (“x” is replaced with a particular place name):

Place Identity

- I feel “x” is a part of me.
- “x” is very special to me.
- I identify strongly with “x”.
- I am very attached to “x”.
- Visiting “x” says a lot about who I am.
- “x” means a lot to me.

Place dependence

- “x” is the best place for what I like to do.
- No other place can compare to “x”.
- I get more satisfaction out of visiting “x” than any other.
- Doing what I do at “x” is more important to me than doing it in any other place.
- I wouldn’t substitute any other area for doing the types of things I do at “x”.
- The things I do at “x” I would enjoy doing just as much at a similar site.

While the items listed above are commonly applied to wildland recreation studies, measures have also been developed to assess attachment to one’s community. Jurowski, Uysal, and Williams (1997) assessed residents’ attitudes about tourism development related to types and strength of attachments to their community. Respondents rated a series of Guttman-type scales, including impressions of feelings for place, being from the place, importance of what happens in the place, and attachment to the place. The

resulting composite index of attachment is associated with opinions about resource impacts and management decisions. Individuals with strong attachments are more likely to evaluate economic and social impacts of nature-based tourism positively, the environmental impacts negatively, and to feel positive about the overall benefits and costs. Kyle et al. (2004) found that recreationists with the strongest attachments to a place are also the most sensitive to social and environmental influences on the setting.

The Montana Community Tourism Assessment Process (CTAP) was developed to provide guidance for small communities considering tourism development options for their area. This evaluation process has been used in numerous small communities throughout Montana (e.g., Christensen and Nickerson 1996). The process includes survey research techniques to assess local residents' opinions about tourism development as well as their psychometric evaluations of community attachment and economic dependence. While not conforming with the more specifically defined place dependence and place identity items in recreation research, the CTAP community attachment items fit within the somewhat more generic functional and symbolic categories described by Schreyer et al. (1981). Examples of items used in the tourism assessment surveys to measure community attachment include:

Functional

- Tourism would help my community grow in the right direction.
- The overall benefits of tourism in my community outweigh the costs.
- I benefit financially from tourism development in my community.
- My community is becoming overcrowded because of increased tourism.

Symbolic

- If I had to move away from my community, I would be very sorry to leave.
- I'd rather live in my community than anywhere else.
- I have strong ties to the community that I live in now.

The two communities represented in the case study research for this dissertation are similar to the types of communities typically evaluated in the Montana CTAP project. They are both small western communities with economies that have potent to be heavily dependent on nonresident visitation driven by the presence of nearby public wildlands. To explore the potential types of emotional attachment formed with nearby public lands,

the survey questionnaires developed for the case studies in Yakutat and Darby both include items derived from the recreation attachment scales as well as from the community attachment scales described above. The Yakutat questionnaire included 12 total emotional attachment items and the Darby questionnaire included 11 items. The following illustration shows the measurement of some of the place attachment items used in the Yakutat case study questionnaire:

	Strongly Disagree	Disagree	Agree	Strongly Agree	No Opinion
I personally benefit financially from non-local sport fishing on the Situk River.	SD	D	A	SA	X
No other place can compare to the Situk River.	SD	D	A	SA	X
I would rather live in Yakutat than anywhere else.	SD	D	A	SA	X
If I had to move away from Yakutat, I would be very sorry to leave.	SD	D	A	SA	X
The Situk River is becoming overcrowded because of more non-local sport fishing.	SD	D	A	SA	X
I am very attached to the Situk River	SD	D	A	SA	X

Combining Indicators of Human / Place Bonds

The study design uses the combination of the three different types of indicators described above to provide a robust representation of the expression of human / place bonds. The three types of indicators are included because they are measurable, relatively easy to monitor, commonly used in natural resource management research, and each has a history of relevance to opinions about management. Like the history of place research, they reflect a broad set of disciplines, and unlike most studies, they provide

representation across all three components of expression in Low and Altman's human / place bond framework (see figure 1).

The development of the concept of human / place bonds in this dissertation includes the consideration of multiple indicators because it is argued that they represent a latent concept that is difficult to observe directly in all of its complexity. The work of Giuliani and Feldman's (1993) supports a multiple-indicator, latent concept, in their findings of numerous processes involved in associating persons to place, including biological, psychological, experiential, and cultural. The literature presented here suggests that human / place bonds are dynamic and evolve from cultural, family, and individual influences. They vary in types and intensities, some are strong and some are weak, some emphasize tangible benefits and direct interaction while others emphasize intrinsic values that may be formed both off-site and through direct experience. The focus of the conceptual model on a combination of behavioral, cognitive, and affective components of expression to understand human / place bonds is consistent with the types of visitor characteristics often considered in recreation management studies. This framework goes further in simultaneously considering these three components of expression to develop understanding about the public's views on management.

The human / place bonds considered in the following case studies are limited to those formed between residents of small local communities and nearby public wildlands. The studies do not consider numerous other types of place bonds, such as those formed with the built environment of homes and communities described by many authors on place (e.g., Gieryn 2000; Manzo 2003; Proshansky et al. 1983). As human / place bonds is a broad concept, the scope of consideration must be limited by the purpose of the application. The human / place bond research approach described in this dissertation is limited in scope by its purpose, which is to assist managers and the public to develop understanding of how these bonds are related to attitudes about management and preferences for conditions of public wildland places. Therefore, the work focuses on indicators that seem most related to management issues, and through statistical analysis that will be described in the methods chapter, it focuses on indicators that provide the most variation and ability to discriminate across the population of the study community.

Human / Place Bonds and Attitudes about Management

There has been a history of research in recreation management linking each of the three types of indicators of human / place bonds with attitudes about management. Certainly the greatest efforts have been focused on understanding the link between activities and preferences for management. Typical of many recreation resource management studies, Warren (1985) found important differences in attitudes about conditions and management preferences at the Arctic National Wildlife Range based on activity participation of the recreation visitors. For example, his research showed that hunters are most sensitive to sightings of other groups, while non-hunting recreationists are most sensitive to light aircraft sightings. Watson, Niccolucci, and Williams (1994) also studied conflict between different activity groups in the John Muir Wilderness. They found that perceptions of conflict are related to the way visitors define a place in terms of place attachment and experience use history. They found an asymmetrical type of conflict between activity types, with the way hikers define a place influencing their perceptions of impacts of encounters with stock users. Along with preferences for conditions and experiences of conflicts with other users, support for management options is firmly tied to activity participation. Vogt and Williams (1999), for example, show that attitudes about fees are related to camper / day-use activity type, and found that campers in the Desolation Wilderness are more consistently supportive of fees to maintain current conditions rather than to enhance facilities and services.

Along with common findings of links with activity participation, there is ample evidence that the development of values assigned to a place greatly influences perceptions about its management. Wilson (1999) showed that the way the environment is described can serve to attach external values as part of place identity during struggles for land-use rights, and that this perceived identity can be a political process that can serve to appeal to broader interests. Schreyer, Jacob, and White (1981) in studying recreation use and environmental meanings in national parks concluded that managers need to understand various functional meanings (similar to assigned values) attributed to public recreation places in order to find solutions to conflicts. Future planning efforts in the Arctic National Wildlife Refuge will be aimed at developing understanding from visitors about their perceptions of the importance of the assigned values expressed by the

original supporters, as well as their perception of the importance of other values that may have developed contemporary significance. Refuge managers are interested in how these perceptions of assigned values are related to views on management options. For example, how is the perceived importance of the founding values of the refuge (wildlife, recreation, science, cultural heritage, and bequest to the future) related to the desire for more convenient access and infrastructure development? This understanding will help inform the development of general management and wilderness recreation plans for the Arctic Refuge (Roger Kaye 2007, personal communication). The consideration of assigned values to understanding human / place bonds complements more traditional measures in natural resource management by considering assigned values that may form without direct experience or contact with a specific place. This type of indicator may be particularly suitable to account for attitudes about the management of special places on public lands that are rich in symbolic meanings such as designated wildernesses, wildlife refuges, nation parks, and national monuments.

Measures of place attachment have also commonly been used to understanding views on recreation and resource management issues in both developed and wilderness landscapes (Eisenhauer et al. 2000; Jurowski, Uysal, and Williams 1997; Kyle et al. 2004; Williams et al. 1992; Williams and Vaske 2003). Research has shown that it is likely that recreationists will disapprove of management attempts at conflict resolution based on the substitutability principles of the Recreation Opportunity Spectrum when they have strong emotional attachment to specific special places on public lands (Eisenhauer et al. 2000). When a recreationist has a place bond with a strong affective component a manager may find it difficult to encourage substitution behavior based on the availability of other suitable recreation opportunity settings. Hammitt et al. (2004) compared four classifications of trout anglers on place bonding and substitution behavior. The classifications were based on amount and concentration of experience use history in trout angling participation and included: inexperienced, visiting, local, and veteran. Not surprisingly, they found that more experienced and more local anglers have higher levels of place bonding. They also found that visitors have a higher propensity for substitution than locals. Interestingly, they found that more experienced anglers are more likely to exhibit substitution behavior than beginners. The group of experienced anglers from

outside the local area may have developed an intense activity focus in their place bonds that allowed or encouraged substitution, while local residents, regardless of activity focus had stronger emotional place bonds that limited their propensity for substitution behavior.

Hay, in a study conducted in a small ocean-side community in New Zealand, found evidence supporting Tuan's experiential perspective in his work on intensity of place attachments (Hay 1998). He demonstrated that attachment changes in quality and intensity over time, and through life stages. In his study newcomers to the community have similar types and intensities of attachments as native-born children (whose attachments have not had time to fully develop). However, over time community, historical, and cultural connections influence how differing types of human / place bonds progress. Local children, and newcomers with historical ties to the community, develop more intense and multi-faceted bonds, while the bonds of newcomers with no previous connections to the community seldom progress in this manner. Hay (1998) found that human / place bonds change over time, these bonds may develop in qualitatively different ways, and they may be influenced by a number of internal and external factors. He observed that respondents with the strongest place attachments hold generational, social, and cultural ties to the land and community, whereas tourists and transients with limited residency are less inclined to report strong emotional and spiritual ties. The current research includes measures of respondents' length of residence in their community and state, thus providing an opportunity for testing the convergent validity of the attachment to place measures that are used. This type of test is similar to the method used by Williams and Vaske (2003) who considered the number of past visits as an independent test of convergent validity of place attachment among recreation visitors.

The assessment of human / place bonds is intended to inform managers about the public's opinions regarding resource management on public lands. Social dilemmas are often driven by perspectives that are not well accounted for in the economic principle of decision making embodied in rational choice theory with its emphasis on assigned, tangible values (Ostrom 1998). From a human / place bond perspective, this point is illustrated by the many stories of 'land rich and money poor' farmers and ranchers who could sell their land and live comfortably on the profits, but choose instead to continue working for low profits because of a special bond with their home and culture. Previous

studies using each of the three indicators of bonds described above have found links between human ties to place and attitudes about management. The combination of these findings offers support for the argument that when conflicts arise over use of public wildland resources individuals' attitudes about appropriate management responses are influenced by the nature of their human / place bonds. The literature in this chapter presents substantial evidence of the validity of this argument. Ultimately, the study of human / place bonds may provide managers with insight about the underlying causes of conflicts in contentious planning situations and provoke innovative solutions through greater mutual understanding.

While the purpose of these investigations is to inform decision making, the process of resolving conflicts over the management of public wildlands is political in nature. The human / place bond research approach is designed to inform that process rather than serve as a democratic 'voting' procedure to supplant it. The terms 'politics of place' and 'contested nature' refer to processes that occur as various individuals and institutions attempt to influence place meanings. A place can attain shared social and political meanings over time through association with particular activities and groups (Williams 2004; Wilson 1999). Stokowski describes how social actors attempt to shape the contested meanings of places through language, discourse, and social context. These processes influence how we make decisions in recreation and natural resources management; as for example, when the politics of place in tourism development contend that the economic benefits of destination development outweigh negative impacts (Stokowski 2002). Fitting with the goals of this study to inform managers about place bonds and related attitudes about management, Stokowski concludes that understanding the processes of place meaning formation can reveal strategies for challenging existing social values and resolution processes, thus allowing more appropriate consideration of important human / place bonds in management decisions.

The human / place bond research approach case studies include several types of survey questions to assess respondents' attitudes about conditions and preferences for management options. The data from these questions provides opportunity to relate types of human / place bonds to these public expectations. Both study questionnaires include sections for respondents to evaluate potential conflicts with other users, current

conditions, and preferences for management options. Of these three types, the questions on preferences for management are most directly related to the overall goals of the study to understand preferences for management based on human / place bonds, but all three types provide insight to respondent attitudes about management of these public places. The evaluation questions are adapted from previous research and modified to reflect local conditions primarily through consultation with local managers. Examples of each of the three types of evaluations are presented below. The first example is from the Yakutat case study questionnaire showing how the evaluation of interference from other users is assessed.

Q3a. Has any person, group of people, or organization ever interfered with your relationship with the Situk River? *(Check all that apply)*

- | | |
|---|--|
| <input type="checkbox"/> Commercial fishers | <input type="checkbox"/> Non-local sport anglers |
| <input type="checkbox"/> Subsistence fishers | <input type="checkbox"/> Local recreationists |
| <input type="checkbox"/> Motorized boaters | <input type="checkbox"/> Professional river guides |
| <input type="checkbox"/> Managers, law enforcement officers, ranger patrols | |
| <input type="checkbox"/> Other (specify) _____ | |

b. Please describe the problems or types of interference. *(If there were none, go to Q4. Write on the back cover if you need more room to explain)*

The next example shows the two questions used in the Darby case study questionnaire to evaluate current management-provided services and opportunities.

Q6. Evaluate the current **amount** of management, services and facilities in the Bitterroot National Forest, compared to what you would prefer. *(Circle one response for each)*

The current amount is:

	Way too low	Somewhat too low	About, right	Somewhat too high	Way too high	Don't Know
Recreation facility maintenance	WL	L	R	H	WH	X
Road and trail maintenance	WL	L	R	H	WH	X
Recreation travel information and regulation signs	WL	L	R	H	WH	X
Toilet facilities.	WL	L	R	H	WH	X

Q7. Evaluate the current **opportunities** in the Bitterroot National Forest for each of the following types of recreation activities, compared to what you would prefer. *(Circle one response for each type of recreation opportunity)*

The current opportunity for this activity is:

	Way too low	Somewhat too low	About, right	Somewhat too high	Way too high	Don't Know
Hiking, backpacking	WL	L	R	H	WH	X
Horseback riding	WL	L	R	H	WH	X
Bicycling or mountain biking	WL	L	R	H	WH	X
ATV, motorized recreation	WL	L	R	H	WH	X

The following illustration shows an example of the management preference questions used in the Darby case study.

Q8. Tell us whether you **oppose or support** the following recreation and travel management options for the Bitterroot National Forest. *(Circle one response for each statement that best represents your level of support or opposition)*

	Strongly oppose	Oppose	Not Sure	Support	Strongly support
Provide more opportunities for trail riding open to ATV's and motorcycles, but closed to larger motor vehicles.	SO	O	N	S	SS
Provide more opportunities for using full-size four-wheel-drive vehicles on primitive, non-maintained roads.	SO	O	N	S	SS
Provide more opportunities for hiking and equestrian use on trails closed to motorized use.	SO	O	N	S	SS
Open more currently gated roads to year-around motorized access.	SO	O	N	S	SS
Open more currently gated roads to motorized access during the summer months.	SO	O	N	S	SS

Operationalizing Human / Place Bond Research

Conducting applied research using the human / place bond model to understanding opinions about management requires both the conceptual basis described above and the situated knowledge of the local community. Measuring human / place bonds following the foundation of literature described above requires an instrument that considers the multi-dimensional characteristics of these bonds as well as the influences on them. The scale of the research must be appropriate for local geographic, cultural, economic, and political conditions. Statewide, or national public surveys would generally be ineffective in understanding bonds to most specific places. Opinions about management options for local public lands must be measured and interpreted from a perspective that is informed by past studies and scholarly theory (e.g., the influence of

contested place meanings on attitudes about management) as well as by local conditions in order to provide relevant information to a planning process.

The research in this dissertation includes the use of a quantitative-based questionnaire that is informed by understanding gained from prior analysis of locally-based qualitative data. The quantitative questionnaire includes measures within the three types of human / place bond indicators described above, each with multiple items that are developed based on situated qualitative findings. The three measures include activity participation, values assigned to a place, and attachments to place. The literature in this chapter along with qualitative findings during each case study informs the development of the survey questions. The questionnaires contain three separate sections of questions to assess human / place bonds. Activity items and assigned value items (e.g., family, economic, cultural, spiritual, etc.) are worded to reflect the local culture and situation. Attachment to place items, reflecting affecting expression of bonds, are adopted from established psychometric scales measuring place dependence, place identity, and community attachment items, but are also selected and worded to reflect local conditions. For example, the Yakutat case study includes more items measuring community attachment related to tourism than the Darby case study because that issue is so central to management of the Situk River. The wording of those community attachment items refers to non-local sport fishing rather than tourism because that is how local residents think about nonresident visitation.

This review of literature provides evidence that the indicators representing the three components of expression are related to the overall concept of human / place bonds, to each other, and to attitudes about management (e.g., Kyle et al. 2003; Kyle, Mowen, and Tarrant 2004). Researchers working with managers of public wildland resources must recognize and understand important human / place bonds and develop ways to incorporate this understanding of bonds between humans and special places into meaningful conflict resolutions and more acceptable resource allocation decisions. This form of inquiry may be able to identify management solutions that protect and enhance meanings that are appropriate for the public purpose of the places being managed. The following chapters describe two case studies that measure human / place bonds and

attitudes about management options, and then explore the ability of this methodology to contribute to the planning process.

METHODS

This chapter describes the application of the human / place bond research approach within the two case studies presented in this dissertation. The chapter describes the qualitative and quantitative data collection and analysis methods used in the research, and the limitations of the case studies and general study design. The research in this dissertation follows a perspective described by Tashakkori and Teddlie (1998) as a pragmatic paradigm that adapts the study design to the problem and situation. The human / place bonds considered in these studies are situated at a relatively small community scale and they are evaluated on relationships to opinions about specific place-based management dilemmas. Although these case studies demonstrate that the human / place bond approach is widely applicable, it must also be adaptable to these specific local situations to be effective in informing local management decisions. This pragmatic methodology utilizes both qualitative and quantitative research to develop understanding about unique local human / place bonds and residents' concerns about management of nearby public lands.

The steps in the human / place bond research approach were developed through a progressive history of studies on people's bonds to public places (Borrie et al. 2002; Brod and Christensen 1998; Watson, Patterson, Christensen, Puttkammer, and Meyer, 2004). The dissertation builds on work by Brod and Christensen (1998), who developed understanding of differential support for tourism development decisions on and off a Montana Indian reservation based on measures of place attachment similar to those used in the current case studies; it is also influenced by the work by Borrie et al. (2002), who segmented the public in Oregon and Washington based on measures of their opinions about management and on their activity participation on National Forest lands in the two-state region; and it is based on research by Watson et al. (2004), who developed depth of understanding about jet boaters' bonds to the Salmon River through qualitative interviews used to inform the design of a quantitative survey that was able to build understanding about activity types, participation history and symbolic meanings of jet boating on that specific river.

The Case Study Design

The dissertation uses a case study design to apply and refine the human / place bond research approach. Using a case study design allows for both the contextual and generalizable components of human / place bonds to be considered. Flyvbjerg (2001) says that the most advanced understanding and new discoveries in science come from close association with the context and intense observation made possible by a case study. Flyvbjerg (2001, p. 71) also says “the case study produces precisely the type of context-dependent knowledge which makes it possible to move from the lower to the higher levels of the learning process.” The study of human / place bonds, particularly aspects relevant to attitudes and preferences for management of a specific wildland place, is necessarily situated in the context of the community and its nearby natural environment.

While much insight has been gained by the generalizability of past recreation visitor studies of attachments to place, the focus on human / place bonds in this study is situated in local communities and nearby National Forest System wildlands. Because these bonds are contextual, the study of local residents will not produce results statistically generalizable to a larger population of individuals outside the community - neither to nonresidents with bonds to the local place, nor to individuals who form bonds in general with public wildland places. It may, however, contribute to general understanding about local human / place bonds and views about contentious recreation planning situations on public wildlands. A case study design will appropriately account for the development of both contextual and generalizable knowledge.

Gerring defines a case study as “an in-depth study of a single unit (a relatively bounded phenomenon) where the scholar’s aim is to elucidate features of a larger class of similar phenomena (Gerring 2004, p. 341).” He further emphasizes that a case study intensely focuses on one unit for the purpose of understanding a larger class of similar units. Gerring says that a single case study is defined by consideration of a single unit of analysis, but he also says that there may be any number of observations (N), from multiple sources, within one case study population such as a community. These observations can occur at the community scale, as in examining census data, or at a smaller scale that can be aggregated to the community, such as with data from surveys of individuals. He states that the case study design only precludes across-unit N by

definition, but does not limit a large number of within-unit observations. Within-unit observations refer to all cases that lie at a lower level of analysis relative to the inference under investigation.

To strengthen the design, two case studies are included in the overall study (similar to including two independent experiments in an experimental design, according to Yin, 2003). These two cases were chosen for their similarities and differences on planning issues and in context, with both providing opportunity to compare and generalize evidence toward theoretical propositions leading to better understanding of the connections between human / place bonds and preferences for management and conditions.

Gerring (2004) says that a case study is a way of defining cases not a way of analyzing cases, and he sees no necessary limitation of using only qualitative data in a case study design, a view also supported by Yin (2003). However, it is also appropriate to use a mixed methodology in case study design. Each case study in the overall study design of this dissertation relies on a mixed-methods model using a sequential structure (Tashakkori and Teddlie 1998), where the methods are applied in sequence to develop understanding of human / place bonds in the local community population and its application to management decisions. Tashakkori and Teddlie (1998) list a number of reasons for choosing a mixed methodology. Using their list as a guide, the mixed method model in these case studies, which use a sequential combination of scoping, in-depth interviews, quantitative surveys, and debriefing interviews, benefits from a number of these reasons including: 1) triangulation of results, 2) complementary methods examining overlapping and different aspects of a phenomenon, 3) development, as in using the methods sequentially to inform the method, and 4) expansion – using mixed methods to develop breadth and depth of understanding.

The first case considers a collaborative planning effort to address sport fishing and motorized boating on the Situk River within the Tongass National Forest in Southeast AK. The second case is focused on recreational off-highway vehicle (OHV) planning efforts on the Bitterroot National Forest. Each of these case studies assesses contentious planning issues about motorized recreational use and general access to public wildlands, and each includes a concerned and divided population of local residents.

Other similarities include: a rapidly changing population and an ongoing shift in the local economy from dependence on National Forest System lands for resource extraction to dependence on them for recreation and other lifestyle amenities. Major differences between the two cases include culture, historical context, climate, types of activities, and types of economic opportunities. The two cases are briefly introduced in the next section, while a more detailed description of their methods is presented following a general overview of the steps used in the human / place bond research approach.

Yakutat Case Study

The Yakutat case study was conducted to help clarify management issues faced by a collaborative partners group that was organized to develop a management plan for the Situk River on the Tongass National Forest in Southeast Alaska. The development of a management plan for the river had been contentious for many years, with issues centered on commercial, subsistence, and sport uses of the Situk salmon and steelhead fisheries. Among the river's stakeholders, there were tensions over the allocation of guide/outfitting permits, tourism development, motorized boating, access to the river, and the allocation of the fisheries to the different types of use. The collaborative partners, consisting of the various levels of government with jurisdiction over the watershed, were interested in applying social science to develop understanding of management issues among residents of the local community of Yakutat. Following the human / place bond model, the Yakutat case study develops understanding in two general areas – 1) the nature of human / place bonds between adult Yakutat residents and the Situk River, and 2) their views on management of the river and how those views differ by the types of human / place bonds they have with the river.

The field work for this case study began in the fall of 2004 with qualitative interviews in Yakutat, and continued through the winter of 2005 with a quantitative survey. Yakutat is the only community near the Situk River and the area is not connected to the outside road system so access to the area is limited to sea or air. This 'closed system' made it fairly easy to identify local residents. The population of interest for the Yakutat case study is defined as adult residents of the community of Yakutat during the 2004 - 2005 study period.

Darby Case Study

The Darby case study was implemented to help clarify the social conditions and concerns over management of motorized and nonmotorized recreation uses of the Darby Ranger District on the Bitterroot National Forest in Southwestern Montana. Following the human / place bond research approach, the Darby case study combines information about respondents' interactions with the Bitterroot National Forest in terms of their: 1) activity participation, 2) assigned values, and 3) attachments to place. These components are then used to identify segments of the community having similar human / place bonds with the local Bitterroot National Forest ranger district. As with the Yakutat case study, the Darby study evaluates and compares the human / place bond community segments on their views about management and planning for recreation uses of these public lands.

The Darby case study began as a result of controversy over the proposed Trapper – Bunkhouse forest stewardship project on the Darby Ranger District. The Trapper - Bunkhouse stewardship project included a variety of management proposals for the part of the district near the communities of Darby and Conner, Montana. The proposal included a travel management component that was designed with the new national travel management rule in mind, and it proposed to formally designate a series of OHV routes – most on currently existing roads and trails. The plan's formal designation of these routes was particularly troubling to some people in the local community, while it was supported by many OHV users. A series of four public meetings, referred to as the Trapper Bunkhouse Public Discussion Sessions, were held at the Darby Community Center in the fall of 2006. The goal of the process was to bring community members together to increase understanding of others' values and activities, to foster public dialogue, and to develop recommendations to the Darby Ranger District about the Trapper - Bunkhouse Stewardship project. The meetings were arranged and sponsored by the Montana Forest Conservation and Experiment Station independent of the US Forest Service. Representatives of the Forest Service, including District Ranger Chuck Oliver, attended the meetings to participate in discussions and answer questions.

The focus on travel management and the comments it generated at these meetings became the basis for the Darby case study of local human / place bonds with national forest lands in the area. The population represented in the Darby case study includes

adult residents of Ravalli County that live within the area south of Hamilton included in postal zip codes 59827 (Conner) and 59829 (Darby). This area encompasses most of the residences within close proximity to the Darby Ranger District, and is estimated to include less than 5,000 adults in the population. Ravalli County residents living in the Hamilton zip code area and areas south of Darby and Conner are excluded from the target population in order to focus study resources on residents living closest to the Darby Ranger District and the proposed Trapper Bunkhouse stewardship project.

Human / Place Bond Research Process

The two case studies presented here follow the same general model of inquiry. The methods used in each case study differ slightly because of the situated nature of human / place bonds, because planning resources and needs vary between cases, and because the sequential case study design includes the opportunity to adapt the methods based on experience from its application. A comprehensive, mixed method, multi-variate study design is used to develop and apply understanding about human / place bonds to inform contentious recreation planning problems.

The first stage of data collection uses qualitative methods to examine historic documents and conduct key informant interviews. The initial scoping is followed by more directed, semi-structured interviews or other type of primary qualitative assessment. The purpose of the scoping and qualitative assessment phase is to develop understanding of issues, key stakeholders, management options, and locally relevant terminology for indicators of human / place bonds to the study area. The second stage is the quantitative data collection phase. The understanding of issues and terminology from the qualitative phase is used to develop survey questions about locally-relevant indicators of activity participation, assigned values, and attachments. The qualitative work also develops knowledge about locally-relevant management issues and options. Survey questionnaires are then administered to a representative sample of the population to collect quantitative data on human / place bonds and corresponding views about management. The systematic collection of a representative sample of data about local human / place bonds and recreation management issues allows for greater understanding about the prevalence

of views across the community as well as the relationship between types of bonds and views about management.

Following data collection, the quantitative survey data are analyzed to identify relationships between human / place bonds and attitudes about management options. The data analysis follows three general modeling steps. In the first step factor analysis is used to reduce the list of human / place bond indicator items, measured in the survey questionnaire as activity participation, assigned values, and attachments to place, to a set of sub-components within these general categories (e.g., ‘motorized activities,’ ‘economic assigned values,’ ‘functional attachments’). The second data analysis step uses the human / place bond sub-components from the factor analysis as input to cluster analysis. The cluster analysis simultaneously considers factor intensity scores across all human / place bond sub-components to classify individuals into segments of respondents with similar types and intensities of human / place bonds. The third step statistically compares opinions about management issues and solutions across the community segments derived from the cluster analysis. The combination of statistical methods used to develop the quantitative results is an appropriate set of tools to account for the multiple types of expression of human / place bonds. Factor analysis identifies latent components of human / place bonds that are otherwise difficult to observe and measure, while cluster analysis identifies segments of the local community having similar human / place bonds based on a combination of qualitatively different types of indicators. After the analysis of results is completed, the final step is to implement the results by interpreting and reporting them to managers and the community to help inform public land management decisions. Managers and stakeholders should be given the opportunity during this final phase to evaluate the methods, and the application of study results. This provides ongoing feedback on effectiveness and efficiency of this social science application to inform the planning processes.

Qualitative Methods

There are a number of sources of qualitative data in a community that can be used to develop insight about local characteristics of human / place bonds. Initially, a background investigation of the situation considers historical documents such as

ethnographies, planning meeting notes, and written public comments. Early consultation with managers and stakeholders is also important and involves key informant interviews to gain further understanding of the planning situation and the need for information to resolve issues. Following these preliminary investigations, the qualitative phase is focused on obtaining structured input from members of the study population. In Yakutat semi-structured qualitative interviews with a purposeful sample of community members were conducted at this stage. In Darby this depth of understanding was developed through the use of written comments generated during the series of public meetings at the Darby Clubhouse. Indicators of human / place bonds must reflect locally relevant terminology for activity participation, assigned values, and attachments, and that terminology is developed through the use of qualitative research techniques. The depth of understanding developed during this phase is used to inform the development of measures of human / place bonds and views about management for the quantitative data collection step that follows.

Yakutat Qualitative Data The Yakutat case study began with review of available background information such as a comprehensive ethnography of the community of Yakutat (de Laguna 1972), and records of public meetings and comments (US Forest Service, Yakutat Ranger District 2003a, 2003b, 2002, 1999), along with discussions with managers to provide background for designing questionnaire items. Background review was followed by a series of interviews with community members to develop deeper understanding of their unique bonds to the Situk River, their perceptions of conflict, and their opinions about management options. The Yakutat case study used a formal interview process with eight respondents to collect qualitative data. The eight interviews were conducted in Yakutat, AK between October 15th and 19th, 2004. Respondents include six males and two females, between the ages of 40 and 85, with four identifying themselves as Tlingit Indian and four identifying themselves as non-Tlingit.

A mix of key informant and purposeful convenience sampling methods were used in this qualitative phase of the Yakutat study. Interviewees were identified in three ways. The local Yakutat Tlingit tribal planner identified three community key informants for the researcher that were knowledgeable about management issues and would offer

differing viewpoints of conditions and preferences. The tribal planner described the purpose of the interviews to the three potential respondents prior to the researcher's arrival in Yakutat. Two additional key informants were chosen based on the researcher's familiarity with their positions of leadership in the community. The investigator chose another three respondents from the community at large to be interviewed. They were chosen to represent typical residents with a diversity of perspectives, likely somewhat different from those of the key informants. During the five days of contacts and interviews no one refused outright to be interviewed, though several requests were turned down due to time constraints. The interviews took place in the community at a variety of locations including a public building, local businesses, the community boat dock, a public park bench, and in a private home. Appendix A shows the interview protocol that the investigator followed for consistency across interviews. Topics covered include: general descriptive questions about the respondents, what the Situk River means and why it is important to them, what types of activities they pursue on the river, what types of conflicts they experience, and how they feel about the various agencies that manage the Situk River.

Darby Qualitative Data This case study does not replicate the process used in the Yakutat case study where a set of qualitative interviews were conducted with local community members. The Darby case study uses the input from participants in the Darby Clubhouse meetings as the primary source of qualitative data to inform the development of a quantitative survey instrument. Both sources provide suitable input for developing a quantitative survey. The more formal interview technique used in Yakutat allows the investigator to guide the interviews toward specific topics of interest and to probe the respondents with follow-up questions for depth of understanding about issues. The design of the Darby case study is more efficient and less burdensome on the public because the qualitative data collection was secondary to the purpose of the meetings and the written comments they generated. The Darby method also provides a wider range and greater number of relevant comments than the more intensive interview method used in Yakutat.

The Darby case study generated qualitative data from spoken and written comments made by the public at the Darby Clubhouse public meetings. This comment process is efficient at generating comments that specifically addressed the relevant topics. The meetings were well attended, with the final meeting including almost fifty interested citizens, nearly all having attending most of the previous meetings in the series. The majority of the discussions at the meetings were centered on the travel management component of the stewardship project. As travel management is currently a contentious and growing issue on the Darby Ranger District and a contentious component of the Trapper-Bunkhouse stewardship project, the focus of the meetings was anticipated but not necessarily limited by the facilitator. In addition to providing direct input to Forest Service managers, the discussions and recommendations that came out of these meetings serve as the qualitative data for the development of the foundational understanding for this study about local human / place bonds with public lands and concerns about OHV management on the Darby Ranger District.

Quantitative Survey Development

The qualitative findings from the two case studies presented above greatly influence the development of the quantitative survey instrument that is used to systematically measure human / place bonds and attitudes about management. While the concept of human / place bonds was developed in the literature chapter above and the general content of the survey instrument was developed through repeated applications in recreation studies, this section describes the contribution of the qualitative findings to the final format of the survey instrument in each case study. The process of incorporating the results of the qualitative findings is a progressive step between the qualitative and quantitative phases of the case study design. The qualitative findings are used to develop relevant lists, with appropriate local names, for 1) activities that residents participate in on the forest, 2) types of values they assign to these public lands, 3) appropriate descriptions for attachments to place items, and 4) relevant management problems and solutions. This section explains the development of items for the questionnaires in these four categories.

Activity Participation The measure of activity participation behaviors is the most common component of recreation studies. Some activity items are included with the same description in both of the Yakutat and Darby questionnaires, including:

- walking or hiking,
- picnicking,
- gathering plants, berries, mushrooms,
- hunting,
- motorized boating, and
- nonmotorized boating.

The remaining activity items included in each list are more distinctive to each study. Fishing is a main focus for Yakutat residents, who participate in ‘subsistence’ and ‘commercial’ as well as ‘personal or recreational’ types of fishing. They generally reserve the term ‘sport fishing’ for the activities of nonresidents. Darby residents simply go ‘fishing.’ In Yakutat, guiding and outfitting are an important and prevalent activity, while it was not mentioned in the Darby findings (although it is certainly important to some people in the community). In Yakutat it is sufficient to list ‘ATV riding,’ while in Darby that needs to be clarified to be more inclusive and to reflect only the legal version of the activity - ‘ATV, motorized trail use.’ Members of both communities participate in subsistence-type activities like ‘hunting’ and ‘collecting plants, berries, and mushrooms,’ but only the Yakutat study includes ‘harvesting eggs’ and only Darby residents use the study area for ‘gathering firewood.’ There are very few developed facilities on the Situk River, so Yakutat residents simply go ‘camping,’ while Darby residents can choose between camping in ‘developed sites’ and ‘undeveloped sites,’ Darby residents also might go overnight backpacking in the Bitterroot Mountains, while Yakutat residents rarely backpacked because there are no trails or places to walk along the Situk River. Bicycling, mountain biking, snowmobiling, and cross-country skiing are listed in the Darby study but not in the Yakutat study.

Assigned Values The types of values that local residents assign to the study areas are described differently in the two questionnaires. Items in this section differ because

they are described differently in the qualitative findings of the two studies, but also because the Darby study followed the Yakutat study and the process of measuring values was refined from the experience of conducting the first case study. For example, the Yakutat study measures general economic benefits, while the Darby study distinguishes between the economic value of timber and the economic value of recreation. Both studies ask about recreation, spiritual, and cultural values (although the wording of the items differ slightly). The Yakutat study includes subsistence activities under values as well as under activities because it is described in terms of values - economic, personal, and cultural by the interview respondents.

Attachments to Place The items measuring attachments to place generally reflect the two sub-components described in the literature as ‘functional’ and ‘symbolic.’ The items included in this section are adapted from two sources. Both case studies adapt the majority of their items from the dependence and identity sub-dimensions of place attachment described by Williams and Vaske (2003). Both studies also include community attachment items primarily influenced by nonresident tourism development (Brod and Christensen 1998), although the community attachment items are given greater emphasis in the Yakutat case study. Because the qualitative findings reveal a focus by some community members on the tourism benefits of recreation use of the Situk River, items are included in the survey instrument to explore aspects of functional attachment related to economic benefits of nonresident visitation to the river. The Darby study instrument focuses more on wildland recreation type dependence and identity attachment items adapted from Williams and Vaske (2003), but because of the strong association of the Bitterroot National Forest and the community, it also includes items to measure community attachment adapted from community tourism development work (e.g., Brod and Christensen 1998).

Management Options The management options included in the survey instruments reflect concerns and options from the qualitative interviews. Management options are also substantially derived from discussions with the managers to develop accurate descriptions of potential options as well as to ensure that options of importance

to managers are evaluated. The overall management concerns in Yakutat tend to focus on sport fishing and related motorized boating, while the emphasis in the Darby study is on issues related to travel management on forest lands.

Quantitative Methods

The study design within each case study uses a social science survey method, with questionnaires administered to a representative sample of the local population, to collect quantitative data. The quantitative data from these surveys are used to develop understanding of residents' bonds with local public lands and the link between types of bonds and opinions about management. A survey methodology, administered to a representative sample, allows the results (e.g., the amount of support for a particular management option) to be generalized to the population. Both studies use a questionnaire design that is printed in an eight-page folded and stapled booklet format following general design recommendations of Dillman (2007). Copies of the questionnaires are included in appendices B and C for the Yakutat and Darby case studies, respectively. The contents of the two survey instruments are similar, but not identical. Both instruments contain the same four types of questions, including activity participation, assigned values, attachments to place, and opinions about management options. The items within each type of question, however, differ to account for the situated nature of the local communities. The specific items were developed after analysis of the qualitative data.

The set of bond indicator variables used in the community segmentation are 'localized' using knowledge gained from the qualitative analysis. The sections of the questionnaires designed to measure human / place bonds collect three types of self-reported characteristics: activity participation behaviors, assigned values, and attachments to place. Each of the characteristics are measured with multiple items: 1) behaviors are measured as past or present participation in a list of locally relevant activities on the local forest lands, 2) assigned values are measured as the importance of different values or benefits associated with these national forest lands, and 3) attachments to place are assessed as the level of agreement with items describing different types of attachments to these local public places. The studies described in the literature above

were used as a starting point for the format and content of the three sets of indicator items in both case studies presented in this dissertation. These questions have been previously tested in research on recreation, place, community attachment, and local effects of tourism. They are adapted to local conditions based in the qualitative findings that preceded the quantitative survey in the two case studies.

Yakutat Quantitative Data The Yakutat case study questionnaire (Appendix B) is designed as a form to be filled out by respondents and returned directly to the field interviewers. Investigators contacted potential respondents in the community at homes and public places and either waited for them to fill out the forms, or left them and returned a short time later that day to retrieve the completed questionnaire. The goal of sampling these local residents was to obtain a sufficient number of responses to the questionnaire for good representation of the population and for being able to conduct statistical tests during data analysis. According to the Alaska Department of Fish and Game Community Profile Database (v. 3.12, 7/10/2001), the 2000 US Census estimated that Yakutat includes 234 households and 635 individuals. According to the census, about 30 percent of the Yakutat population is younger than 18 years old, leaving a population of about 445 adults, as the study considers only adult members of the community. A large population generally requires a sample of about 400 completed questionnaires to ensure statistical precision with a confidence interval of +/- five percent or less at a confidence level of 95 percent for most questionnaire items. Assuming an adult population of 500, it is estimated that representation of Yakutat's relatively small population requires a sample size of 217 for a finite population adjusted confidence level of 95 percent with a confidence interval of +/- five percent around statistical estimates.

A sampling plan was developed to randomly select occupied households in Yakutat to participate in the study. On-site data collection took place in Yakutat between February 28th and March 5th, 2005. Four interviewers generally worked in teams and went to randomly chosen residences according to the pre-determined sampling schedules. All adult members of targeted households that were home were asked to participate in the survey. Sampling results were reviewed daily during the interview process to monitor for necessary adjustments in order to ensure the sample reflected known demographic

characteristics of the population. As the sampling progressed, the criterion for targeting households was relaxed to include sampling from every, rather than every other, occupied household. Later in the week questionnaires were also distributed at public locations to respondents otherwise missed. The four interviewers worked a total of about 40 hours each between Monday and Friday of the fieldwork week. This process produced a total of 226 completed and usable questionnaires from community members. Refusals to participate in the study were minimal, with less than 10 percent of those asked not being willing to fill out or verbally respond to a survey read by the interviewer.

With completed questionnaires from almost half of the adult residents of the community (n=226), the data appear to provide a good representation of the overall population of Yakutat. Respondents reported ages ranging from 19 to 78 years old, with an average age of 43 years. On average, respondents had lived in Yakutat 60 percent of their lives: with a quarter of the sample living in Yakutat their entire lives and another quarter living in Yakutat less than 25 percent of their lives. The sample is split 42 percent female to 58 percent male, and 44 percent of the respondents indicated that they are Tlingit. These sample characteristics closely align with US Census and community estimates of population demographics.

Darby Quantitative Data The Darby case study questionnaire (Appendix C) is designed almost identical to the Yakutat survey instrument. However, this survey package includes a cover letter and return envelope and is designed to be mailed to potential respondents, who would then fill it out and mail it back. A random sample of names and mailing addresses within the two zip codes defining the population of interest was selected from the local phone directory to represent the population of Darby and Conner residents. All names listed for a randomly chosen household were selected for individual mailings. This was intended to help improve the representativeness of the sample by including more than just the first name listed, which was often a male householder. Despite this effort, it was still difficult to obtain a sample of names that was properly balanced between males and females, as there are a greater proportion of males listed by name in the phone directory than occurs in the general population. The criteria for determining the sample size is to maximize statistical accuracy within the constraints

of study resources. Following accepted social science protocol of a 95 percent confidence level with a five percent confidence interval, the target sample size needed to represent the Darby and Conner population was determined to be 325 returned and completed questionnaires. This sample size would provide descriptive statistical estimates for survey responses with a minimum accuracy of plus or minus five percent, 95 percent of the time when evaluating response means.

To ensure a high response rate to the survey, a modified Dillman (2007) survey methodology was used. Experience has shown that using this modified method in similar situations consistently results in return rates of at least 60 percent, which is usually sufficient to guard against nonresponse biases. The method used in this study consists of an initial mailing to the sample that includes an introductory cover letter, a questionnaire, and a postage paid return envelope. The initial mailing is followed one week later by a postcard thank you and reminder to return the questionnaire, three weeks after the initial mailing by a replacement questionnaire package, and seven weeks after the initial mailing by a final replacement package (cover letter, questionnaire, and postage paid return envelope).

The initial mailing was sent out November 15th, 2006 to a random sample of 530 names and addresses drawn from the telephone directory (Table 1). However, 217 questionnaire packages from the initial sample were returned because of undeliverable addresses. Many of the returned envelopes had postal messages indicating that the addresses did not have mail receptacles. It is thought that many of the residents at those addresses are likely served by post office boxes for mail delivery. To supplement the initial sample that was reduced to 313 by the undeliverable portion, a second sample of 123 names with post offices box addresses was drawn from the same telephone directory and sent out two weeks after the initial mailing. This sample was obtained from a separate listing at the end of telephone directory and includes all PO box addresses within the two zip codes that hadn't previously been used. The 'first wave' of mailings obtained a response rate of 66 percent from the deliverable addresses, while the smaller 'second wave' sent only to post office boxes obtained a 42 percent response rate. This resulted in an overall response rate of 60 percent and a final sample size of 245 completed surveys

from Darby and Conner residents. Table 1 summarizes the Darby case study survey sampling effort.

Table 1: Survey Sample Characteristics; Darby Case Study, 2007.

Questionnaire Sample	Initial Wave	Second Wave	Overall
Mailed Out	530	123	
Returned Undeliverable	217	31	
Returned Completed	206	39	245
Response Rate	66%	42%	60%

Analyzing Results

The two case studies collected both qualitative and quantitative data about human / place bonds and opinions about management of local public places. Prior to collecting the quantitative data or conducting statistical analysis, the qualitative findings were assessed for input on the design of the quantitative survey instruments. The qualitative analysis process is described first below because it occurs earlier in the overall process than the quantitative statistical analysis. Following the survey data collection, both case studies used the same statistical analysis and modeling process to assess human / place bonds and their correlation with opinions about management. The analysis of the quantitative questionnaire data was conducted using SAS statistical software, and required a series of statistical tools including: 1) regression analysis to impute missing values on variables to be used in subsequent modeling to prevent loss of incomplete case data; 2) factor analysis of the individual human / place bond indicator items to identify a set of latent constructs; 3) cluster analysis of respondents' factor scores to identify segments of the community with similar types and intensities of human / place bonds, 4) descriptive analysis of respondent characteristics within human / place bond segments, and 5) testing for significant differences in preferences for conditions and management of the local national forest lands across the human / place bond segments using multiple analysis of variance. T-tests with Bonferroni adjustments to control for overall type I error are used to test for significant opinions within each of the segments regarding conditions and management options. The steps used within each of these quantitative

analysis modeling tools generally follow the multi-stage data analysis decision process described by Hair, Black, Babin, Anderson, and Tatham (2006).

Qualitative Data Analysis

Qualitative data is useful for at least two purposes in the human / place bond research approach - to inform the development of the quantitative survey instrument, and to supplement the survey data to inform managers and the public interested in the planning effort. Qualitative data are primarily assessed by organizing comments according to topic and opinion, and by examining the range of comments on particular topics of importance, including activities, assigned values, attachments, and management issues. The data are examined for specific topics and for how those topics are described and named by the local public.

The Yakutat case study interviews were recorded and transcripts were typed from the recordings. All eight of the interviews were conducted, transcribed and analyzed by the author, while a colleague reviewed the transcriptions, analysis, and conclusions and offered confirmation and additional insight. The author recorded the eight interviews and typed transcriptions verbatim from the recordings. He also edited the transcriptions for accuracy by re-listening to the tapes while reading the typed version. This process generated an extensive amount of data - even with only eight interviews. To manage and organize this volume of information, QSR NVivo qualitative analysis software was used to code and organize the transcripts by topic as they emerged from the data.

The Darby case study qualitative data, consisting of comments and discussions that occurred at the Darby Clubhouse public meetings, were analyzed with the same objective of identifying emergent themes related to human / place bonds with the Bitterroot National Forest and concerns about its management. The volume of data collected from this qualitative process, was small in comparison to the Yakutat case study but they were shorter and more focused, with topics more easily organized and analyzed without the aid of the computerized qualitative analysis software.

The categories that were developed in the qualitative analysis are referred to as emergent topics because they were identified from analysis of the qualitative data rather than being pre-defined prior to analysis. This method is used to emphasize the

identification and description of situated elements rather than relying on more generic concepts and terminology. The emergent topics were identified and coded as they occurred in the text, with the development of categories guided by the review of literature and local background information, the investigators' personal experience in the community, and the study objectives (Berg 2004; Spradley 1979). This process of identifying emergent topics and the act of interpreting meaning from qualitative data involves subjective mental exercises. Together these characteristics of qualitative methodology have more potential to introduce investigator biases and perspectives into the study results than quantitative surveys, but in trade they offer greater depth of understanding of human thought and behavior than is possible with structured questionnaires. The overall design of this study, including a qualitative method to inform a quantitative method, utilizes the strengths of both while attempting to mitigate their limitations.

The results of the analysis of the qualitative data are presented for each case study in the results section. The results section presents examples from the qualitative data along with their interpretation from the analysis of the topics. The link between the qualitative findings and the quantitative questionnaire content is demonstrated by showing the development of the specific survey questionnaire items in the results section following the presentation of qualitative findings and prior to the quantitative results.

Quantitative Data Analysis

There are two general modeling phases in the analysis of quantitative data. The first is to segment the sample into groups with similar types of human / place bonds and the second is to assess differences in opinions about management across those segments. The segmentation is based on the indicators of human / place bonds that are measured in the survey sections on activity participation, assigned values, and attachments to place. The data is checked for errors and cleaned prior to beginning the actual analysis. In addition, missing values are estimated for human / place bond scale items using a process of imputation described below.

Missing Value Imputation Prior to the segmentation process, it is useful to conduct missing values analysis on the indicator variables. Imputation, using regression analysis, is a method for developing estimates of responses to indicator variables for study participants that did not answer all of the survey questions. The estimate for each missing value is based on the respondent's answers to other questions of the same type in the survey. If a respondent didn't answer any of the related questions, then no estimate of a missing value is calculated for that section. Because subsequent steps in the statistical segmentation model drop entire cases with any missing values, the missing values imputation procedure provides a useful, analytical technique for fully utilizing available data. The missing values imputation analysis used in these case studies is a two-step multiple imputation regression procedure provided in the SAS statistical package.

Factor Analysis of Bond Indicators Following imputation of missing values, the community segmentation process uses factor analysis as an intermediary step to summarize the data to provide a more parsimonious and interpretable explanatory model. Factor analysis identifies patterns between a large number of variables that can be represented by a smaller number of underlying components (Hair et al. 2006). The goal of this analysis is to identify sets of variables with response patterns that are most similar to each other and least similar to other variables being considered. In the research approach, this process identifies locally relevant sub-dimensions within each type of human / place bond indicator, increases understanding of difficult-to-observe latent bonds, and simplifies further analysis by reducing the number of variables being simultaneously considered. Reducing the number of variables to be considered in subsequent modeling is an important step for identifying statistically significant relationships in small datasets like those of the Yakutat and Darby case studies.

There are three general options for using the factor analysis results to reduce the number of variables considered in subsequent modeling. Each factor may either be represented by a surrogate variable, by a summated scale of variables loading highest on the factor, or by the factor score itself. The most valid representation of the data from among the three choices comes from the factor scores, while the primary disadvantage of this method is its lower reliability across applications (Hair et al. 2006). As the human /

place bond research approach uses a case study methodology that is intended to be a place-specific application, the concern about reliability of the scales beyond the local population does not apply. Therefore, factor scores provide the most valid representation and overall best choice for data reduction and subsequent modeling in this research model.

While using factor scores maximizes the validity of the empirical data reduction process within a limited population, the resulting scales are still subject to questions of validity within the theoretical context of the model. The objective of this validity assessment is to extend the consideration of scale contents beyond empirical evidence to include theoretical and practical considerations (Hair et al. 2006). The factors are subjectively assessed for content validity by checking the correspondence of the items to the theoretical constructs described in the literature. The content validity of the factors developed in the Yakutat and Darby case studies are assessed in the results section as they are identified, described, and labeled. The literature suggests that primary divisions in behaviors might be found among incompatible types of activities like motorized and nonmotorized, that assigned values might divide along tangible / intangible sub-dimensions, and that emotional attachments may be distinguishable by functional and symbolic sub-divisions. The full body of literature on the indicator types provides guidance for the assessment of content validity of the indicator factors. However, as human / place bonds are situated, so to are the relevant local sub-dimensions of the indicator types, and content validity based on theoretical sub-dimensions must be weighed against knowledge of local conditions.

Common factor analysis is used to identify groups of variables that are related to each other based on their common variance. After developing a suitable factor solution, the resulting factors must be rotated to improve their interpretability. An oblique rotation is used when possible (i.e., when an interpretable solution is found), as opposed to an orthogonal rotation that would impose an artificial restriction (uncorrelated factors) on the relationship between the human / place bond sub-components. Following the steps recommended by Hair et al. (2006), the factor analysis is an iterative process that adjusts the factor model until assumptions are met and an appropriate solution is reached. The resulting groups of variables, or factors, may not contain all of the original set of

variables, as some individual items are dropped during the iterative modeling process because they do not exhibit desirable characteristics for combining with any of the other items.

Following guidelines of Hair et al. (2006), the final factor solution is developed with a set of steps that are followed consistently for each factor analysis in the research approach. The first step in the process is to run an initial model with all variables of the same type to be considered (e.g., all of the activity variables are included in the initial model). The appropriateness of the factor model is assessed with the overall measure of sampling adequacy (MSA) indicator, which should be at least 0.7 for a good model. The MSA is also assessed for each variable, and if any fall below 0.5 the lowest one is removed, the model is re-run, and these steps are repeated until all included variables satisfy the minimum MSA criteria. The solution is then assessed for minimum commonality measures for each variable included in the solution. Measures of commonality represent the amount of variance of the variable accounted for in the overall solution. If any remaining variables have commonality measures below 0.4 they are removed in an iterative fashion as described above in the MSA assessment step. When all remaining variables meet the criteria of these indices, a final solution is developed, with the number of factors extracted being the minimum supported by the results of scree plot inspections.

As with the missing value imputations in the previous step, separate factor analyses are conducted for each of the three types of human / place bond indicators. The resulting factors, representing sub-components of the three indicator types, are labeled numerically from low to high based on their overall human / place bond index score. Each respondent is assigned a factor score for each factor that reflects relative weighted scores across all of the items in the factor. For example, a factor analysis of the activity participation items on a survey might find that ice fishing, cross country skiing, and trapping are closely associated with each other. Individuals that do one of the activities, typically do the other two at similar rates. The factor analysis assigns each individual in the survey a score for the 'winter activity' factor based on their participation rates across all three of the associated activities. The factors that emerge from this analysis must make sense, be interpretable, and they should naturally follow the established theoretical

concepts described above in the review of literature (i.e., they should exhibit content validity).

The reliability, or consistency, of the scales that are developed from the factor analysis can be assessed using a diagnostic reliability index known as Cronbach's alpha reliability coefficient. This index assesses whether or not all items included in a summated measure are consistently measured on the same numeric scale. The generally agreed on lower limit of this index is 0.70, although it may decrease to 0.60 in exploratory research such as the situated case studies in this dissertation (Hair et al. 2006). Although factor scores, rather than summated scales, are used in this research methodology, it is still useful to assess the Cronbach's alpha reliability of a summated scale created from the items loading high on the factors. The Cronbach's alpha for summated scales of the factor items is reported in the research results along with the factor score coefficients. Factor analysis in each case study found two factors for each of the three types of indicators of human / place bonds, for a total of six factors in each case study. The Cronbach's alpha index is acceptable for all 12 of the factors, with only one being above 0.60 but below 0.70, and the rest being well above 0.70.

Cluster Analysis of Bond Factors The next step after factor analyses of the indicators is to cluster analyze the factors that represent the underlying components of human / place bonds. Cluster Analysis is used to identify groups of respondents (representing segments of the population) with similar types and intensities of bonds with a specific public place. The two case studies use a k-means clustering procedure in the SAS statistical package for this analysis. The k-means procedure uses an iterative process (rather than hierarchical) to assign each individual respondent to a group having similar response characteristics across the bond components. The cluster analysis used in this study differs from the factor analysis in the way similarities are recognized and grouped. While the factor procedure groups variables based on their inter-item correlations, the cluster procedure groups cases together based on the similarity, or proximity, of their responses in multi-dimensional space (across multiple variables). This creates groups of respondents with similar responses across the entire set of human / place bond factors.

The combination of factor and cluster analysis is not completely objective and requires a number of intermediary decisions about methods and interpretations. It is important to assess the results of the analysis to determine if the final clustering solutions are interpretable. Successful clustering results are those that 1) identify distinctly different types of human / place bonds, 2) include a wide and somewhat evenly distributed set of community segments, 3) can be identified and compared based on characteristics other than those considered in the modeling (e.g., segments based on human / place bonds should also show differences in things like demographic characteristics), and 4) identify segments of the public with different views about how to manage the public place.

Analysis of Variance of Bond Segments' Attitudes When an effective cluster solution is developed, the analysis process can address the study objectives regarding developing understanding about the connections between bonds with public wildland places and opinions about their use and management. Both of the case study questionnaires include sections asking for respondents' opinions about current conditions, problems, and management options. These sections form the basis for statistical comparison of differences across the human / place bond segments.

There are three sections of the Yakutat case study survey designed to measure perceptions, opinions, and preferences about the Situk River management (refer to Appendix B). The first section, consisting of question Q2 and question items Q3aa through Q3ag, measures perceptions of inappropriate behavior and interference from other people with respondents' bonds with the Situk River. The next section uses question five to ask respondents to evaluate the amounts of current services, facilities and management on the Situk River and question six to measure preferences for amounts of fishing and motorized use on the river. The third section includes items in question 13 assessing opinions about management regulatory options designed to address conflicts on the river. The Darby case study uses similar measures to assess respondent opinions about management (see Appendix C). Questions four and five of the Darby survey ask respondents to identify inappropriate behavior and impacts from other users and managers, questions six and seven ask about current use levels and conditions, and

question eight assesses the level of support for different types of management options to address motorized and nonmotorized travel issues.

These sections are each tested for statistically significant variation across the human / place bond segments using a multiple analysis of variance (MANOVA) model. Significant results from the MANOVA analysis offers evidence of the validity of the research approach to effectively segment the public to inform managers about preferences, and also provides input to the interpretation of the survey results offered to managers and stakeholders in the final study reports. The overall tests for significant differences are followed by t-tests within each segment to determine significant opinions *of that group* regarding conditions and management options. The significance of the t-test comparisons are subjected to Bonferroni adjustments to account for the multiple comparisons of items and control for overall type I error. Within group t-tests of attitudes are used rather than post hoc comparisons with Tukey's or Scheffe's adjustments for type I error because of the applied focus of the research approach. It is more useful for managers to understand which items have significant support or opposition rather than to understand significant differences in attitudes about specific items across segments.

The validity of the research approach to meet the study objective is supported by the MANOVA tests performed within the Yakutat and Darby case studies. In fact, every one of the MANOVA tests found significant differences in attitudes about conditions and preferences for management across the community human / place bond segments. These results are summarized here and included in results section tables. The MANOVA models are not corrected for the finite populations within the case study communities because the correction is not widely available in statistical analysis packages. The effect of the population correction is to decrease the standard error around the mean, and therefore, a finding of significant differences without the correction may be considered a conservative or highly significant finding. In the Yakutat case study MANOVA tests suggest the following significant differences across segments:

- question 5 - preferences for management and development ($F = 1.7, p = 0.004$),
- question 6 - preferences for fishing and motorized use levels ($F = 2.1, p \leq 0.001$),
- question 13 - opinions about management options ($F = 2.5, p \leq 0.001$).

In Darby, the MANOVA models suggest:

- question 5 - types of interference and problems ($F = 2.1, p < 0.0001$),
- question 6 - level of management services and facilities ($F = 2.2, p < 0.0001$),
- question 7 - level of current recreation opportunities ($F = 2.1, p = 0.0002$),
- question 8 - views about management options is significant ($F = 3.0, p > 0.0001$).

Overall, these tests show that there is a significant effect attributable to segment membership on opinions about recreation opportunities and management on the public lands in these case studies. Taken together the consistent significant findings of these MANOVA's provide convincing evidence of the validity of the human / place bond research approach to identify community segments that differ in their expectations about specific public places.

Limitations of the Human / Place Bond Research Approach

There are numerous limitations with conducting one or two case studies, each at one point in time, for understanding the concept of human / place bonds and its role in wildland resource planning. The literature presented in this dissertation has described human / place bonds as complex, situated, dynamic, and evolving. At the least this requires a fresh look at each application. As was described in the study design section, the statistical results of the quantitative surveys cannot be generalized beyond the local community in which they are conducted. However, through utilizing a consistent structured (although adaptive) methodology, each of these case studies, as well as future case studies will contribute to a generalized body of knowledge about human bonds to wildland places and their components, as well as to the understanding of how to use this to inform management decisions.

The multi-staged, mixed method design allows important aspects of local human / place bonds to emerge during the qualitative phase so that they can be included in indicator items and evaluations of management in the survey instrument. However, it is still likely that because of study limitations, such as a small qualitative sample size in Yakutat, the lack of direct interviewing in Darby, or inadvertent investigator influences on a subjective process, important aspects of the local human / place bonds were

overlooked in the case studies. In addition, allowing topics to emerge and adapting quantitative measures to fit these concepts raises questions about the validity of these untested measures. This concern is mitigated by relying on the study's theoretical framework to guide the slight modification of previously tested quantitative measures of indicators of human / place bonds to reflect the current local circumstances.

The scope of this project also has limitations beyond those of the general design. First, the studies were completed before the results were able to influence final recreation management plans on the forests, and therefore, participants can evaluate the success of the process but they have limited ability to assess the overall impact of its application. Second, in both case studies it would be very beneficial to the understanding of the situation and the local human / place bonds if there were better data on all types of uses of the wildland places being studied. The research effort to inform planning on the Situk River recognized the importance of obtaining comprehensive information about use, across residents and nonresidents, since the original work began in 2002. However, because of the logistical difficulty and expense of on-site data collection in the Situk River watershed, the original goal was modified to consider the uses of the river in two phases, with the first effort targeted at visiting recreationists (Christensen, Watson, and Whittaker 2004). For these nonresidents, it was possible to get a good random sample of their use by intercepting them at the commercial airport in Yakutat – virtually everyone that visits the Situk from the outside passes through the airport in Yakutat. Getting a detailed understanding of Yakutat resident use is more difficult because local use is more variable and dispersed: locals take many more trips per year, during more seasons, use more parts of the river, and participate in more types of activities than do visitors from the outside. The use of public wildlands by local residents tends to be much more dispersed, both spatially and temporally, than visitor use, and it is also considerably more varied in type and amount. These factors require more expensive study designs to obtain accurate information about local residents' on-site use, and this level of resource allocation was not available for the current study.

The primary data collected in the case studies are of two general types – qualitative and quantitative, and goals of analyses of these data are for two different types of generalizable understanding. The strength of the qualitative interviews is to develop

knowledge about the types of human / place bonds that occur in the community and the types of concerns about interferences with human / place bonds and preferences for conditions that community members hold. The strength of the quantitative survey is to develop understanding of the distribution and prevalence of these views in the local community. Because the goals for generalizability are different, the sampling techniques are also different, with the qualitative samples being much smaller and less representative of the community, demographically, than the highly representative quantitative samples.

The sampling methods used in Yakutat did not reach the seasonal residents. Previous recreation research on the Situk River considered the perspectives of visitors (Christensen et al. 2004). The current study focuses on resident perspectives. There may be a fairly large population of seasonal residents in the community who are not represented by either of these studies. Seasonal residents are only in the community in the summer time, while the case study sampled during other times of the year in order to catch the majority of full-time residents at home. Many of the seasonal residents are commercial fishers, but increasingly, some are second homeowners and recreational anglers. Three of the four Non-Tlingit respondents that participated in qualitative interviews in the case study had moved to Yakutat permanently after starting out as seasonal residents. This suggests that as the temporal commitment to this place increases, many of the current seasonal residents may transition into full-time resident status. As seasonal residents are likely very different than full-time residents in their place bonds and concerns about management, this limitation in sampling suggests the need for cautious interpretation and application of results likely to influence management decisions limiting this under-represented group. However, their uses and concerns may be somewhat better represented in the results of the Situk River Nonresident Visitor Study because many of them are involved in recreational use of the river in a similar manner to nonresidents.

The sampling limitations found in the Yakutat case study are similar to factors limiting the understanding of local human / place bonds in the Darby case study. Similar to local use of the Situk River, Darby residents interact in many different ways with their local public lands. It would require considerable resources and effort to get a comprehensive understanding of actual current activity participation patterns on the

Bitterroot National Forest by local residents. This type of understanding of use should continue to be a priority in these two places, but it has been beyond the scope of these case studies to address. Although these studies do not adequately reflect the variety of use patterns of Yakutat or Darby residents on nearby public lands, they do assess current and past yearly participation rates for common recreation activities as well as other critical aspects of human / place bonds between local people and their public places. This treatment of activity participation is a limiting factor in fully understanding the behavior in these places, but it does provide a foundation for future assessments of local recreation use patterns. A reiterative method, adapting to limits of current efforts by building future capacity, is similar to the idea of adaptive management to environmental issues using incremental responses, monitoring, and adaptive learning (Scoones 1999).

An incremental research approach may be sensible in a wildland planning environment with contentious issues and limited budgets. An incremental approach is consistent with an open democratic process (Albaek 1995) and therefore, may be more acceptable in collaborative efforts. It may be the most appropriate method to develop understanding of the moving target of local human bonds to public places and the application of that information to wildland planning decisions. This dissertation develops an application framework from an existing body of theory on place in the social science of natural resource management. As an applied social science model that tries to account for human / place bonds, this work may suffer from trying to consider too much. The pragmatic paradigm, with its encouragement of mixed method/mixed model designs, may tend to define problems too broadly. Developing this technique incrementally and reassessing for each case study helps to provide useful boundaries in the scope of the pragmatic paradigm. The following chapter presents the results of the two case studies considered in this dissertation. The lessons learned from these studies are considered with this incremental perspective. The second case study adapts its methods based on experiences from the first study, just as future research is recommended based on the progression of knowledge following both of the studies considered here.

RESULTS

This chapter presents qualitative and quantitative results from the two case studies included in the dissertation. The qualitative findings are described first. The purpose of the qualitative research is to develop deeper understanding of local characteristics of human / place bonds as well as local perspectives on appropriate management of local public lands. This understanding is important both to inform the development of the quantitative survey instrument as well as the interpretation of the results. The qualitative results are presented as summaries of information and example quotations gathered from public meetings, written comments and formal meetings that occurred prior to the development of the quantitative survey instruments. Following description of the qualitative findings from both case studies, the chapter describes the questionnaire items adapted from those findings, and then presents the quantitative survey results. The quantitative results include a description of the segmentation process followed by comparisons of preferences for management across the human / place bond segments. More detailed results are presented in appendices D and E of the dissertation and in reports to managers of the ranger districts in the case studies (e.g., Christensen and Watson 2006b).

Yakutat Study Qualitative Findings

Findings from the Yakutat case study consist primarily of data gathered from eight formal, semi-structured confidential interviews with residents of the community. The findings are supplemented by results from informal interviews with managers and review of historical documents. Analysis of qualitative data began with reading transcripts and identifying unique topics and comments. Each comment was determined to be relevant to the analysis if it could be categorized under one of the two main topic areas of the study: 1) characteristics of human / place bond components of activities, values, and attachments; and 2) influences on those human / place bonds related to management, such as regulations and conflicts with other users. These results were examined for trends and major groupings as well as for topics of great importance to a few respondents. Knowledge gained from this process was incorporated into the design of the survey instrument that was administered in the subsequent step.

The analysis of the Yakutat community qualitative findings reveals a number of important characteristics of human / place bonds with the Situk River. Respondents mentioning activities largely organize them around a long history of fishing on the river, which they describe in several different ways. Many respondents reported having participated in subsistence, commercial, and ‘personal’ fishing on the Situk River at some point in their lives. They often use the term ‘sport fishing’ to refer to activities of visiting nonresidents rather than to something they would do themselves for recreation on the river. Respondents also talk about the importance of family activities such as picnicking, and seasonal subsistence activities like hunting, picking berries, and harvesting eggs. The following quote describes some of these activities along with the importance of economic, historical, and family values associated with the river. It also describes bonds with the river that suggest this person has strong functional and symbolic forms of attachments to place.

...people who are interested in guiding for, or just taking people and friends out to see the river, to fish on the river, just for personal use, their own enjoyment. And then for subsistence, that is where we go for our kings and our sockeye and silvers. And it is really important to us as commercial fishermen, because we derive so much of our income from there, and it is just so easy to get to...So for subsistence use it gives us all of the fish that we could possibly want. Then recreationally, it is just a wonderful place to be. A great place to bring your children to and, I raised my younger children out there. It is just a big sand box, and easy to keep track of – the kids, while my husband and I fished. It is important to all of the user groups for all these different reasons. It’s really special to my family, too, because that’s where my grandmother and my grandfather had their honeymoon.

There are differences in the types of bonds that are formed with the river and the emphasis and importance that is placed on the bond components and sub-components. While some individuals have difficulty identifying any single most important value associated with the Situk, the following two quotes are clear about the primary values and types of attachments these individuals have with the river.

Foremost would be an economical relationship. Being that I have the charter boat company, my business is directly related to sport fishermen

coming to fish here. And the way my business works is that the returning sports fishermen, which is the biggest part of my business, know to come during the time of year when they can fish both salt water and fresh water.

Ah, it's economic actually, being in business, ah I'd say a good 70% of our customers utilize the Situk. And therefore, when they get paid, I get paid.

While the quotes above describe the importance of tangible, economic values associated with the river to these respondents, they also reveal a focus on a functional type of attachment to place. In contrast, the following quote is from an individual that seems to place a greater emphasis on a symbolic type of attachment to the Situk River than the two respondents quoted above.

I float it, I fish it, I work on it, I mean it's ah, it's a part of my life, it is every day...It is like an old friend...I mean it is hard to put in perspective what it is, but you know it's, you could say my life kind of revolves around it...

The population of Yakutat is about equally divided between the native Tlingit and non-Tlingit cultures that coexist and, in some ways, blend their values and place meanings. The interviews suggest that respondents from both cultures like their neighbors and perceive shared common bonds with the Situk River that they do not feel are shared by nonresident visitors. However, the Tlingit residents are from a culture with much deeper roots in the community, and that long temporal association is reflected in bonds that include strong feelings of symbolic attachment and high emphasis on cultural and intrinsic intangible values. The following quotes are from Tlingit respondents describing long personal activity histories and strong symbolic attachments developed through generations spent on the river.

And so, ok. My grandfather's people came to this area before 950 years ago. And I started fishing when I was eight years old. Does that help you any, compared to you guys that have been fishing here 20 years and 30 years?

Yea, the river means quite a lot to me. ... I fished on it commercially for years, and we also use it as our subsistence resource. So my family goes out every year. So not only do we use it for those purposes, but we use it for camping out and getting the family together, to do things together. Every since I was a little kid, you know, Situk and Ahrnklin has been a place that I know of where my family, you're talking about my parents and my grandparents and people before them, has always had a close relation to the Situk River. They used it for the same purposes that I just described.

These quotes suggest that a long temporal commitment is instrumental in developing bonds with the river, and it also suggests that these bonds can change and evolve over time. The river may mean different things to someone at different stages of their lives. The first of the two quotes directly above also indicates some of the tension in the community between individuals with longer and shorter-term bonds with the river.

Along with insights on the types of bonds that Yakutat residents form with the Situk River, the qualitative research attempts to better understand the concerns that residents have about current conditions and management options. The following quotes describe views about management factors that influence the human / place bonds between local people and the Situk River. The Situk River is jointly managed by the US Forest Service, The US Fish and Wildlife Service, The Alaska Department of Natural Resources, The Alaska Department of Fish and Game, The Yakutat Tlingit Tribe, and the City and Borough of Yakutat. The difficulty of Situk River management, involving these numerous government agencies and a long history of controversy and change, is revealed in these descriptions.

The Alaska Native Claims Settlement Act of 1971 (ANCSA) and the Alaska National Interest Lands Conservation Act of 1980 (ANILCA) together brought about profound, recent, and ongoing changes in local land ownership, management, and use of the Situk River and its watershed. The Tlingit respondents in the qualitative interviews all lived through these changes to their local place, while the Non-Tlingit respondents moved to Yakutat subsequent to the 1980 Act. All respondents who had something to say about these ongoing changes agree that these federal acts have led to a frustrating set of land management circumstances.

The ANILCA legislation protecting rural subsistence rights on federal lands and waters along with conflicting protections under the Alaska state constitution have contributed to unconventional management arrangements. A non-Tlingit respondent's description of the current situation indicates the difficulty of dealing with multiple management authority.

Well, the management of it, the fight over it, you know between the state, and the feds, and the local people, and that is the interesting, intricate, you know very intricate how everybody thinks they own it, they run it, they enforce it, other enforcers. It's ah; they're just kind of different. I've never been to a place where there is actually the Forest Service acting as a fish cop too... Yeah, unique and also obnoxious.

The following individual would agree with the last quote that the current management situation is less than desirable. This respondent is a Tlingit elder, who would like to see the management of the river better reflect local, native concerns. He conveys a strong sense of symbolic attachment, and historical/cultural intangible values associated with the river, as well as a sense of functional attachment toward its resources. His description of his bond with the river conveys a desire for exclusive ownership that is not supported by current management.

We'd probably take over all of the management of the Situk area. It would either be the city and borough, or you know working in conjunction with the tribe. As long as it is brought down to the local level where we can see what's actually happening, and begin to manage it in a way that would be beneficial to the people. And then realize the benefits from the resources ...we'd invite people to come here and use it, yeah. But, the river really belongs to us. We've used it, you know, since time immemorial. It has been the source of our resources for hundreds or thousands of years.

Another Tlingit respondent also expresses sentiments that current management of the river does not protect the types of human / place bonds that he feels toward the Situk.

...They put a sign there and says "Hey, we're going to take you to jail, or we're going to fine you," see. And our grandfathers' land [said with great emphasis]! Land where our grandfathers' bones are here! Not down, not in New York. Not wherever. Here!...One day we woke up and says "well,

by proclamation of the president of the United States this is now a big park called Tongass National Forest.” See? So everything in here, we have to live with.

Both of the above quotes suggest not only dissatisfaction with current management of the river, but also the improbability that current planning efforts for the river will be able to resolve the types of concerns held by some Tlingit members of community. The following quote suggests that working toward a more unified or coordinated form of management among agencies, along with sensitivity toward the types of long-term human / place bonds held by elder Tlingits, might help.

Park Service, Glacier Bay National Park, wildlife preserve, Tongass National Forest, Saint Elias, and Wrangell National Park. All around us. And each one of them working their separate management regulations. So that you just go nuts trying to straighten out who is who, or whose land are you standing on. And they all threaten you. “We’re going to fine you so much, or we’re going to send you to jail.”

The following respondent, a younger non-Tlingit member of the community also feels frustration with the current management situation that is often unpredictable and controversial even among managers. These inconsistencies in management negatively influence this respondent’s bonds with the river that are partially based on economic tangible values. He views the problem as inconsistencies in management policies, enforcement reflecting individual personalities, and inefficient use of management resources.

Some of it I don’t understand, why there has to be so many hands in the pot, and that is why it gets so highly orchestrated there. ...ah, some of the rules and, I guess some of the people and how they enforce those rules are a little bit unfair. ... And some of that, I think, is just a few people in the Forest Service that take their authority a little bit too far. But ah, with all the guide days that are out there you know they, they pick on the people who are legal and have the user days, and just micro manage them. Yet they have all of the illegal people that they do nothing about, when it would be so simple to catch them.Well, they need to straighten out their enforcement, what they are doing now. ...And ah, people double-dipping, you know. We get a lot of foreigners that come in, and they fish at night, and they fish in the daytime.

The quote above not only describes a perception about current management of the river, it also begins to illuminate the prominence of the controversy over management of its sport fisheries. Several respondents express concern that visitors lack respect for the Situk and its resources. The following quote illustrates frustration with the behavior of uninformed visitors and their inadvertent impact on the fishery. He feels that the behavior indicates a lack of respect for the fish that endangers the fishery.

But I am real concerned about the way the river is being abused, you know, not respected ...very few Yakutat residents sport fish... So the abuse I am seeing is from sport fishermen from the outside...There are people that don't know how to catch a sockeye...They catch them in the back. And even if they release them you are putting stress on the fish. They don't understand you don't take the fish out of water...they are pulling them up on the banks, taking hooks out, and kicking them back in. They think they are doing the right thing, but that fish is probably going to end up dying before it gets up to do its thing.

Another respondent is also concerned about the lack of respect he sees among the visiting sport anglers. He attaches the lack of respect to the whole place rather than to the fish. He implies that his concern is related to the impact on other sport fishermen, and ultimately on his business if tourism declines due to user conflicts on the river. He would like to see the tourism industry focus on upper class visitors who pay more and, he feels, tend to show more respect:

...a lot of guys hire a guide that come through me, take better care of things. They pay more attention to detail. They pay more attention to the rules, and they are here to have a good time...And the other guys are here to have a good time, but they camp out, they leave their garbage, they throw their garbage in the river, they shit in the river, they don't, they disrespect it is basically what I'm trying to say...There is a big difference between, I guess you could call it, the class of people. You know you've got the budget fishermen, then you've got the meat fishermen, then you've got the professional fishermen.

The following respondent talks about a lack of respect among visiting sport anglers as well. She describes her conflict with the visitors' lack of respect as being due to her Tlingit cultural values and to her perception of how outsiders are different from

locals. She suggests a potential management option of educating visitors about appropriate behaviors.

It's just trying to educate them on the fact that we were taught as native people that fish and animals give their life for you, and you respect that, and you don't ever, their life is gone so that you live. And so you have to remember that. You don't ever disrespect that. And we just try to teach the people that come in to take good care of what they have. When you go to a grocery store, you don't take your steak and drag it up the aisle, which is what we see people doing here sometimes that don't know how to...they don't seem to understand that fish is food. A lot of them do, but there are always those that you see that just drag it around and treat it disrespectfully. And we look at it and say "and you're going to eat that now?"

The following quote offers further insight into the differences in human / place bonds that are perceived by members of the community. The description reveals a potential tension between individuals that have traditional bonds to the Situk versus those who primarily depend on the river for a sport fishing livelihood, such as local guides. Like the quotes above, this respondent indicates that visitors lack respect for the river and for the types of values he holds for the place.

You don't, in them days you do not...kill an animal if you are not going to use it. All salmon is not bothered until it comes inside, up the river. That is where the traps were. And you take what you need. You don't waste any part of an animal, in them days. ...If you abuse it, it's not going to come to you. Ok, if you shoot a bear or animal, if you don't take care of it properly...Maybe that was the old people's way of conservation...Now, we have a new moneymaking proposition in the Situk River. And I call them stick fishermen [referring to sport anglers using fishing rods]. That's all they are. They come here, see, taking the resources, everything; they don't leave anything. Because they stay out there, and only the lodges get the money...

The above quotes describe prevalent feelings that people in the community would like managers to educate visitors about appropriate behavior and to consistently and fairly enforce existing sport fishing regulations. The quotes also suggest divisions in the community that will likely emerge in the segmentation process that follows this analysis.

Community divisions have been described as generational, cultural, and economic. The prevalence of concerns based on these divisions suggests that the impacts of nonresident sport fishing will be the source of the greatest challenges for managers of the Situk. Perceptions of negative impacts are not limited to sport fishing, however. One respondent, who is a sport fishing guide, expresses concern about impacts to sport fishing from other uses of the river. He describes the practice of gill netting that is used by both commercial and subsistence anglers. The nets are set in the wide estuary section of the river, and target the salmon runs as they first return to the river from the Gulf of Alaska. The sport anglers, using rods and reels, fish in the freshwater of the upper river and target fish that have successfully navigated the lower reaches on their way to spawning grounds upstream.

You know one thing that does impact my livelihood, is the commercial fishing, the sportsman knows that when the commercial fishing starts up, the gillnetting, that his recreation fishing is just going to be impacted

...the Situk River has never had an influx of sport fishermen as we have in the past 10 or 15 years...I don't think it diminished the commercial end, because you know, they are down river and they catch them first. It is just that the two groups have never been able to come together and come to peace and coexist. There is always "those dam sport fishermen are up there again," "when are those commercial fishers going to take up their nets so that we can have more fish up here." Things like that.

Identifying management solutions to these concerns about the river is a complicated matter. These concerns do not arise from unhealthy fisheries, as the resources are monitored and managed for sustainability, and further enhancement of the fisheries will not likely reduce negative perceptions between user groups. These concerns about management of the river seem to originate in differences in the types of human / place bonds that residents of the community hold toward the river. Differences in the importance of assigned values seem especially relevant to understanding opinions about management of the Situk. As the conflict does not appear to be over scarce resources, reducing use or other types of 'heavy' management tactics may not address the

problem. The idea of separation of use along the river was mentioned by some of the respondents.

But as far as managing, the one big thing that I would like to see, and I don't know if they can do that, but I know that as far as, if they could keep the sport fishermen and the commercial fishermen separate, that would be one of the bigger things to be able to do.

Summary of Qualitative Findings

The interviews suggest that many people in the community of Yakutat have important bonds with the Situk River. Everyone that was asked was willing to be interviewed and was easily engaged in the topic. There was reluctance among all respondents to speak of conflict between community members – although there are two distinct cultures in Yakutat. The exceptions to this lack of criticizing each other were when the conversations turned to 1) local managers, where there are plenty of negative opinions, and 2) commercial lodges, as some of the respondents feel that they do not contribute economically to the local community. Although many people have well-developed bonds with the river, these bonds vary greatly in the types of activities, values, and attachments that define them. Some of these variations may be related to cultural differences between Tlingit and non-Tlingit residents. Most of the non-Tlingit respondents speak of instrumental, functional attachments along with bonds influenced primarily by tangible assigned values. In general, the Tlingit respondents are more likely to describe symbolic attachment and to describe their human / place bonds in terms of a long history of activity participation and changing relationships with the river. Because length of time in the community and amount of experience with the river are also associated with the ethnicity of the respondents, it is difficult to attribute human / place bond characteristics to one source. In fact, the human / place bonds identified here suggest considerable overlap in perspectives and assimilation between short-term and long-term residents and between Non-Tlingit and Tlingit cultures.

These results suggest a number of activities that local residents participate in on the river that likely differ from those of visitors. For example, respondents mentioned harvesting eggs, berries, and other types of food. They also mentioned the use of four

wheelers to access areas of the river – an option generally unavailable to visitors who must access the general area by ferry, private boat or plane, or commercial airline. When local residents talk about their own fishing on the river they distinguish between personal, subsistence, and commercial orientations, while they reserve the term ‘sport fishing’ for the activities of visitors. The issue of motorized boating access to the upper river is not as prevalent on the conscience of residents as it is with the visitor population (Christensen et al. 2004). The interviews reveal that values assigned to the river range from tangible and economic to more intangible and family oriented, and there is a strong emphasis by some on cultural and historic intangible values. Both functional and symbolic types of attachment to place are well represented in the interviews. Tangible values and functional attachments are influenced by an orientation either toward commercial fishing or toward tourism.

The differences in opinions about conflict and management seem to vary with the types of human / place bonds that respondents have with the Situk River. The community members that were interviewed feel that their bonds are very different than those of nonresident visitors and the differences may be a primary cause of conflicts. Conflicts over use of the Situk River are often expressed as ‘us versus them.’ The strongest of these dichotomies represented in the interviews is the ‘us/them’ expressed by the Tlingit elder toward the visiting recreation anglers. These descriptions suggest that residents assign very different types of values to the river’s resources than nonresidents, and that they perceive these differences as a source of conflict.

Despite differing orientations to place and conflicts over types of use, residents of Yakutat generally express greater solidarity across the community than between community members and visitors. It would seem logical for conflict to exist between local people engaged in commercial fishing and subsistence fishing activities, as they compete more directly for the same resource than they do with sport fishing in the upper river (both subsistence and commercial activities occur in the estuary and use the same technique of gillnetting). While both native and nonnative residents participate in commercial and subsistence fishing, the respondents are generally divided along cultural lines as to the relative emphasis they place on these types of fishing on the Situk. However, more tolerance of fellow community members, regardless of their ethnicity or

fishing orientation, and less tolerance for the visitors seem the norm among the interview respondents.

Darby Study Qualitative Findings

The Darby case study qualitative data consist of written and spoken comments originating from a series of public meetings held to provide a forum for discussion of management issues related to the proposed Trapper - Bunkhouse stewardship project on the Darby Ranger District of the Bitterroot National Forest. Four public meetings were held at the Darby clubhouse in the fall of 2006. Numerous comments about the travel management proposal in the stewardship project provide insight about the local publics' bonds with the Bitterroot National Forest and their views on the travel management issue. Like residents of Yakutat, many people in the community describe their activities on local public lands as varied and encompassing a long history. Although many residents described a mix of motorized and nonmotorized activities, the community is divided in their views about management of motorized use of the forest. The following residents describe long histories in this place and a concern about motorized use.

The Trapper-Hart Bench area offers excellent horseback opportunities, including scenic, flora, wildlife, solitude, semi-challenging trails, and cross-country opportunities. I've been riding in the Bitterroot National Forest since 1961 (45 years). The Trapper-Hart Bench area should remain in the current status of non-motorized except for those roads designated in the Forest Travel Plan.

I have been horse-back riding this long loop for 25 years to enjoy the owls. In the past seven years I have seen horrible trash and soil degradation from OHV use.

Some respondents described participation in both motorized and nonmotorized activities. These "cross-over" users typically described their interaction with other recreationists as being based on tolerance of their differences.

We use this area for riding ATV's, horses, and hiking. When we ride or walk it is never an issue to share with ATV's or other motorized vehicles.

Another perspective is described in the following comments indicating “cross-over” history of multiple types of use that now have become centered on motorized use. Respondents mention their age as a contributing factor to their desire for motorized access. Like many of the comments, these people describe the importance of family recreation opportunities, and refer to long-term or multi-generational bonds to the place.

(I) want all of the trails the Forest Service has proposed open for multiple use... We need (a place) to take our grandkids that is close, safe, and has views, wildlife, etc. (I) have done some hunting in this whole area in the past. We have too much area closed to motorized access... Due to our age and health problems, we use an ATV to get out and use some of the areas where we used to hike.

I can ride ATV's with my grandfather who is partially disabled, and that is why we can and need to use this trail.

I am 69 years old - love to be able to access the roads and enjoy our National Forest, as I did when my children were young.

The idea of access to public lands is a common thread in these comments. Many people in the meetings expressed concern that they are being locked out of their public lands. The person writing the first comment below combines concerns about access with statements about their desire for more ATV loop opportunities - a common thread expressing an opinion about management options in the comments. The second comment comes from a new-comer to the area who also has concern about access to public lands.

I would like to see the roads and trails that are already out there left open to ATV's and motorcycles. I believe in having loop trails. The majority of the users start at and go the same direction. If you can't make a loop, then everyone has to come back on the same trail and some of these places you have to pass are dangerous. In addition, you have to leave the trail to safely pass one another. To me a loop is much better, so please keep the trails and roads open. After all, whose forest is it anyway? It's not only yours and mine. It's everybody's! How can you shut out ATV's and OHV's and just have a chosen few say who can go into and how to use everyone's forest.

We're new to this particular area. (We) enjoy all areas for riding ATV's. Dislikes - too many homes in recreation areas. Too many closed gates, need more connecting trails. This is OUR forest, NOT someone's backyard.

Some of the concerns about access are directed toward the managing agency, while other comments, such as the one immediately above, include concerns about the influence of local homeowners on limiting motorized use of the forest. Complaints include residents treating the local public lands like their own back yard. Some of the nonmotorized users identify themselves as residents of the area and some do describe the area as their back yard. Many of the nonmotorized users and local residents have concern about increased OHV use in their local area, and focus their concerns on impacts to wildlife, resources, safety, and solitude. In contrast to the motorized users, nonmotorized users are less likely to express concerns about maintaining access to local public lands. Some of the respondents that are concerned about motorized use, as in the first quote below, feel that the current situation is worse because users don't follow the rules and there is a lack of law enforcement.

"Take the money that it will take to do this project and hire law enforcement to keep the OHV on the trails that they already have."

I live here, I enjoy the solitude and quietness...I recreate here year-round - sledding, mountain biking, horseback riding, x-c skiing, hiking. Problems only when mutual respect not shown to other types of users. I enjoy meditating while walking, sitting, riding - enjoying the quiet. Increased motorized noise disturbs my ability to meditate...I fish up this drainage and enjoy the quietness and low recreation use. Noise and more use disturbs my experience. This is my backyard...more motor traffic disturbs my quiet times.

I use this area for all types of quiet uses. OHV's are having all sorts of negative impacts on my experience and the environment. They should be limited to roads.

Comments from outside the nonmotorized user group also refer to concerns about wildlife habitat in the area. Some of the motorized users mention the impacts of new homeowners in the area.

In the matter of the elk population declining in the area, I would suggest that you find out when the residents houses were built compared to the time period the elk population started to decline. I think it is very possible that the elk moved because their living space was taken up by large houses, cars, and people in the area permanently there instead of a few OHV users temporarily in the area.

Participants offering comments generally indicate some frustration with the current management of OHV's and other recreation on the forest. A common thread is the difficulty of understanding and following the rules and the planning process.

“When I’ve looked at new and improved Forest Service maps in the last year, the first thing I notice is SO MANY numbers, colors, purposes, and restriction schedules...The confusion of managing forests as motorized vs. non-motorized travel is running far short of effective land stewardship.”

“Close roads identified as contributing to sedimentation build-up and degradation of water quality...Close roads temporarily or permanently that cannot be brought up to Forest Service standards due to budget restraints.”

Summary of Qualitative Findings

The Darby and Conner residents that attended the clubhouse meetings and participated in the discussions generally describe important, multi-faceted bonds with local areas of the Darby Ranger District on the Bitterroot National Forest. As with the residents of Yakutat, the bonds that Darby residents develop with nearby public lands vary considerably in their form and history. Many of the residents describe long personal histories in the area and bonds formed through sharing experiences with family and friends. Some describe changes they have experienced over this history, particularly in terms of the logging industry and new home development. Residents that recreate on the district often described their activities based on ‘quiet uses’ or motorized uses, and many refer to the other set of activities as a source of conflict or concern. A third group of residents, usually those with relatively long histories in place, described their recreation participation (or their family’s) across the spectrum of motorized/nonmotorized activities.

Another distinction that residents tend to describe is the proximity of their residence to the district boundary. Those living near the boundary sometimes described the forest as an extension of their home place - i.e., their backyard. Residents living further away sometimes expressed resentment for this backyard attitude about their shared public lands.

The community members that attended the Darby clubhouse meetings were there because of concern about present conditions or management proposals for change. Some of their key interests include the following:

- A desire to limit incompatible recreation uses of public lands near their homes. This attitude is sometimes referred to as NIMBYism, for ‘not in my backyard.’
- Resentment of NIMBYism by other community members who do not live next to the forest boundary.
- Motorized use off of the existing road system. Many residents desire increased access to trails and the opening of new areas while others want to limit off-road use, either seasonally or by activity type.
- A concern about the proposal of the management agency to formally designate off-road motorized trails. Some feel it would protect and enhance their access, while others are concerned that it would provide unwanted publicity and attraction to the area.
- Residents would like managers to improve safety, maintenance, law enforcement, and education,
- They would also like managers to develop plans, rules, and practices that are more predictable and understandable.

These key issues identified from the qualitative data are used to develop the survey instrument to be administered to a representative sample of the population. The questionnaire developed for the Darby Community study is largely influenced by the collaborative process undertaken at the clubhouse meetings to develop understanding among local residents. Insight gained from that process insures that each section of the questionnaire uses locally-relevant terminology and categories to measure human / place

bonds with the forest, including the list of recreation activities, types of economic and other values, and terms for psychological concepts. It also assures that the questionnaire provides opportunity to evaluate relevant concerns and options for management of the ranger district.

Yakutat Study Quantitative Results

This section presents the results of analysis conducted on the quantitative survey data from the Yakutat study. The complete set of tabulated survey results are presented in Appendix D and arranged by survey question number for reference. This section provides a description of the results from the perspective of the human / place bond research approach where bond characteristics are used to segment the respondents and compare their views relevant to managing the resources. The survey collected seven types of information about respondents and the Situk River. The seven survey items are listed below and include three measures of expression of human place bonds (items 1 - 3), a set of questions collecting personal information for description and model validation (item 4), and three measures addressing management interests (items 5 - 7):

1. Activity participation on the Situk River
2. Importance of different types of values assigned to the Situk
3. Attachments to the Situk River and the community of Yakutat
4. Personal characteristics – age, sex, ethnicity, and years lived in the community.
5. Evaluations of conflicts
6. Preferences for amounts of use and types of facilities and management
7. Preferences for options to address issues and conflicts

These categories are considered in an analysis process under three general sections. First respondents are segmented according to their responses to human / place bond indicators (items 1, 2, and 3 above). Second, the human / place bond segments are described based on respondent characteristics (item 4). Third, evaluations of conditions

and preferences for management (items 5 through 7 above) are compared across the human / place bond segments.

Human / Place Bond Segmentation

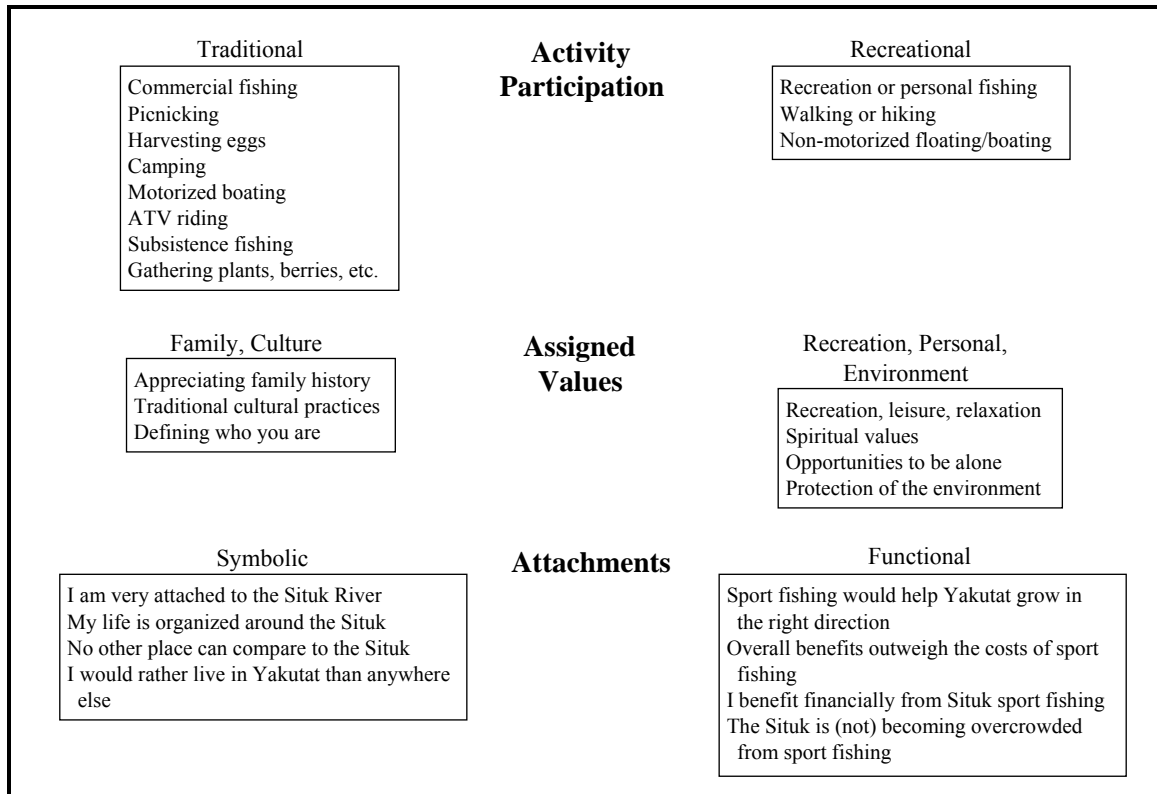
The first step in presenting these results is to segment the respondents according to their human / place bonds with the Situk River. This segmentation into groups that share similar activity participation rates, assigned values, and attachments to place with the Situk River provides a structure for understanding and considering the diverse desires of the public for its conditions and management. The human / place bond segments are identified using a combination of factor and cluster analyses based on the three type of indicators of expression of respondents' human / place bonds with the Situk River. The cluster analysis found five community segments based on unique combinations of six factors representing locally-relevant sub-dimensions of the three types of human / place bond indicators. The next section will describe the development of the six factors and the following section describes the use of the factor results as input to cluster analysis.

Identifying Indicator Sub-Dimensions

Factor analysis is used first to identify combinations of questionnaire items that are correlated with each other. The goal of this type of analysis is to combine variables with response patterns that are most similar to each other and least similar to others in the set being analyzed. Factor analysis identifies the underlying dimensions represented by the set of variables, it identifies sub-dimensions that are well represented by the set of survey items and also that have wide variation across the community, it increases understanding of the locally relevant sub-dimensions of bond expression, and simplifies further analysis by reducing the number of variables being simultaneously considered. Separate factor analyses were conducted for each of the three types of human / place bond indicators. The pools of items were reduced to two sub-dimension factors for each of the three components of human / place bond expression (for a total of six factors). Figure 2 shows the six factors and the items that comprise them with the items listed from highest to lowest factor loading. Each factor is given a descriptive label for later

reference that reflects its most influential items (generally, items listed first load the highest).

Figure 2: Human / Place Bond Factors and Indicator Components; Yakutat Case Study, 2006.



The two activity factors divide local activities into the primary groups labeled ‘traditional’ including activities typically conducted as part of a subsistence and family-oriented lifestyle and ‘recreational’ comprised of activities done primarily for personal pleasure. The two value factors, labeled ‘family/cultural’ and ‘recreation, personal, environmental’ did not divide along the major tangible/intangible categories described in the literature. Both factors emphasize intangible values and include tangible value items while neither includes economic or subsistence items. Instead, these factors seem to reflect cultural differences or some other division in the community in the way intangible values are assigned to these public lands. The attachment factors, labeled ‘symbolic’ and ‘functional,’ do reflect expected divisions in the indicator items described in the

literature. Both symbolic and functional forms of attachment reflect a mixture of items from wildland recreation and community development sources.

Each respondent is assigned a factor score for each of the six factors. The factor scores are standardized in the form of z-scores with an overall mean of zero and standard deviation of one. Respondents receive a negative z-score for a factor when they rate the questionnaire items included in that factor lower than average and they receive a positive z-score when they rate the items in the factor above average. The factors are described in the following three sections, and each section includes a table that lists factor score coefficients, indicating positive and negative contributions of the items toward the factors.

Activity Participation The first factor analysis was conducted on the activity participation items listed in question one of the survey instrument (Appendix B). The fourteen specific items were analyzed for underlying factors representing different combinations of related activities. Three of the fourteen items were dropped from the analysis during an iterative modeling process (described in the methods section) because of low commonality measures (indicating the amount of the variable's variance accounted for in the model). The dropped items, in the order they were dropped, included Q1e – guiding and outfitting (commonality of .05), Q1m - photography (commonality of .16), and q1n - hunting (commonality of 0.37 along with high double loading). The remaining 11 items form two activity participation factors, which are listed in Table 2.

Table 2: Activity Item (Survey Q1) Factor Score Coefficients; Yakutat Case Study, 2006.

Specific Activity:	Variable Name	Factor Score Coefficients:	
		Factor One: Traditional Activities	Factor Two: Recreation Activities
Commercial fishing	q1d	0.24	-0.06
Picnicking	q1l	0.23	0.12
Harvesting eggs	q1g	0.17	-0.04
Camping	q1k	0.19	0.09
Motorized boating	q1j	0.17	0.08
ATV riding	q1f	0.12	0.03
Subsistence fishing	q1b	0.12	0.06
Gathering plants, berries, mushrooms	q1h	0.11	0.09
Recreation or personal fishing	q1c	-0.06	0.39
Walking or hiking	q1a	-0.03	0.27
Non-motorized floating, boating	q1i	-0.02	0.23
Cronbach's alpha reliability coefficient (boxed items):		0.82	0.65

Table 2 lists the eleven activities from question one of the survey and their factor score coefficients for each of the two activity factors. The factor score coefficients are boxed to indicate the factor best represented by the item. The factors are assigned descriptive labels based on the combination of items loading highest on them. The first factor - traditional activities is defined by high participation in activities such as commercial fishing, harvesting eggs, and ATV riding. The second factor - recreation activities, consists primarily of a combination of recreation fishing, walking or hiking, and non-motorized floating or boating activities. While the items are not clearly delineated along a recreation / non-recreation criterion, the items in the recreation factor are almost always done for pleasure, while the items in the traditional factor, such as camping and ATV riding, are often done as part of subsistence practices. The Cronbach's alpha reliability coefficients for summative scales from items in these factors indicate high reliability for the first factor and acceptable reliability for the second. This pattern is repeated for the remaining factor analyses in both case studies, with the first factor extracted in each analysis having very high reliability and the second showing lower, but acceptable reliability above 0.70. All of the factor analyses in the two case studies identified two factors as the best solution.

Assigned Values The second factor analysis was conducted on the human / place bond indicator items assessing assigned values in question four of the survey. The nine items in question four measure respondents' ratings of the importance of different types of values they might assign to the Situk River and its resources. Only one item in this analysis was determined inappropriate for factoring within the set of items. This item, Q4b – economic, commercial benefits, had a low communality score (0.23) indicating little common variance with the other items in the factor analysis. It was the only item representing an economic type of value and was dropped from subsequent consideration in the factor analysis. A second item, 'subsistence activities' was retained in the factor analysis because it satisfied the MSA and commonality criteria for retention. However, it loads low on both of the main factors that were identified in the analysis and so contributes only to the stability of the factor solution, rather than to the interpretation of the two retained factors. It is essentially dropped from further consideration in the interpretation of activity factors. A better measure of the economic and subsistence importance of the river emerged from the measures of place attachment described in the next section. Table 3 lists the eight value items that were included in the analysis and their factor score coefficients on the two assigned value factors that emerged. Items loading highest on the first factor - family and cultural values included 'appreciating family history' and 'traditional cultural activities.' Items most important in defining the second factor - recreation, personal and environmental values, include: 'recreation, leisure, relaxation,' 'opportunities to be alone,' and 'protection of the environment.'

Table 3: Assigned Value Item (Q4) Factor Score Coefficients; Yakutat Case Study, 2006.

Value Item:	Variable Name	Factor Score Coefficients:	
		Factor One: Family and cultural values	Factor Two: Recreation, personal and Environmental values
Appreciating family history	q4i	0.55	-0.11
Traditional cultural activities	q4g	0.18	0.05
Defining who you are	q4h	0.20	0.12
Subsistence activities	q4f	0.07	0.06
Spiritual values	q4d	0.11	0.20
Recreation, leisure, relax	q4a	-0.04	0.44
Opportunities to be alone	q4e	0.01	0.23
Protection of the environment	q4c	0.00	0.18
Cronbach's alpha reliability coefficient (boxed items):		0.88	0.77

Attachments to Place The third set of human / place bond indicators measuring types of attachment to place were also factor analyzed, and the results are presented below in Table 4. Analyzing these items identified two factors of related attachment items that are consistent with the theoretical sub-dimensions of symbolic and functional forms of emotional place attachment. Three items were dropped from the item pool during the factor analysis, leaving nine items remaining to form the two factors. The three dropped items include q7f - “sorry to leave” (invalid commonality = 1), q7b - “sport fishing helps the economy” (commonality of 0.26), and q7l - “could go to another place” (commonality of 0.26). The retained items are listed below in Table 4 with factor score coefficients boxed to indicate which of the two factors they load heaviest on.

Table 4: Attachment Item (Q7) Factor Score Coefficients; Yakutat Case Study, 2006.

Attachment Item:	Variable Name	Factor Score Coefficients:	
		Factor One: Symbolic attachment	Factor Two: Functional attachment
I am very attached to the Situk River	q7j	0.57	0.03
My Life is organized around the Situk	q7a	0.20	0.05
No other place can compare to the Situk	q7d	0.14	0.01
I would rather live in Yakutat than anywhere else	q7e	0.10	-0.08
I seldom take time to visit the Situk River	q7k	-0.13	0.06
Sport fishing would help Yakutat grow in the right direction	q7g	-0.01	0.33
Overall benefits outweigh costs of sport fishing	q7h	-0.02	0.24
I benefit financially from Situk River sport fishing	q7c	0.02	0.20
The Situk is becoming overcrowded from sport fishing	q7i	0.02	-0.34
Cronbach's alpha reliability coefficient (boxed items):		0.78	0.72

Identifying Community Segments

The results of the three factor analyses described above, consisting of six factor scores for each individual respondent, were cluster analyzed. K-means clustering was used to identify groups of individual respondents with similar response patterns across the six factors measuring different aspects of human / place bond to the Situk River. Five clusters (community segments) of respondents were identified based on similar intensity levels on each of the six human / place bond factors.

To provide additional insight on bonds an overall ‘human / place bond intensity’ index score was created. The index is calculated by combining an individual’s z-scores for each of the six indicator factors and then calculating a new z-score for the resulting score. The overall bond intensity index is defined as the combination of relative levels of expression of all three types of human / place bond components. As with the individual factor scores, the overall human / place bond intensity scores are re-calculated as z-scores with negative values representing below average scores and positive values representing above average scores relative to other members of the community. Average intensity index scores, sample distribution, and z-scores for individual bond indicators are listed for each segment in table 5. A segment with very high overall human / place bond intensity score would score high on all of the components as well - they would have high levels of activity participation, high assigned values, and high levels of emotional

attachment across all six sub-dimensions of expression. Segments with average or low overall scores will have different combinations of high, low, and average scores from the individual factors. Therefore, overall intensity scores provide one indicator of bonds that must be interpreted cautiously along with knowledge of individual components because different community segments with similar overall intensity scores will have different types of human / place bonds. For example, one medium intensity segment may score high on recreation activity participation and low on other indicators, while another medium intensity segment could score high on symbolic attachment and low on recreation activity participation and other indicators.

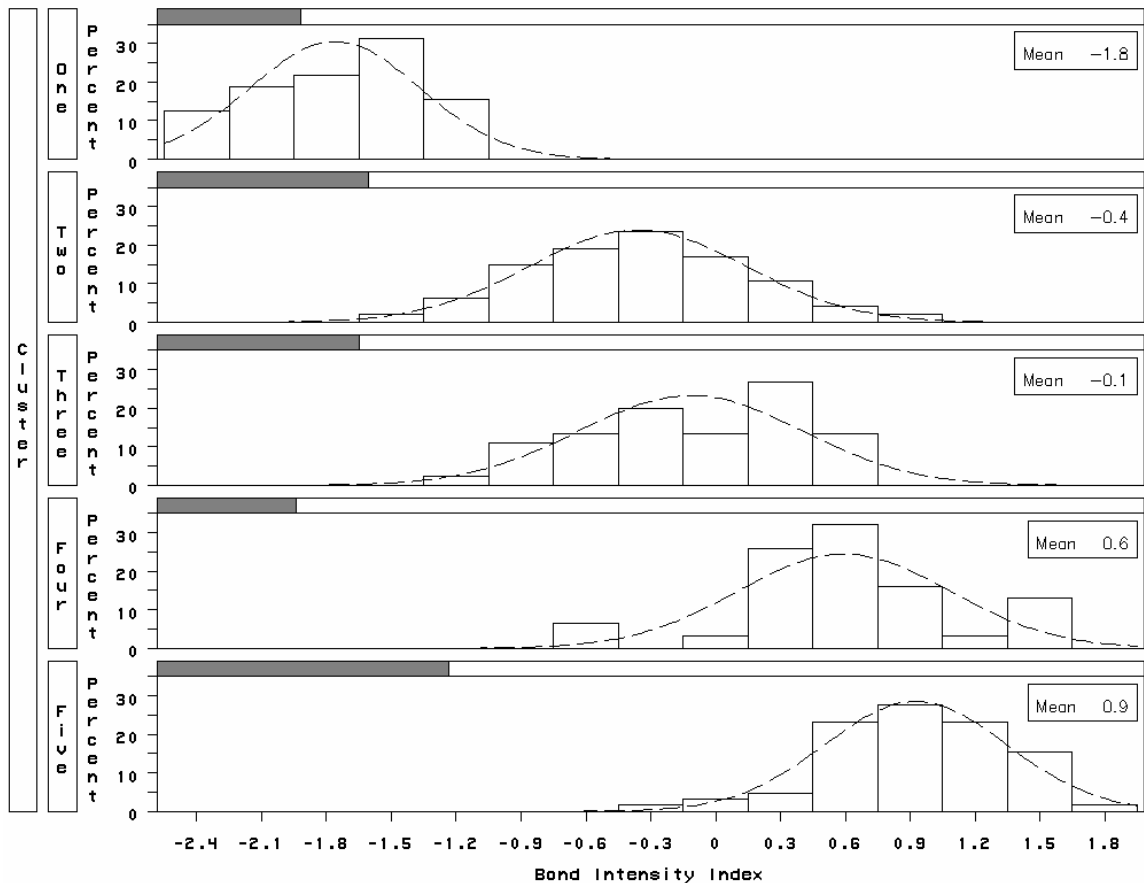
The five clusters were given consecutive numerical labels from one to five indicating their rank from low to high, respectively, on their overall intensity scores. The numeric labels alone do not accurately reflect all of the unique characteristics of human / place bonds within the segments but they do provide a simple way of organizing the segmentation results in memory. Table 5 lists sample characteristics, the overall human / place bond index z-scores and the z-scores for each factor across the five segments (note: an ‘overall’ column is not included in the table because overall average z-scores would be zero).

Table 5: Relationship Indicator Factor Scores and Sample Characteristics by Community Segment; Yakutat Case Study, 2006.

Segment Characteristics:	Segment				
	One	Two	Three	Four	Five
Sample size	35	47	46	32	65
Percentage of overall sample	16%	21%	20%	14%	29%
Overall bond intensity index score (z-score)	-1.76	-0.36	-0.12	0.59	0.93
<u>Bond Sub-dimensions of Expression:</u>					
Traditional activity participation factor (z-score)	-0.80	-0.37	-0.31	0.00	0.92
Recreational activity participation factor (z-score)	-0.68	0.35	-0.64	-0.40	0.76
Family and Cultural values factor (z-score)	-1.23	-0.94	0.60	0.59	0.60
Recreation, Personal and Environmental values (z-score)	-1.38	-0.25	0.29	0.35	0.52
Symbolic attachment factor (z-score)	-1.57	-0.19	0.36	0.29	0.55
Functional attachment factor (z-score)	0.21	0.31	-0.68	1.12	-0.40

Each of the five human / place bond segments represents between 14% and 29% of Yakutat residents, with segment five accounting for the largest percentage and segment Four representing the smallest. Figure 3 shows the distribution of overall bond intensity index scores across the five segments. The bar graphs at the top of each segment in the figure represent their relative size in the community population.

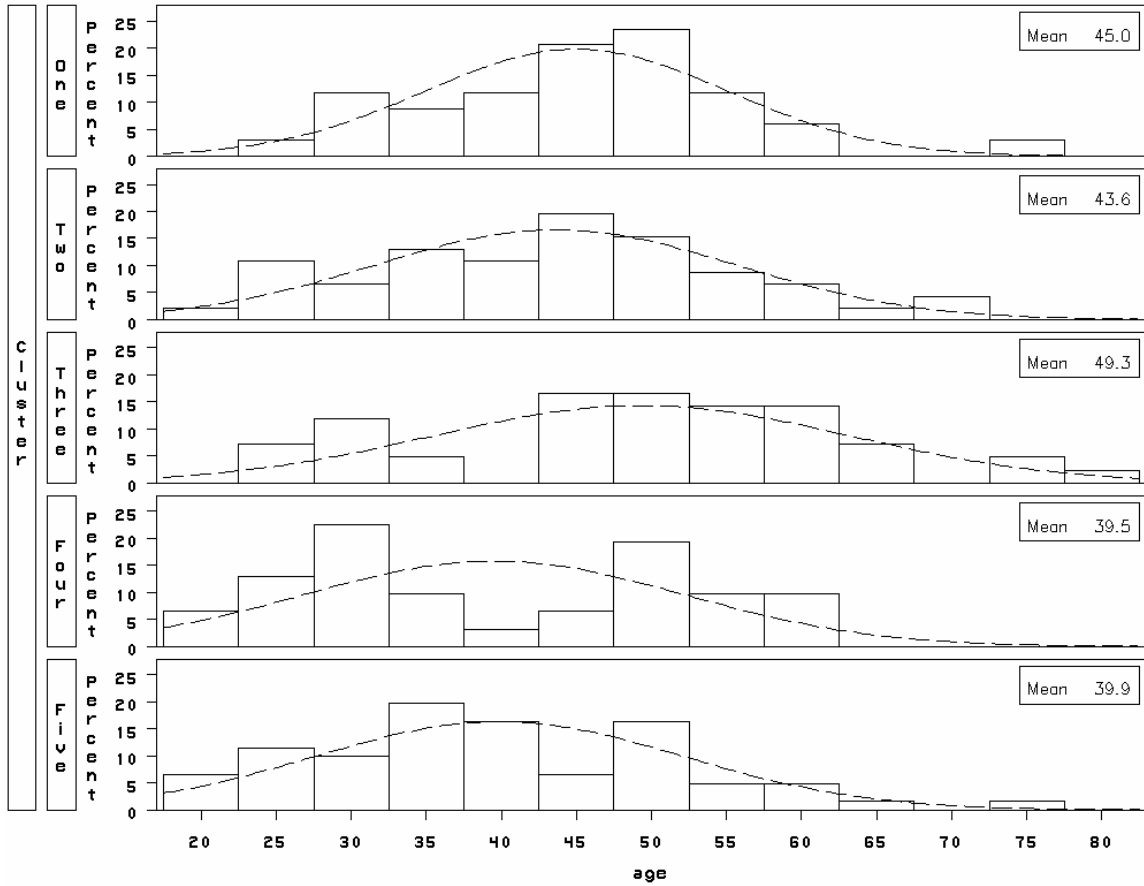
Figure 3: Percent Distributions of Human / Place Bond Overall Intensity Index Scores for Each Community Segment; Yakutat Case Study, 2006.



Age is an important indicator of life stage and experiences, and provides a form of cluster validation as it should be related to characteristics of human ties to place. Figure 4 provides a summary of the distribution of age across the five human / place bond segments. While all of the distributions show wide spans of age, and their average ages are somewhat similar across the segments, they do have some telling differences. Long-term community elders are mostly represented in segment three, while segments four and

five contain the younger long-term residents. Segment four has a bi-modal distribution, with good representations of '20 some-things' and '50 some-things'. Segments one and two, representing newer residents, each have a wide distribution of ages, though segment one members are a little older on average

Figure 4: Percent Distribution of Age for Each Community Segment; Yakutat Case Study, 2006.



Community Segment Characteristics

Table 6 lists average ages and other demographic characteristics as well as participation rates in fishing activities across the five segments. This table also provides evidence of the cluster validation process in developing meaningful segmentation results based on criteria external to the clustering process.

Table 6: Demographic Characteristics and Fishing Participation Rates by Community Segment; Yakutat Case Study, 2006.

Segment Characteristics:	Segment					Overall
	One	Two	Three	Four	Five	
Average Age	45	44	49	39	40	43
Percent Tlingit	11%	13%	59%	60%	67%	44%
Percent Male	54%	66%	60%	42%	59%	58%
Average Years lived full time in Yakutat	15	16	35	24	30	25
Percent of life in Yakutat (full + part time)	39%	38%	72%	65%	77%	60%
Fishing Participation Rates:						
Commercial fishing in past year	6%	13%	7%	9%	49%	20%
Commercial fishing before past year	20%	21%	46%	56%	23%	32%
Never commercial fished	74%	66%	48%	34%	28%	48%
Subsistence fishing in past year	20%	55%	35%	38%	83%	51%
Subsistence fishing before past year	31%	19%	50%	59%	15%	32%
Never subsistence fished	49%	26%	15%	3%	2%	17%
Recreation fishing in past year	31%	83%	17%	25%	78%	52%
Recreation fishing before past year	40%	11%	57%	44%	20%	32%
Never recreation fished	29%	6%	26%	31%	2%	16%

The comparison across the various types of fishing, which is the primary activity on the river other than walking or hiking, shows some interesting differences in the community. In general, members of segment one are less likely than other Yakutat residents to have participated in any fishing activities, especially in the past year. Members of segment one are most likely to have participated in all types of fishing, especially in the past year. Members of segment two also show high levels of fishing participation, especially in recreational fishing. Segments scoring higher on the overall human / place bond intensity index tend to be more likely to have commercial or subsistence fished in their lifetime. This pattern does not hold for participation rates in recreation fishing, where members of segment two with relatively low temporal attachment and overall human / place bond intensity scores are more likely than most others to have participated in their lifetimes, and are more likely than any other segment to have participated in the past year in recreation fishing. The following points summarize the key differences in human / place bonds and personal characteristics across

the five segments of Yakutat residents as presented in tables 5 and 6 and figures 3 and 4 above:

- Segments one and two represent relative newcomers to the community with members having spent about half as much of their lives in Yakutat as those belonging to other segments. In general, the segmentation identifies a major division between relative newcomers and long-term residents.
- Segments one and two are much less likely to identify themselves as Tlingit than members of the other segments.
- Members of segment one exhibit low overall activity participation rates, but they score relatively high on measures of functional emotional attachment.
- Segment two has the highest percentage of males and also the highest percentage of participation in recreation fishing in the past year. Segment two members score relatively high on the recreation participation factor and the functional attachment factor.
- Segment three includes the oldest members on average.
- Segment three members have among the lowest current activity participation rates, but score higher than segment one and two members on past activity participation rates. While they may retain high levels of emotional attachment and place high importance on resource values, this segment likely represents older members of the community with declining participation rates and therefore declining overall bonds intensities relative to their past life stages.
- Segment three, along with segments four and five, place high importance on the values of the Situk's resources and these respondents indicate high levels of symbolic attachment to place. However, this group has the lowest average functional attachment to place of any of the segments.
- Members of segments four and five are similar to each other, with high scores on overall intensity of human / place bonds. However, members of segment four show much higher levels of functional attachment to place, while members of segment five show much higher levels of both traditional and recreational activity participation.

There appears to be a dichotomy between newer residents and long-term residents that accounts for a number of differences across the human / place bond segments. The two newer segments differ substantially from the other three in length of residence, but also in ethnic makeup, the importance placed on resource values, and the amount of symbolic attachment to the Situk River. However, based on intensity of human / place bonds rather than just on length of residence, some Yakutat residents on either side of the newer resident/long-term resident dichotomy are closer to each other in bond intensity with less homogeneity within the short-term/long-term groups than is suggested from these data and the qualitative interviews. There is a semi-permeable nature to the dichotomy – as newer residents gain experience interacting with the river and increase the intensity of their place bonds, they may develop human / place bonds more characteristic of the long-term residents. As long-term residents grow older, their activity participation and overall bond intensity may decline, bringing their bonds closer to the type or intensity of newer residents (although, unlike the newcomers, their past experience would still be reflected in their evolving bonds). This dichotomous division is likely one of culture, which adapts, rather than ethnicity (which is static) because the newer residents are predominantly non-Tlingit but the long-term residents are more ethnically mixed.

As mentioned above, segments two and three are similar to each other in overall human / place bond intensity scores, but the relatively similar intensity index scores are derived from very different bond characteristics. Segment two members, having been in the community less time, have a relatively short temporal history with the Situk, but they actively pursue activities on the river, and are especially focused on recreation fishing. Segment three members, in contrast, are long-time community residents with established, emotionally charged bonds to the Situk, but with low rates of current participation in Situk River activities. Segment three members show high past participation rates. Segment two members may move to the community and immediately establish a bond to the Situk characteristic of these types of human / place bonds or they may first establish a segment one type bond that transforms over time and with activity participation experience to a segment two bond. Segment three human / place bonds are established

over a longer period of time, with members likely transitioning from segment five type bonds as their activity participation rates decline with age.

The human / place bond profile and views of segment three members have more in common with segment five than four, and given segment four members' high past participation rates (similar to those of segment three) it may be that segment five members transform to segment three as activities decline. Segment four members appear to be more stable in their views and affiliation and less likely to transition over time to a different type of bond, even as their activity participation rates decline.

Dropped Variables The final consideration in this segmentation process is to return to the variables that were dropped during the three factor analyses. These variables did not factor well with other variables of the same type, and were removed from the analysis based primarily on the amount of explained variance indicated by their commonality with the overall factor. Table 7 lists the summary of responses to those variables across the five segments. The seven items were not included in the formation of clusters or the strength of human / place bond score, but they appear to vary across the segments in predictable patterns – either showing little difference across segments or showing increased levels with increased overall human / place bond intensities. Guiding and outfitting are most likely to be done by members of segments four and five, while hunting and photography are popular with everyone – especially segment five. Belief in the economic and commercial importance of the river increases with overall human / place bond intensity. However, belief that sport fishing is economically beneficial is highest in segments two and four, possibly reflecting their recreation and sport fishing activity participation and functional place attachment, respectively. Segment five's low score on the belief that sport fishing is economically beneficial is consistent with its lower functional place attachment score.

Table 7: Characteristics of Items Not Included in the Human / Place Bond Factor and Cluster (segment) Models by Community Segment; Yakutat Case Study, 2006.

Relationship indicator items not considered in factors/clusters:	Segment					Overall
	One	Two	Three	Four	Five	
Q1e Guiding and Outfitting (ever participated)	6%	2%	7%	13%	14%	8%
Q1m Photography (ever participated)	49%	51%	59%	78%	80%	64%
Q1n Hunting (ever participated)	40%	57%	48%	50%	78%	58%
Q4b Economic, commercial benefits (importance, 0 to 4)	1.7	2.1	2.3	2.9	2.8	2.4
Q7b Sport fishing benefits...financially (agreement, -2 to +2)	1.0	1.2	0.2	1.1	0.4	0.7
Q7f ...I would be very sorry to leave (agreement, -2 to +2)	0.7	1.2	1.5	1.6	1.7	1.4
Q7l I could go to another river instead of the Situk (-2 to +2)	0.1	-0.7	-1.1	-1.4	-1.1	-0.9

Implications of Human / Place Bond Segmentation

Having identified segments of the population of Yakutat residents sharing similar types of human / place bonds with the Situk River, and having presented a brief description of their characteristics and concerns, the results now turn to the details of Yakutat residents' concerns, experiences of conflicts, and preferences for management solutions. There are many differences in perceptions of conditions and opinions about management that are unique to a particular segment or that do not change in a predictable linear pattern as bond intensities increase or decline. The results are reported for the overall sample of Yakutat residents and across the five human / place bond segments to provide insight on the influence of these bonds on preferences for conditions.

Conditions, Impacts, and Interference from Others Question two of the Yakutat case study questionnaire asks respondents if they feel the Situk River has been negatively impacted by inappropriate behavior of other people. More than two-thirds of the respondents (68%) feel that other people have negatively impacted the river. Responses to question two vary across the five human / place bond segments, ranging from a low of 46% of segment four indicating impacts to a high of 79% of members of segment three indicating that they perceive negative impacts. Interestingly, segment three has less current experience on the river than segment four but its members perceive more problems with current conditions. Respondents who feel the river has been impacted were asked to describe the specific behaviors that cause the impacts. Appendix D of the report to managers (Christensen and Watson 2006b) lists the specific responses to

question two of the survey. Typical responses mention negative behaviors such as littering, motorized use, crowding, rudeness, and poor sportsmanship.

Survey question three obtained more specific information about sources of interference with respondents' bonds to the Situk River. The question asked respondents to indicate what types of other users have interfered with their bonds with the river. In addition to written comments received on question two, Appendix D of the report to managers (Christensen and Watson 2006b) lists the written descriptions of problems from responses to question three of the survey. A variety of situations are described as sources of interference, most having something to do with sport anglers' behavior, motorized use, the amount of use, or the behavior of managers. Table 8 includes percentages of respondents indicating interference from specific types of user groups from the categorical response section of question three. The table lists responses overall and across the five human / place bond segments.

Table 8: Sources of Interference with Residents' Bonds with the Situk River by Community Segment; Yakutat Case Study, 2006.

Q3: Source of Interference:	Segment					Overall
	One	Two	Three	Four	Five	
Non-local sport anglers	26%	38%	52%	34%	51%	42%
Managers, LEOs, rangers	9%	17%	13%	16%	25%	17%
Motorized boaters	11%	26%	11%	6%	6%	12%
Professional river guides	9%	15%	7%	3%	11%	9%
Commercial fishers	3%	2%	2%	9%	5%	4%
Subsistence fishers	0%	2%	0%	6%	2%	2%
Local recreationists	3%	4%	0%	3%	0%	2%

In general, respondents indicate that the greatest source of interference, by far, is non-local sport anglers; 42% feel non-local sport anglers have interfered with their relationships (e.g., their activity participation) with the Situk River. This source of conflict is twice as likely to be indicated by members of segments three and five as by members of segment one (52% and 51% compared to 26%, respectively). These perceptions of interference suggest greater conflict with users having greater differences in types of human / place bonds. Less significant sources of interference include managers (17%), motorized boaters (12%), and professional river guides (9%).

Managers are especially likely to interfere with bonds to the Situk of segment five; 25% of that segment indicates interference by managers. Motorized boaters and professional river guides are most likely to interfere with human / place bonds of segment two members (26% and 15%, respectively).

Evaluation of Current Management, Services, and Facilities Table 9 shows the results of question five of the survey, asking respondents to evaluate the current amounts of various aspects of Situk River conditions. Responses are on a five-point scale from way too low (-2) to way too high (+2). Items in the table are ranked from lowest to highest rating, overall. Most items are evaluated near the mid point on the scale (currently about right). Two-tailed t tests, with corrections for the finite population and multiple comparisons, indicate that overall mean responses to all of the items except enforcement of subsistence regulations differ significantly from ‘currently about right’ at $p \leq 0.05$. Enforcement of sport fishing regulations and education about appropriate behavior are both rated the lowest overall, with general agreement across segments that they are currently too low. Other items with low ratings of current levels include ‘consulting with local managers’ and ‘the number of toilet facilities.’ The only item rated too high overall is enforcement of commercial fishing regulations. In general, development and access items are rated slightly low to about right across the segments, with segments three and five giving more ratings of about right.

A generalized multinomial logistic regression analysis with a finite population correction was conducted to determine if responses to the items in question five could predict segment membership. Consistent with the MANOVA, the overall logistic regression model is significant ($p < 0.001$) with a logit (Nagelkerke) R^2 , indicating the proportional reduction in error (PRE) of predicting segment membership, of 0.28 (i.e., a 28% reduction in classification error over chance alone). Four of the 11 items are significant predictors of segment membership at $p \leq 0.05$: Q5b – boat launches, Q5c – enforcement of fishing regulations, Q5h – agency patrols, and Q5j – campsites. The most significant differences are illustrated in Figures 5 and 6 below. The bars in the figures represent responses across categorized for each segment. A bar is shorter if most people

in the segment it represents rated the items about right and longer, either on one or both sides of the graph, depending on the level of agreement within a segment.

Table 9: Preferences for Amounts of Management and Development on the Situk River by Community Segment; Yakutat Case Study, 2006.

Q5: Current Amounts (-2 'way too low' to +2 'way too high')	Segment										Overall	
	One		Two		Three		Four		Five		mean	se ^a
	mean	se ^a	mean	se ^a	mean	se ^a	mean	se ^a	mean	se ^a		
^c Enforcement of sport fishing regs (Q5c)	-1.2	0.12	-0.9	0.11	-1.3	0.12	-0.3	0.18	-1.2	0.09	-1.0	0.06 ^b
Education about appropriate behavior	-0.8	0.12	-1.1	0.09	-1.0	0.09	-0.8	0.13	-1.0	0.09	-1.0	0.05 ^b
Consulting locals about management	-0.5	0.13	-0.8	0.10	-1.0	0.10	-0.6	0.12	-0.9	0.08	-0.8	0.05 ^b
Toilet facilities	-0.8	0.11	-0.7	0.09	-0.6	0.09	-0.8	0.13	-0.4	0.07	-0.6	0.04 ^b
^c Campsites (Q5j)	-0.6	0.10	-0.5	0.11	-0.2	0.10	-0.3	0.14	-0.3	0.08	-0.4	0.05 ^b
^c Boat launches (Q5b)	-0.4	0.11	-0.4	0.08	0.0	0.11	-0.5	0.13	-0.4	0.09	-0.3	0.05 ^b
^c Agency patrols (Q5h)	-0.5	0.11	-0.3	0.12	-0.4	0.13	-0.2	0.14	0.0	0.09	-0.3	0.05 ^b
Access trails	-0.5	0.13	-0.5	0.11	0.0	0.10	-0.1	0.12	0.0	0.10	-0.2	0.05 ^b
Public use Forest Service cabins	-0.2	0.09	-0.2	0.09	-0.1	0.10	-0.2	0.12	-0.1	0.09	-0.2	0.04 ^b
Enforce subsistence fishing regs	-0.2	0.11	-0.1	0.09	0.2	0.11	0.3	0.12	0.1	0.08	0.1	0.05
Enforcement of commercial fishing regs	-0.1	0.14	0.0	0.11	0.2	0.10	0.5	0.13	0.2	0.08	0.2	0.05 ^b

^a se - standard errors of the mean were adjusted for the finite population of Yakutat adults. The total population was estimated at 500 with segment sizes estimated from their percent distribution in the sample.

^b Individual t tests with finite population corrections and Bonferroni corrections for multiple comparisons found these items to differ significantly overall from 0 - 'currently about right' at $p \leq 0.05$.

The MANOVA test assesses overall response differences across segments.

MANOVA Test (Wilks' lambda):	Test Value	F Value	Num DF	Den DF	Sig. of F
(without finite population correction)	0.707	1.70	44	790	0.004

The Multinomial Logistic Regression predicts segment membership based on response patterns.

Generalized Logistic Regression:	Wald Chi-Square	DF	Sig of ChiSq	R-Square
(with finite population correction)	102.7	44	<0.001	0.284

^c These items were significant predictors of segment membership in the logistic regression model

	Wald Chi-Square	DF	Sig of ChiSq
Q5c	20.6	4	<0.001
Q5h	11.8	4	0.019
Q5b	10.4	4	0.034
Q5i	10.3	4	0.035

Figure 5: Comparison across Human / Place Bond Segments of Preferences for Amount of Enforcement of Sport Fishing Regulations (Q5c) by Community Segment; Yakutat Case Study, 2006.

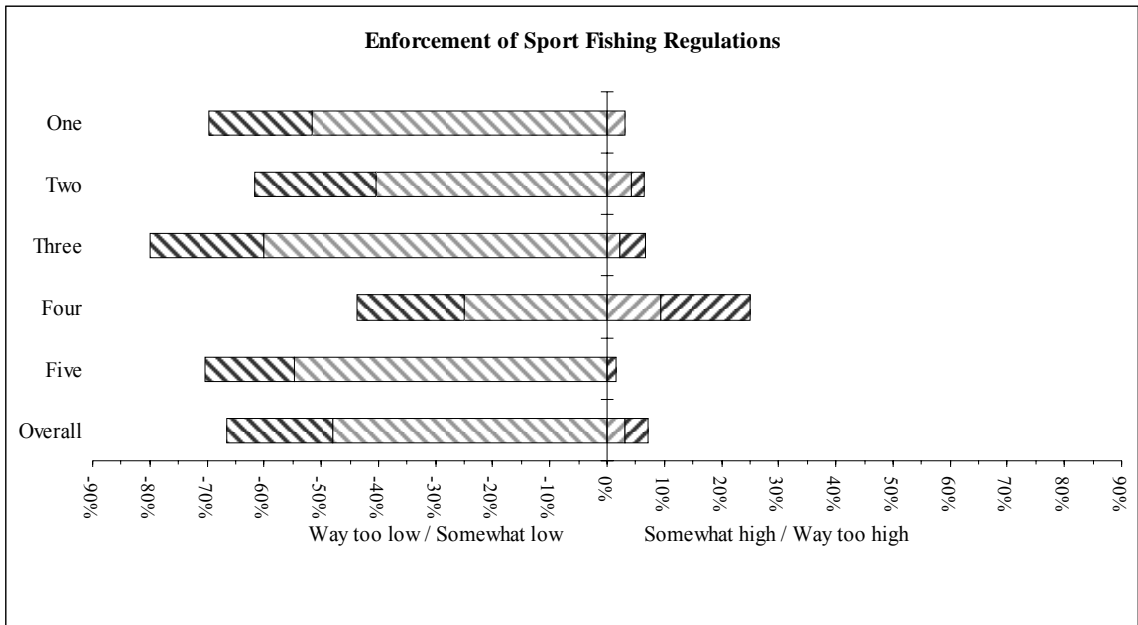
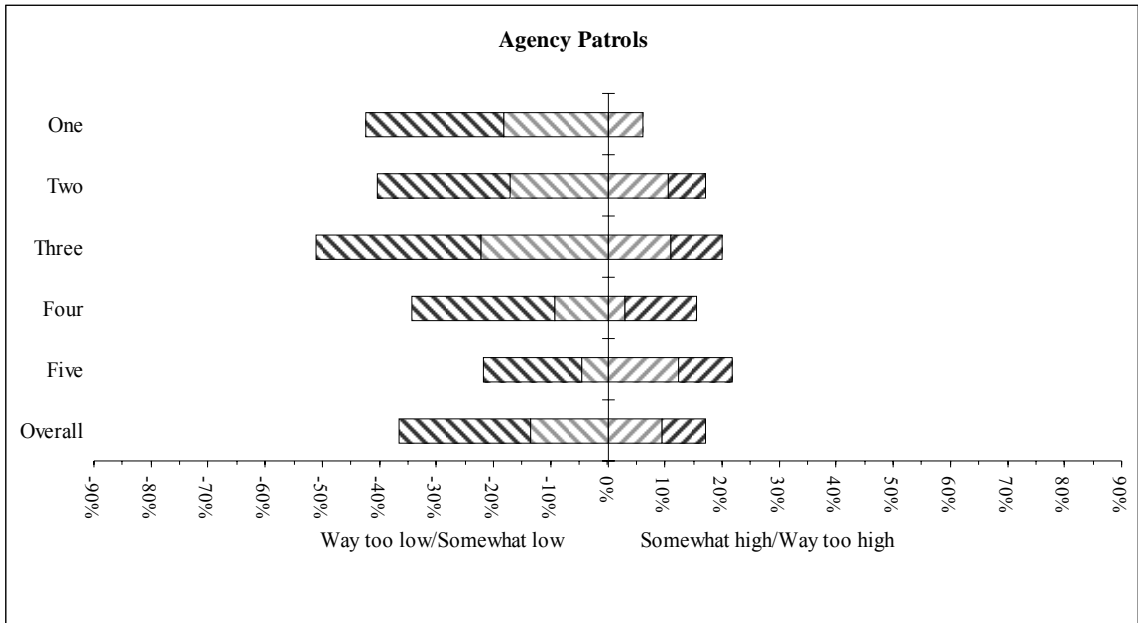






Figure 6: Comparison across Human / Place Bond Segments of Preferences for Amount of Agency Patrols (Q5h) by Community Segment; Yakutat Case Study, 2006.



-  Way too low
-  Somewhat low
-  Somewhat high
-  Way too high

Note: this key applies to the two figures above and also serves as an example for interpreting other figures like this in the dissertation. Each line graphs the opinions of one community segment. The four patterns on each bar represent strength of opinion. The vertical line is at neutral and each bar to the left is negative, while positive opinions are represented to the right. Neutral responses are not graphed - shorter bars represent segments with more neutral responses.

Amount of Use Question six of the survey asks respondents to indicate if they would prefer more or less of certain activities on the Situk River. The items are measured on a five-point scale from -2 (prefer none), through -1 (less than now), and +1 (more than now), to +2 (prefer unlimited use). Table 10 lists average responses to the items from question six in ascending order of preference overall. Two-tailed t tests, with corrections for the finite population and multiple comparisons, indicate the overall mean responses to all of the items within each segment differ significantly from 0 - 'prefer current level' at $p \leq 0.05$. The majority of respondents across all segments indicate that they would prefer less motorized use above the weir. Most respondents also prefer less outfitted or guided sport fishing. On the positive side, most respondents indicate that they would prefer more subsistence and commercial fishing. Two of the seven items are significant predictors of segment membership at $p \leq 0.05$: the preferred level of subsistence fishing and the preferred level of private sport fishing.

The two items from question six that are significant predictors of segment membership are shown with bar graphs in Figures 7 and 8. These charts compare the items across the five segments. Segments with short bars indicate more neutral responses, while the length of the bars on one or both sides of neutral indicate the amount of support or opposition within each segment. The graph of responses to subsistence fishing shows that nearly all respondents across the segments support subsistence fishing. Short-term residents, however, are more likely to feel that current use levels are adequate, while long-term residents would generally like more subsistence fishing. It is interesting to note that segment four respondents are most likely to want more private sport fishing, even though they are less likely to participate in sport fishing than segment two or five respondents. This may reflect their very high levels of functional attachment to the river relative to these other segments. Figure 8 clearly shows segment three respondents' desire for lower sport-fishing use levels and segment four respondents' desire for higher levels.

Table 10: Preferences for Use Levels of Fishing and Motorized Use on the Situk River by Community Segment; Yakutat Case Study, 2006.

Q6: Preferred Activity Levels (-2 'none' to +2 'unlimited')	Segment											
	One		Two		Three		Four		Five		Overall	
	mean	se ^a	mean	se ^a	mean	se ^a	mean	se ^a	mean	se ^a	mean	se ^a
Motorized boats above weir	-0.4	0.13	-0.7	0.13	-1.0	0.12	-0.4	0.17	-0.9	0.09	-0.7	0.06 ^b
Outfitted sport fishing	-0.5	0.10	-0.4	0.09	-0.8	0.09	-0.1	0.13	-0.6	0.08	-0.5	0.04 ^b
Guided sport fishing	-0.3	0.09	-0.2	0.09	-0.7	0.09	0.1	0.13	-0.5	0.07	-0.3	0.04 ^b
Motorized boats below weir	0.0	0.13	-0.2	0.10	-0.5	0.11	-0.1	0.16	-0.5	0.08	-0.3	0.05 ^b
^c Private sport fishing (Q6e)	-0.2	0.10	0.1	0.08	-0.4	0.12	0.4	0.13	-0.3	0.08	-0.1	0.05 ^b
Commercial fishing	0.2	0.07	0.2	0.10	0.5	0.08	0.5	0.14	0.2	0.07	0.3	0.04 ^b
^c Subsistence fishing (Q6b)	0.4	0.08	0.4	0.09	0.7	0.08	1.1	0.12	0.4	0.08	0.6	0.04 ^b

^a se - standard errors of the mean were adjusted for the finite population of Yakutat adults.

The total population was estimated at 500 with segment sizes estimated from their percent distribution in the sample.

^b Individual t tests with finite population corrections and Bonferroni corrections for multiple comparisons found these items to differ significantly overall from 0 - 'prefer current level' at $p \leq 0.05$.

The MANOVA test assesses overall response differences across segments.

MANOVA Test (Wilks' lambda):	Test Value	F Value	Num DF	Den DF	Sig. of F
(without finite population correction)	0.764	2.10	28	759	<0.001

The Multinomial Logistic Regression predicts segment membership based on response patterns.

Generalized Logistic Regression:	Wald Chi-Square	DF	Sig of ChiSq	R-Square
(with finite population correction)	76.7	28	<0.001	0.224

^c These items were significant predictors of segment membership in the logistic regression model.

Figure 7: Comparison of Preferences for Amount of Subsistence Fishing (Q6b) by Community Segment; Yakutat Case Study, 2006.

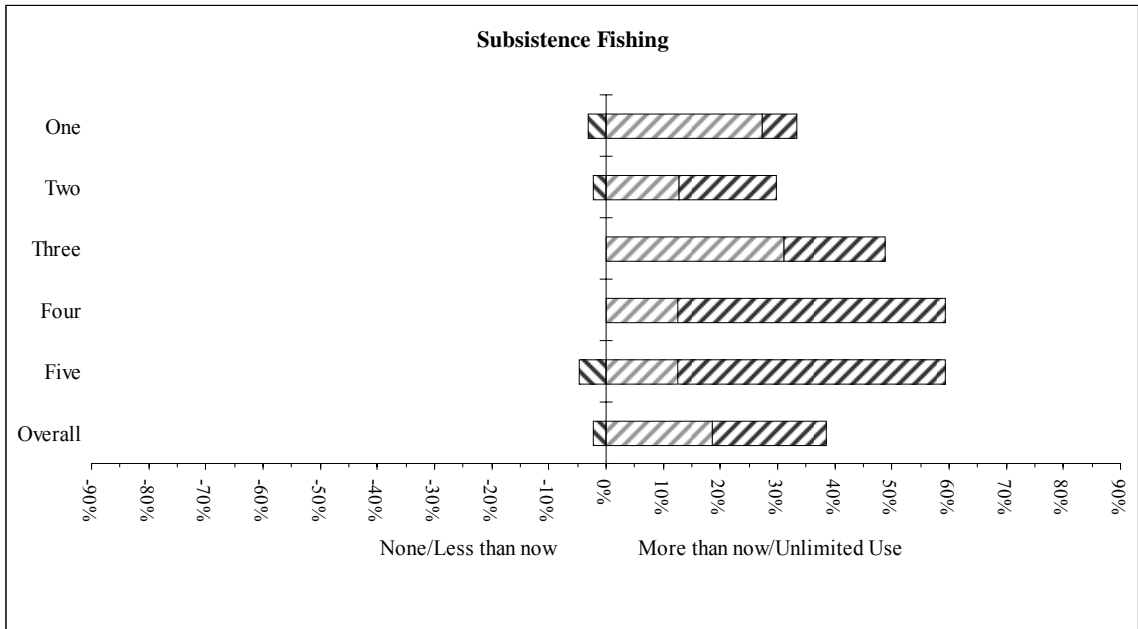
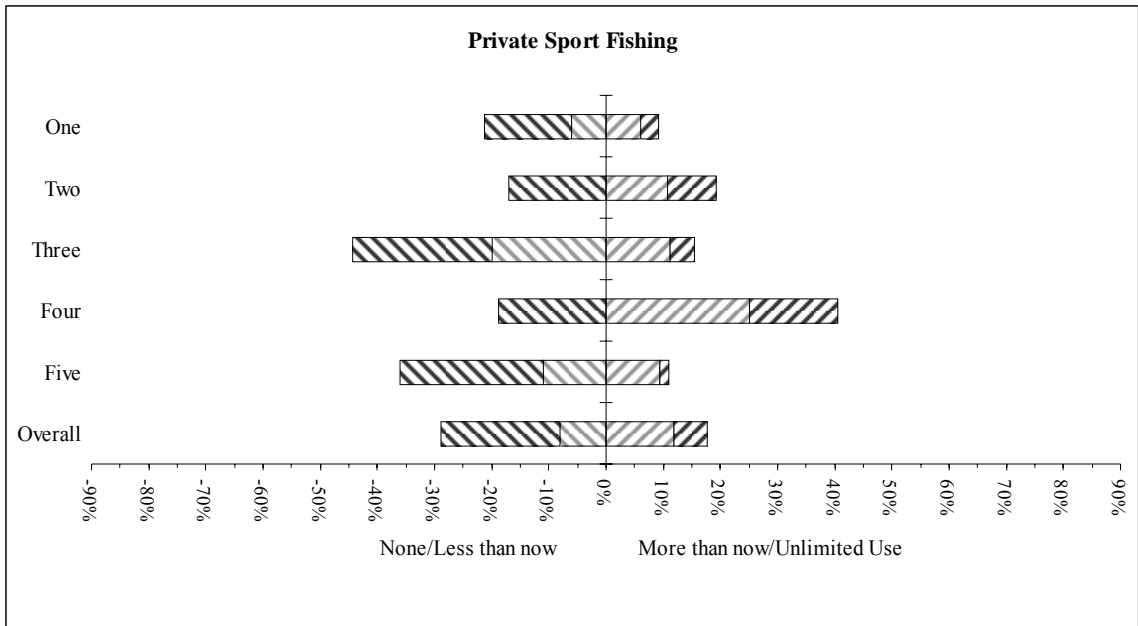


Figure 8: Comparison of Preferences for Amount of Private Sport Fishing (Q6e) by Community Segment; Yakutat Case Study, 2006.



In addition to question six in the survey asking about preferred use levels by type, question ten asks respondents to indicate their opinion about the need to limit overall use

of the Situk River. Unlike question six where respondents could indicate preference for limits that do not affect them personally, in question ten respondents are asked about limiting use in general and reminded that limiting use could reduce their own opportunities. Table 11 summarizes these responses across the five human / place bond segments. The majority across all segments feel that use should either be held at the current level or possibly limited in the future. Members of segment two are most likely of the segments to feel that no limit is needed now or in the future. Members in the lowest-use segment, segment one, indicate the greatest satisfaction with the current situation, while members of the low-use, high attachment group (segment three) are most likely to feel that current use is already too high and should be reduced (36%).

Table 11: Opinions about General Limits on Use (Q10) by Community Segment; Yakutat Case Study, 2006.

Q10: Support for a limit on use of the Situk River	Segment					Overall
	One	Two	Three	Four	Five	
Yes limit now to lower use	6%	18%	36%	7%	19%	19%
Yes hold use at current level	52%	29%	34%	48%	47%	41%
No limit now, but maybe later	39%	47%	25%	38%	31%	35%
No there should never be a limit	3%	7%	5%	7%	3%	5%

Preferences for Management Options Question 13 of the survey asks respondents if they support or oppose 14 different management options, all but one imposing some type of restriction on use. Figure 9 summarizes responses to the management options. The specific management option receiving the greatest overall support is the one that does not impose any restriction – to ‘encourage sport anglers to practice more catch-and-release fishing.’ The proposed restrictions receiving the greatest support are to prohibit motors larger than 10 horsepower above the weir and to decrease sport fishing bag limits. The least popular options (the ‘third rail’ for politicians in Yakutat) are to decrease subsistence or commercial harvest limits.

Table 12 lists the overall average responses to these options as well as average responses for each segment. T tests indicate the overall mean responses to all of the composite scores and all of the items except three (designate campsites, stage boat launches, and daily limit on nonguided use) differ significantly from 0 (neutral or no

opinion) at $p \leq 0.05$. This shows that the majority of Yakutat residents have formed opinions about appropriate management of the river across a wide variety of issues.

Figure 9: Ranked Support for Management Options (Q13) across all Respondents; Yakutat Case Study, 2006.

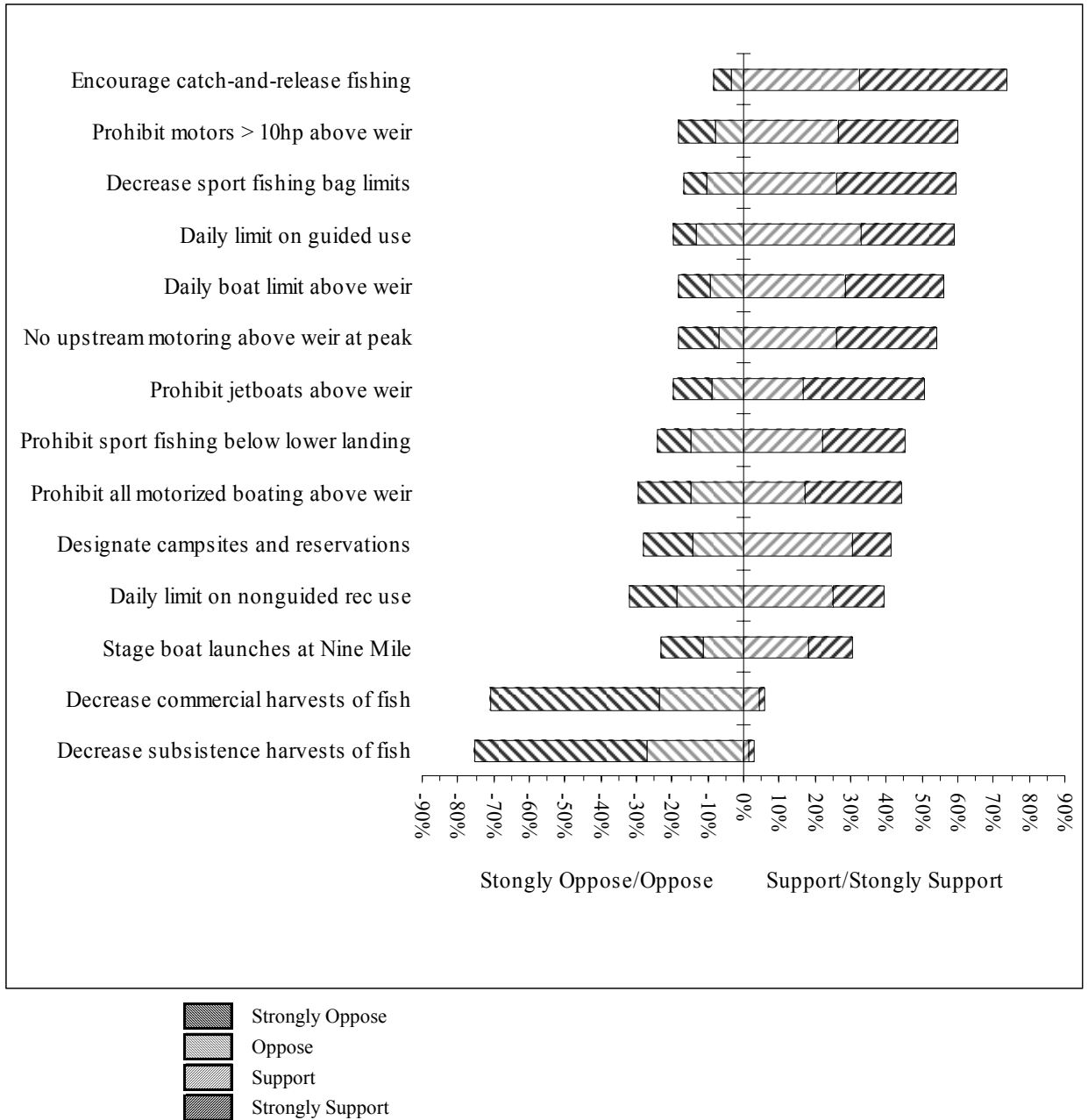


Table 12: Support for Management Options (Q13) by Community Segment; Yakutat Case Study, 2006.

Q13: Management options -2 'strongly oppose' to +2 'strongly support'	Segment											
	One		Two		Three		Four		Five		Overall	
	mean	se ^a	mean	se ^a	mean	se ^a	mean	se ^a	mean	se ^a	mean	se ^a
Encourage catch-and-release fishing	0.8	0.13	1.1	0.11	1.2	0.12	0.9	0.17	1.1	0.10	1.0	0.05 ^b
^c Decrease sport fishing bag limits (Q13l)	0.2	0.14	0.4	0.13	1.3	0.11	0.1	0.17	1.0	0.10	0.7	0.06 ^b
Prohibit motors > 10hp above weir	0.4	0.13	0.9	0.13	1.0	0.14	0.4	0.19	0.5	0.13	0.6	0.07 ^b
Daily limit on guided use	0.3	0.13	0.5	0.14	1.4	0.09	0.1	0.17	0.5	0.11	0.6	0.06 ^b
Daily boat limit above weir	0.4	0.11	0.6	0.13	1.5	0.09	0.1	0.19	0.2	0.12	0.6	0.06 ^b
Prohibit jetboats above weir	0.1	0.11	0.7	0.14	1.4	0.12	0.2	0.21	0.3	0.13	0.5	0.07 ^b
No upstream motor above weir during peak	0.2	0.09	0.8	0.13	1.2	0.12	0.2	0.21	0.1	0.13	0.5	0.06 ^b
^c No sport fishing below lower landing (Q13k)	0.0	0.12	-0.2	0.13	0.9	0.13	0.3	0.20	0.6	0.11	0.3	0.06 ^b
Prohibit all motorized boating above weir	-0.1	0.11	0.3	0.16	1.2	0.12	-0.2	0.19	0.0	0.14	0.3	0.07 ^b
Designate campsites with reservations	0.4	0.12	0.0	0.12	0.4	0.13	0.0	0.17	-0.2	0.12	0.1	0.06
Daily limit on nonguided rec use	0.0	0.12	-0.4	0.13	0.7	0.13	-0.3	0.17	0.2	0.12	0.1	0.06
Stage boat launches at Nine Mile	0.1	0.11	0.0	0.13	0.6	0.11	-0.2	0.17	0.0	0.11	0.1	0.06
Decrease commercial harvests of fish	-0.6	0.10	-1.1	0.11	-1.0	0.11	-1.1	0.15	-1.4	0.09	-1.1	0.05 ^b
Decrease subsistence harvests of fish	-0.7	0.11	-1.3	0.08	-1.3	0.10	-1.4	0.11	-1.3	0.10	-1.2	0.05 ^b
^d Average support for mngt. intervention	0.1	0.06	0.1	0.07	0.7	0.05	-0.1	0.11	0.1	0.06	0.2	0.03 ^b

^a se - standard errors of the mean were adjusted for the finite population of Yakutat adults.

The total population was estimated at 500 with segment sizes estimated from their percent distribution in the sample.

^b Individual t tests with finite population corrections and Bonferroni corrections for multiple comparisons found these items to differ significantly overall from 0 - 'neutral or no opinion!' at $p \leq 0.05$.

The MANOVA test assesses overall response differences across segments.

MANOVA Test (Wilks' lambda):	Test Value	F Value	Num DF	Den DF	Sig. of F
(without finite population correction)	0.532	2.47	56	784	<0.001

The Multinomial Logistic Regression predicts segment membership based on response patterns.

Generalized Logistic Regression:	Wald Chi-Square	DF	Sig of ChiSq	R-Square
(with finite population correction)	167.2	56	<0.001	0.472

^c These items were significant predictors of segment membership in the logistic regression model.

	Wald Chi-Square	DF	Sig of ChiSq
Q13k	14.9	4	0.005
Q13l	13.3	4	0.010

^d Average support is a composite of the other variables and was not included in the MANOVA or regression analyses.

The multinomial logistic regression analysis was consistent with the MANOVA model and showed overall significance at $p < 0.001$ with a PRE of 47%. However, only two items among the 14 listed in question 13 are significant predictors of segment membership in the regression model: 'No sport fishing below the lower landing' and 'Decrease sport fishing bag limits' are significant predictors of segments at $p \leq 0.05$. Segment three was more supportive of these measures than any other group.

Given that only two significant predictors out of 14 items were found in the logistic regression model, another step was taken to better understand opinions about management options across the five human / place bond segments. Two-tailed t tests were conducted to determine which management strategies differ from 'neutral or no opinion' within each segment. This is the same method, corrected for the finite population and multiple comparisons, that is used to test for differences across the entire sample of residents (Table 12). The results of the within segment comparisons are also corrected on their variance estimation as appropriate for this subpopulation domain analysis. Table 13 shows the results of these tests, with indications of which items differ significantly from neutral within each segment at $p \leq 0.05$. The table demonstrates the variable levels of support for options across the segments. All of the segments oppose limiting commercial or subsistence harvests and support encouraging catch-and-release sport fishing, but they differ in opinions on all other aspects of management. Consistent with their concerns about conditions, segment three is especially supportive of management intervention, while segment four is not very supportive of most options. Other segments show levels of support somewhere between these two segments. The only item with obvious disagreement, where one segment opposes and another supports an option, is between segments two and three concerning a daily limit on non-guided recreation use (segment two opposes, segment three supports, and other groups are neutral on this option).

Table 13: Significant Support or Opposition for Management Options (Q13) by Community Segment; Yakutat Case Study, 2006.

Management options for the Situk River, Q13: (n=219)	Yakutat Community RTP Segments					
	One	Two	Three	Four	Five	Overall
Designate campsites with reservations	Support		Support			
Encourage catch-and-release fishing	Support	Support	Support	Support	Support	Support
Prohibit motors > 10hp above weir	Support	Support	Support		Support	Support
Stage boat launches at Nine Mile			Support			
Prohibit jetboats above weir		Support	Support			Support
Daily boat limit above weir	Support	Support	Support			Support
Daily limit on guided use		Support	Support		Support	Support
Daily limit on nonguided rec use		Oppose	Support			
No upstream motor above weir during peak		Support	Support			Support
Prohibit all motorized boating above weir			Support			Support
No sport fishing below lower landing (Q13k)			Support		Support	Support
Decrease sport fishing bag limits (Q13l)		Support	Support		Support	Support
Decrease subsistence harvests of fish	Oppose	Oppose	Oppose	Oppose	Oppose	Oppose
Decrease commercial harvests of fish	Oppose	Oppose	Oppose	Oppose	Oppose	Oppose

Individual t tests with finite population corrections and Bonferroni corrections for multiple comparisons found the items indicated with 'Support/Oppose' to differ significantly from 'Neutral or No Opinion' at $p \leq 0.05$. Measured on the scale: -2 'Strongly Oppose,' -1 'Oppose,' 0 'Neutral,' 1 'Support,' and 2 'Strongly Support.'

The following set of figures graphically demonstrate the relationship between the multiple components of human / place bonds and Yakutat respondents' attitudes about management options. Figure 10 shows a series of four two-dimensional charts. The top two charts and the bottom left chart plot the positions of each of the five Yakutat segments relative to the sub-dimensions of the three human / place bond components and the bottom right chart compares attitudes across two types of management options. Figure 11 shows another graphical example of differences across the segments in levels of support for the management options that are listed in Table 13. The upper left quadrant of Figure 10 plots relative activity participation rates for recreational and traditional activity types. Segment five stands out with the highest participation rates across both types, while segment one shows the lowest rates. In the upper right quadrant the pattern is a bit different, with the three high intensity and long-term resident segments clustering together on the higher scores for both types of assigned values and the two low intensity segments showing considerably lower scores. In the bottom right quadrant, segment four stands out with its high functional attachment, while the higher intensity segments are all above average on symbolic attachment. The bottom right quad contrasts

views about two types of use limits for the Situk River. This plot illustrates considerable dispersion across all segments on opinions about management.

Figure 10: Quad Plots of Bond Sub-Components and Management Preference Comparison Example; Yakutat Case Study, 2006.

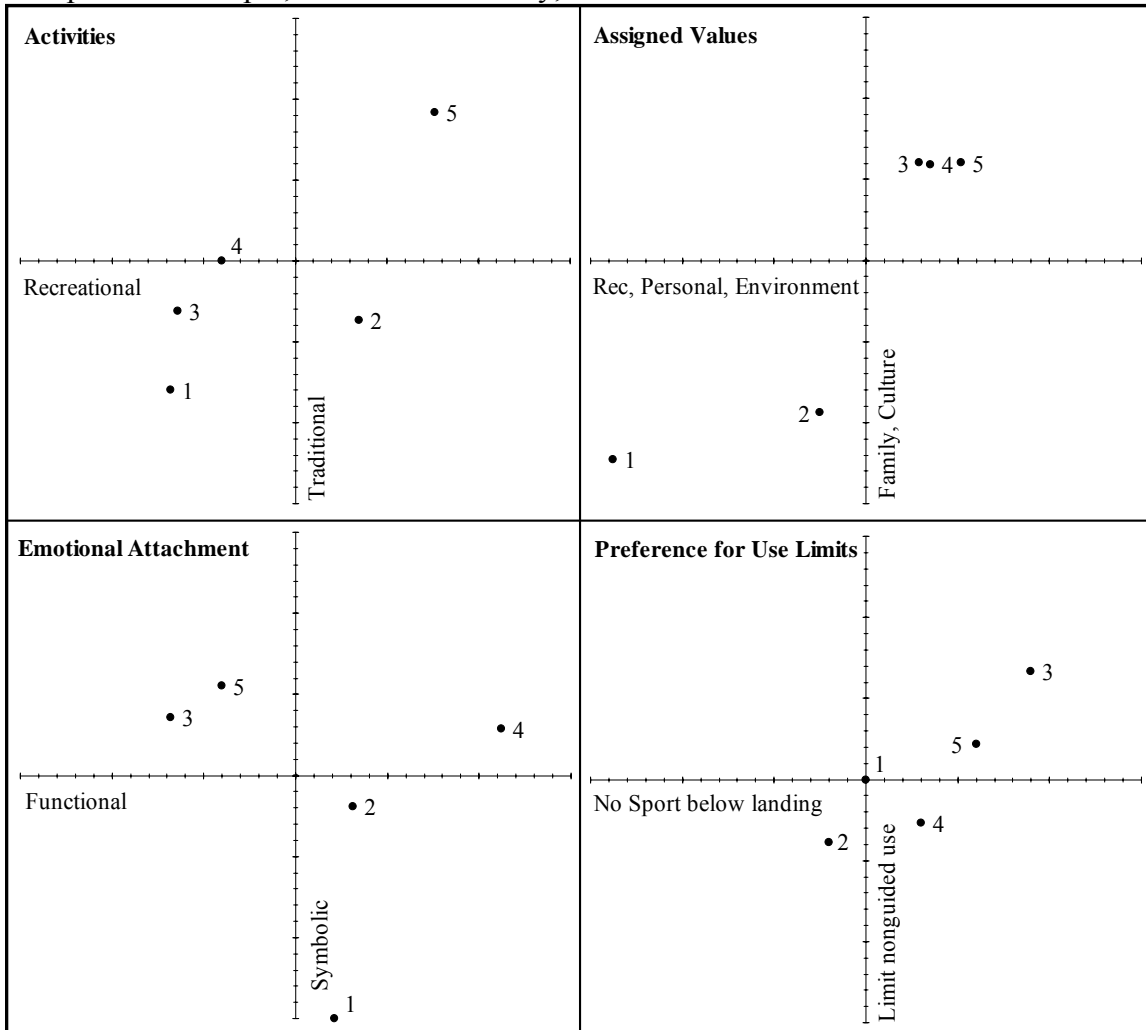
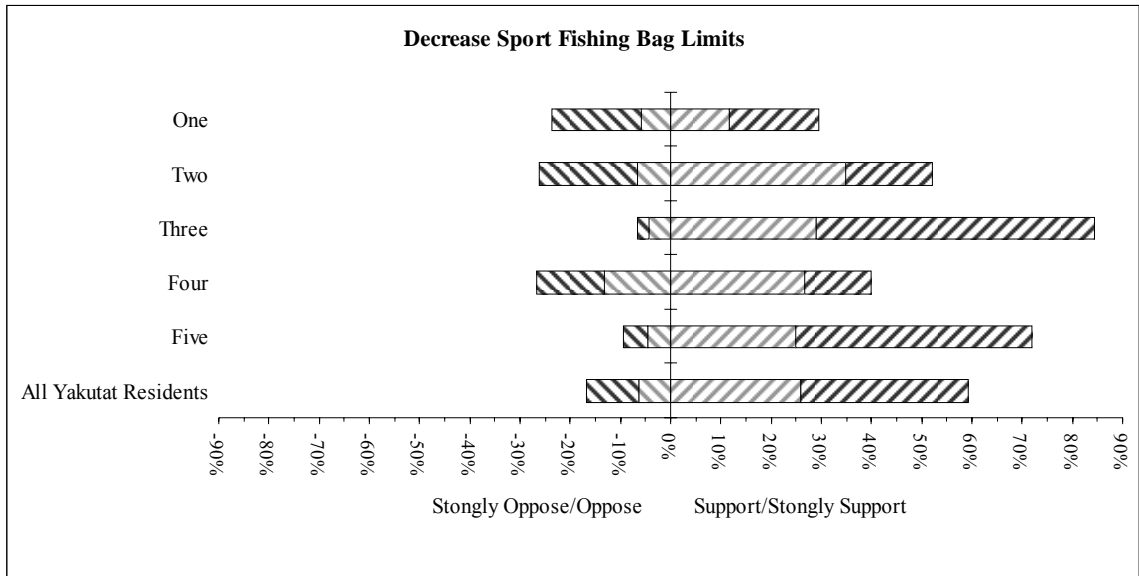


Figure 11 uses a bar chart to illustrate a similar pattern of opinions about decreasing sport fishing bag limits. Notice that as in the plot above, segment three shows the strongest support for this measure, while segment one is the most ambivalent.

Figure 11: Support for a Decrease in Sport Fishing Bag Limits (Q13) by Community Segment; Yakutat Case Study, 2006.



Yakutat Segment Profiles

The following are general profiles of the characteristics and views of each of the five relationship segments that were identified in the Yakutat case study. This section offers a summary for managers of the characteristics of the different segments of Yakutat residents, their concerns, and what is important to them. The following segment descriptions are arranged in order from lowest to highest intensity index scores.

Segment One Members of segment one have the least intense relationship with the Situk River of the five segments identified in the study. This is one of the smaller segments, representing the types of relationships held by 16% of the adult full-time residents of Yakutat. Their overall intensity scores (averaging -1.76) are almost two standard deviations below the average for all residents. Of the six indicators of relationships that are considered in the identification of segments, the only one for which this group scores above average is the functional attachment factor. Members of this group are least likely of the segments to be Tlingit (11%), and are about evenly divided

male/female. Twenty-six percent of them were part-time residents, for an average of 11 years, before they became year-around residents of Yakutat.

It's hard to want to regulate anything, and any restrictions on river use will affect me. At certain times there is overuse and a lack of respect for the resource by not only sport fishermen, but the people that bring them here... I don't know how to solve such a problem, but what ever answer there is has to be as fair to every user group as possible. I know that people abuse limits on the river, I hear about it all the time during the summer... I am not anti-growth, but I believe that during peak times the Situk is over crowded and over used and the time has come to try to control any more use. (Yakutat segment one respondent)

More than half of this segment feels that the river has been negatively impacted, and a quarter of them have personally experienced interference from non-local sport anglers. With an economic (functional attachment) relationship to the river, though, they tend to agree that sport fishing benefits the community financially, and 36% feel they personally benefit financially from sport fishing. Three quarters of segment one feel that the Situk is becoming overcrowded because of sport fishing, and only a quarter feel that more sport fishing would help the community grow in the right direction. However, about half of them feel the overall benefits to Yakutat of non-local sport fishing on the Situk outweigh the costs. They are most likely of the groups to feel that overall use of the river should be held at the current level (52% would like use held at the current level). They tend to be more likely than most to desire more facilities, development, and access opportunities such as trails on the Situk than currently available. The members of segment one seem to have less conflict with visitors than other residents do – perhaps reflecting their economic dependence on sport fishing, but also perhaps as newer residents they perceive more in common with the visitors than other community members do.

Segment Two This segment represents 21% of the overall sample of Yakutat residents. This group has relatively high scores on the recreation activity participation factor, and relatively low scores on the traditional activity factor. They score low on the family/cultural values factor, and somewhat higher on the recreation/personal values

factor. They show slightly below average symbolic attachment, and slightly above average functional attachment to the Situk River. This group has the highest percentage of males, at 66%, of the five segments. Segment two includes many of the sport-fishing residents of the community. Members of segment two are more likely to have recreation fished in the past year than any other group (83%).

Registered and certified guides allowing motorized use to them only; or educated sports fishermen on the habitat and resources that could be damaged by their behavior. (Yakutat segment two respondent)

Not having jet motors on the river would definitely make for a more relaxing experience. Limiting the use of all motors would also benefit the river. It's a small river and motors generally aren't needed. (Yakutat segment two respondent)

Compared to other groups, segment two members were more likely to experience interference in their relationship to the Situk River from motorized boaters or professional river guides. Like other groups, their greatest source of interference is from non-local sport anglers. Like their segment one neighbors, this segment desires more facilities like campsites and access trails. These respondents are most likely to feel that no general limit on use is needed now (or in the future). Segment two respondents support restrictions on motorized use above the weir. However, they are not as likely to support nonmotorized boating restrictions or restrictions aimed at limiting sport fishing access or reducing harvest levels. They are particularly unsupportive of prohibiting sport fishing below the lower landing. While they share the most in common, in terms of activity participation, with members of segment five, segment two respondents do not support the same types of management interventions as the other primary sport fishing segment.

Segment Three This group represents 20% of the local population. They are the oldest members of the community, and those that have lived in Yakutat the longest (averaging 35 years). These respondents are more likely to be male than female (60% male), and more than half are Tlingit (59%). Their bond components consist of high

scores on family and cultural values and on symbolic attachment, but low scores on both activity participation factors and particularly low scores on functional place attachment. They generally show low levels of current fishing participation, but fairly high past fishing participation rates. Their favorite current activities on the river, in descending order, included walking/hiking, subsistence fishing, gathering plants, photography, and recreation fishing.

Reduce sports fishermen and non-local fishermen. Anything done to help protect and preserve the Situk should be done. It is far easier to take care of a healthy Situk River than a damaged one. Tourism is not good for Yakutat. Being more environmentally aware would help preserve this truly unique place. (Yakutat segment three respondent)

Lower the sport fish bag limit to stop encouraging meat fishermen and create a high class sport fishery. Leave the meat to the local fishermen and subsistence users. (Yakutat segment three respondent)

This group feels the highest level of interference from non-local sport anglers of all the segments (52% of them report this type of interference), but other sources of interference are about average compared to the other segments. They are most likely of the groups to feel that enforcement of sport fishing regulations, education, and consultations with local people about management are too low. They are least likely of the groups to feel that current facilities and access sites are too low. Like other long term members of the community they tend to feel that enforcement of subsistence and commercial fishing regulations were currently too high. This group is the strongest advocate for reducing all types of sport fishing and motorized boating, and also strongly advocates increased commercial and subsistence activity levels. They show the strongest support (twice that of any other group) for reducing current use in general on the river. This segment supports management interventions on the Situk much more than any other segment. They support every proposed management option that would limit or reduce use of the river, with the exception of decreasing commercial or subsistence harvests, which they opposed. Compared to the other segments in this analysis, segment three members show the strongest support for changing current conditions and changing the management of the river.

Segment Four This is the smallest segment, representing 14% of the community. This group has mid-range scores on the traditional activity participation factor and low scores on the recreation activity factor. Like other long-term community members, they score high on both types of expression of values. Members of this segment are unique in their very high functional attachment scores, along with moderately high scores for symbolic attachment to the Situk River. Segment four generally includes the youngest adult members of the community, with a bi-modal age distribution showing good representation of 20-somethings and 50-somethings, and an average age of 39. This group has the highest percentage of females of all the segments (58%). Sixty percent of the segment members identify themselves as Tlingit.

This has always been my home. I do not want to lose freedoms I grew up with. With so much economic growth potential, I hope all local entities will find better methods of working together to take advantage of the visitor industry, providing opportunities and a controlled growth that both locals and non-locals can be comfortable with and appreciate. (Yakutat segment four respondent)

With way-above-average functional attachment scores, this segment can be characterized as long-term residents with economic/business orientations. They are more likely than other long-term residents to feel that sport fishing benefits Yakutat economically (87% compared to 62% of segments three and five), and three-quarters of them feel that they personally benefit financially from sport fishing on the river. This group indicated less interference to their relationships with the Situk than most other respondents. Like others, their greatest source of interference on the Situk is non-local sport anglers; although only 34% of the segment feels this way. Members of this segment are also more likely than other community members to feel that current amounts of enforcement of rules are too high. They are more likely than other long-term residents to prefer additional development of facilities and access to the Situk – especially boat launches. Reflecting an economic orientation, members of segment four are more likely than the rest of the community to prefer increased use of all types on the river. They are also least likely to prefer less motorized use of the river, with many preferring more motorized use above the weir and below the lower landing. They are similar in their

evaluation of current use levels to members of segment one – the other segment with high functional attachment. This segment is unique in their low level of support overall for management intervention. They are least likely of any of the segments to favor restrictions on motorized use of the river, or for reducing most other types of use. Even though they are not especially likely to sport fish themselves, they are least supportive across the segments for reducing sport fishing bag limits. Table 13 shows that this group only has statistically significant support for one (non-regulatory) management option – to encourage catch-and-release fishing.

Segment Five This segment - the largest of the five, representing 29% of residents of Yakutat, has the most intense bonds with the Situk River. The distinction of this group's bond type is that they have the highest scores on five of the six bond indicator factors, but one of the lowest scores on the sixth – the functional attachment factor. Along with segment four, this group includes the youngest members of the community – with a mean age of 40. This group contains the highest percentage of respondents identifying themselves as Tlingit (67%). They have lived in the community an average of 30 years, and compared to other segments, have lived in the community the greatest percentage of their lives (77%).

If there is one thing I feel is most important to keep in mind about the Situk and all resources Yakutat has, first is that there are very real cultural issues that need to be addressed, and I think they should be considered above all else. My personal opinion is that economic considerations are less important than maintaining the cultural and environmental integrity of the Situk. I would hate to see this town turned in to a resort for rich sport fishermen. All agencies need to work together to ensure that Yakutat grows in ways that benefit local people first. (Yakutat segment five respondent)

Segment five is highly representative of commercial fishers in Yakutat, with four times the average participation rate in the past year as the rest of the community. They also have the highest participation rates in subsistence fishing in the past year and in their lifetime, the second highest participation in recreation fishing in the past year, and the highest rate of recreation fishing participation on the Situk over their lifetime. They are

also the segment most likely to have guided or outfitted on the Situk in their lifetime. Similar to segment three, half of the segment five respondents indicate that they have experienced interference from non-local sport anglers on the Situk River, while neither group feels that local (Yakutat resident) recreationists have interfered with their use of the river. This segment is the most likely to feel that managers/LEO's/rangers have interfered with their Situk bonds, and they are less likely than other respondents to feel that the number of agency patrols on the river are currently too low. Segment five members rate current amounts of subsistence and commercial fishing regulation enforcement as too high. Members of this segment are very similar to members of segment three in their desire to see reduced levels of sport fishing and motorized use on the Situk, while being somewhat supportive of increased levels of commercial and subsistence harvests. They support decreasing sport fishing bag limits and prohibiting sport fishing below the lower landing. They are likely to feel that use in general should be held at the current level.

Summary of Management Concerns

A review of the combined findings of the qualitative interviews and the results of the quantitative survey suggests some of the many challenges faced by managers of the Situk River. Most respondents indicate some dissatisfaction with the current conditions on the river. The qualitative interviews reveal concerns by residents about overuse and inappropriate behavior of visiting sport anglers. The respondents in both phases of data collection offered very few criticisms of other residents' behaviors. The majority of questionnaire respondents (68%) feel that other people have negatively impacted the river, with most of that interference coming from non-local sport anglers (see Table 8). Residents associate very few problems with the behaviors of other local residents, regardless of activities. The long-term, economically attached segment (segment four) is most affected by the behaviors of other local users (9% indicate interference from commercial fishers and 6% indicate interference from other local subsistence users).

The human / place bond segment with low activity participation but high symbolic attachment, and the segment with high activity participation and high symbolic attachment (segments three and five, respectively) are most sensitive to the inappropriate

behaviors of non-local sport anglers. The newer resident sport anglers (segment two) are most sensitive in the community to impacts from motorized boaters. The greatest source of interference for the two primary sport-fishing groups (segments two and five) is non-local sport anglers, while each ranks a different source as the second greatest interference. The newer resident sport anglers (segment two) rank motorized boaters second, while the high use, emotionally attached, long-term anglers (in segment five) rank managers, law enforcement officers, and rangers secondary to non-local sport fishing groups as a source of interference with their human / place bonds with the Situk. While the use of motorized boats interferes with 26% of segment two members, they only interfere with 6% of residents in segment five.

Many respondents express dissatisfaction with motorized boating on the Situk River. The majority of respondents across all segments would prefer less motorized use above the weir; but there is more support for reducing rather than eliminating that use. There is less concern across the sample about motorized boating below the weir, although the majority would still prefer less motorized use there as well. These sentiments are somewhat consistent with those of the visiting sport anglers studied in 2003. The Situk River Recreation Visitor Study (Christensen et al. 2004) found the majority of visiting sport anglers would prefer less motorized use, with their response patterns on these items being very similar to those of the resident sport anglers group (segment two).

The use of jetboats on the river does not elicit the type of negative written comments from resident survey respondents as it did from the visiting recreationists surveyed in 2003. However, residents are almost as likely overall to support prohibiting jetboats on the river as were the visitors that were studied earlier. Consistent with their views on other use issues, members of segment three are especially in favor of eliminating jetboats from the river. Segment two (the short-term resident sport angling group) shows similar levels of support for eliminating jetboats as the visiting sport anglers, while segment five members (high symbolic attachment, long-term resident sport anglers) are considerably less supportive than visitors or segment two residents of eliminating jetboat use on the Situk River. Segment four respondents are least supportive of reducing jetboat use, a finding consistent with their high level of functional attachment and views against restricting tourism and sport fishing.

There is agreement across the Yakutat resident sample that more enforcement of existing sport fishing regulations and education of the visitors are desirable management options for reducing inappropriate behavior and encouraging catch-and-release fishing (see Table 9 and Table 12). There is much less agreement about the need for additional rules and regulations being established to change behaviors or to reduce current uses. The low use, symbolically attached group (segment three) is generally the most concerned about conditions and shows the highest levels of support for more restrictions. Table 13 indicates that they support all proposed management options except decreasing subsistence and commercial harvests of fish. In an example of contrasting management views among segments with similar human / place bond intensities, the segment three respondents favor imposing a daily limit on non-guided recreation use of the river, while segment two opposes it (all other segments are statistically neutral on this management option – see Table 13). The greatest difference in opinion about the appropriate amount of non-guided and guided sport fishing on the river is between segments three and four – two long term resident segments with similar, low levels of participation in recreation fishing and similar high levels of symbolic attachment and family/cultural values, but with very different levels of functional attachment to the Situk River.

Evaluation of the Application

In addition to including manager review of questionnaire design and documentation throughout the process, a formal evaluation was conducted at the end of the Yakutat case study to assess the likely benefits of the human / place bond research. McCool and Guthrie's (2001) dimensions of effectiveness of public participation are incorporated into an evaluation form that was administered to the managers and stakeholders (n=7) following presentation of the case study results. The evaluations implement a feedback loop between science and application. The use of a formal evaluation tool to focus on improving effectiveness of the application provides useful insight for continued development of the human / place bond model during future studies and should be part of the design whenever possible.

Table 14 shows the criteria evaluated by the Situk managers ranked in terms of their perceived effectiveness. All of the seven elements evaluated by the managers and

stakeholders are seen as positive contributions of the human / place bond research approach to the Situk River planning effort. Improving acceptability of the plan and increased understanding by the managers of the community are seen as the greatest benefits of the human / place bond method while improved trust and cooperation are seen as the least effective aspects. This formal quantitative evaluation is limited by a small sample size, but the results are consistent with managers' reactions throughout the research process.

Table 14: Managers' Evaluation of Human / Place Bond Research Effectiveness as a Form of Public Input; Yakutat Case Study, 2006.

Evaluation of Human / Place Bond Research Effectiveness by Situk Managers: (n=7)	Effectiveness Rank (1 is highest)
This information will improve the management plan's acceptability in the local community.	1
This information helps the managers better understand the local community.	2
This information will improve the management plan.	3
Consideration of this information will improve the community's sense of ownership in the solution.	4
Consideration of this information will improve the community's feelings of being heard in the planning process.	5.5
This information will improve understanding and cooperation among local residents in the community.	5.5
Consideration of this information will lead to improved trust between the community and managers.	7

Representatives of each of the managing agencies remained interested in the research and engaged in the review process during the project. This ongoing feedback improved the application for managers by retaining their interest, improving their familiarity with the results, and allowing them to explore the relevance to planning. The Forest Service district ranger at Yakutat, who has since relocated, commented that the report to managers of the qualitative and quantitative resident research results provides very good background for an incoming manager. With this report, the ranger believes, an incoming employee in any of the managing agencies could efficiently become familiar with a very complex local situation (Patricia O'Conner 2006, personal communication).

The local Alaska Department of Fish and Game manager agreed with Ranger O'Conner's comment and said that he definitely sees the value of the research to brief incoming members of the Situk River collaborative partnership (Robert Johnson 2006, personal communication)

Darby Study Quantitative Results

This section presents the results of analysis conducted on the quantitative survey data from the second case study. The complete set of data from the Darby case study survey are tabulated and summarized in Appendix E, arranged by survey question number. This section provides a description of the analysis following the same process used in the Yakutat case study. The analysis results are presented below in three phases. First respondents are segmented according to their responses to human / place bond indicators, including activity participation, assigned values, and emotional attachments (questions 1, 2, and 3, respectively on the questionnaire in Appendix C). Second, the human / place bond segments are described based on respondent characteristics (including characteristics of the three types of indicators of bond expression and respondent demographics measured in questions 13 – 19). Third, evaluations of conditions and preferences for management are compared across the human / place bond segments (questions 4 - 10).

Human / Place Bond Segmentation

The first step in developing these results is to segment the Darby and Conner resident respondents according to their human / place bonds with the Bitterroot National Forest. Dividing respondents between groups that share similar activity participation rates, values, and attachments associated with the Bitterroot National Forest provides a structure for understanding and considering the diverse desires of the local public for future conditions and management of the forest. The bond segments are identified using a combination of factor and cluster analyses based on three types of indicators of respondents' human / place bonds with the Bitterroot National Forest including: activity participation, importance of different types of resource values, and types of attachments to place. The following section presents the development of six Darby/Conner

community segments based on unique combinations of factors representing the three types of human / place bond components.

Identifying Indicator Sub-Dimensions

Separate factor analyses were conducted for each of the three human / place bond indicator types. The pools of items were reduced to six factors (two from each of the three factor analyses) representing the locally-relevant latent sub-dimensions of the bond indicators. Figure 12 shows the six factors and the items that comprise them. Items loading highest on the factors, and therefore being most representative, are listed first under each of the groups in Figure 12.

Figure 12: Segmentation Indicator Dimensions, Sub-dimension Factors, and Factor Items; Darby Case Study, 2007.

Activity Participation	
<u>Non-Motorized</u>	<u>Motorized</u>
Walking or hiking Camping in developed sites Camping in undeveloped sites Gathering firewood Plants, berries, mushrooms Fishing Picnicking	Snowmobiling ATV, motorized trail use
Assigned Values	
<u>Intangible</u>	<u>Tangible</u>
Cultural and historic Social - defining your community Spiritual or emotional Personal - defining who you are	Wildlife, fish habitat protection Watershed protection
Attachments	
<u>Functional</u>	<u>Symbolic</u>
No other place can compare to the BRF Wouldn't substitute any other place for BRF Rather live in my community than any other	I identify strongly with the BRF The BRF means a lot to me

Activity Participation Activity participation is assessed by combining responses to current, past, and other family member participation obtained in question one of the survey. The index of participation for each activity is created by assigning respondents a numeric score of '0' for no participation history, a '1' for participation prior to the past year, or a '2' for participation in the past year. The score is increased by one if the respondent's other household member(s) currently participate in the activity. Consideration of other household members' activity participation is included in this case study for two reasons: first, informal qualitative interviews with community members prior to the study design as well as comments made at the Darby Clubhouse meetings reveal the importance of family member activities in shaping one's attitudes about managing those activities; and second, the sampling design of this case study failed to adequately reach multiple household members, and this adjustment to the survey provides more information about household members otherwise missed.

The index measures of activity participation were assessed for normal distributions, and each measure was transformed to improve distribution if necessary using either an inverse, logarithmic, or square root operations. All of the activity indices were then standardized to z-scores for comparability prior to factor analysis. Five items were removed from the factor solution during iterative modeling. The removed items, listed in the order they were removed, include: horseback riding (commonality of 0.24), nonmotorized boating (commonality of 0.27), x-country skiing (commonality of 0.32), bicycling (commonality of 0.25), and backpacking (commonality of 0.30). Motorized boating satisfied the MSA and commonality criteria, and was retained in the model. However, it loads low on both of the major factors and is dropped from further consideration in the interpretation of the two-factor solution.

Two activity participation factors were identified in the factor analysis process and assigned descriptive names: 1) Nonmotorized Use, and 2) Motorized Use. The 'nonmotorized use' factor includes seven items, with walking/hiking and developed camping loading highest (Figure 12). Respondents with high scores on this factor would be likely to participate in most of the activities in the factor. Walking/hiking and developed camping are the most representative activities respondents would participate in if they scored high on this factor. The 'motorized use' factor includes two motorized

recreation use items: snowmobiling and ATV use. The finding of major differences in participation patterns between motorized activities and all others is consistent with qualitative data and the literature suggesting the division would reflect the major controversy surround local forest planning. The dominance of snowmobiling in the factor is somewhat surprising as most discussions at the Darby Clubhouse meetings seemed to focus more on summer use. However, the inclusion of both snowmobiling and ATV use in the same factor supports its validity as a reflection of the division between motorized and nonmotorized activity advocates.

Table 15: Activity Item (Survey Q1) Factor Score Coefficients; Darby Case Study, 2007.

Activity Item:	Variable Number	Factor Score Coefficients:	
		Factor One: Non-motor Activities	Factor Two: Motorized Activities
Walking or hiking	q1a	0.16	0.03
Camping in developed sites	q1k	0.17	0.05
Camping in undeveloped sites	q1l	0.20	0.08
Gathering firewood	q1p	0.15	0.07
Gathering plants, berries, mushrooms	q1h	0.17	0.07
Fishing	q1c	0.19	0.07
Picnicking	q1m	0.22	0.05
Snowmobiling	q1g	-0.19	0.73
ATV, motorized trail use	q1f	0.03	0.10
Motorized boating	q1j	0.06	0.05
Cronbach's alpha reliability coefficient (boxed items):		0.84	0.71

Assigned Values The 11 items in this scale all originally showed severe negative skewness and were transformed by reflect and inverse to improve the qualities of a normal distribution. The transformed variables were standardized to z-scores for comparability. Five variables were removed from the final solution during iterative modeling for exhibiting low commonality. The dropped variables, listed in the order they were removed from the model, include; economic value of recreation (commonality of 0.21), economic value of timber (commonality of 0.19), recreation opportunity (commonality of 0.21), hunting (commonality of 0.22), and family (commonality of 0.16). Two types of assigned values emerged from the factor analysis of responses to the

eleven items in question 2. These two sub-dimensions follow the theoretical division suggested in the literature of tangible and intangible values. The intangible value factor includes four items, with the most representative being cultural/historic and social values. Tangible values consist of two environment-related items, including wildlife/fish habitat protection and watershed protection.

Table 16: Value Item (Survey Q2) Factor Score Coefficients; Darby Case Study, 2007.

Value Item:	Variable Number	Factor Score Coefficients:	
		Factor One: Intangible Values	Factor Two: Tangible Values
Cultrural and historic	q2g	0.37	-0.02
Social - defining your community	q2k	0.29	-0.08
Spiritual or emotional	q2f	0.27	0.01
Personal - defining who you are	q2j	0.23	-0.04
Wildlife, fish habitat protection	q2d	-0.17	0.79
Watershed protection	q2a	-0.02	0.19
Cronbach's alpha reliability coefficient (boxed items):		0.82	0.71

Attachments to Place The 11 items in this scale were also transformed to improve the qualities of a normal distribution. The transformed variables were standardized to z-scores for comparability. Five variables were removed from the final solution during iterative modeling for exhibiting low commonality or sever double loading. The dropped variables, listed in the order they were removed from the model, include; q3c - “similar place” (commonality of 0.13), q3d - “benefit more from the Selway Bitterroot Wilderness (commonality of 0.29), q3j - “strong ties” (commonality of 0.31), q3h - “specific places” (commonality of 0.32), and q5k - “the Selway Bitterroot is a part of me” (for loading high on both factors). Another item, q3f - “a lot about who I am” also double loaded, but was retained because it was a low double loading, it satisfied the MSA and commonality criteria for retention, and retaining the item contributed to the stability of the factor solution. However, this retained item does not contribute to the interpretation of the two-factor solution. The two attachment to place factors follow a theoretically-suggested division and are labeled ‘functional’ and ‘symbolic.’ Functional attachment consists of

three items, the most representative being ‘No other place can compare to the Bitterroot National Forest.’ Symbolic attachment consists of two items: 1) ‘I identify strongly with the Bitterroot National Forest,’ and 2) ‘The Bitterroot National Forest means a lot to me.’

Table 17: Attachment Item (Q3) Factor Score Coefficients; Darby Case Study, 2007.

Attachment Item:	Variable Number	Factor Score Coefficients:	
		Factor One: Functional Attachment	Factor Two: Symbolic Attachment
No other place can compare to the BRF	q3g	0.47	0.01
Wouldn't substitute any other place for BRF	q3i	0.40	0.00
Rather live in my community than any other	q3e	0.09	0.04
I identify strongly with the BRF	q3b	0.01	0.57
The BRF means a lot to me	q3a	-0.02	0.32
Visiting BRF says a a lot about who I am	q3f	-0.11	-0.12
Cronbach's alpha reliability coefficient (boxed items):		0.79	0.84

Following the factor analysis, each respondent is assigned a factor score for each of the six factors. The factor scores are standardized in the form of z-scores with an overall sample mean of zero and standard deviation of one. Respondents are assigned a negative z-score for a factor when they rate the questionnaire items included in that factor lower than average; they are assigned a positive z-score when they rate the items in the factor above average. Along with scores for individual factors, a ‘human / place bond intensity index’ score is calculated for each respondent based on combined scores across the six indicator factors. As with the individual factor scores, human / place bond intensity index scores are re-calculated as z-scores with negative values representing below average scores and positive values representing above average intensity scores. An individual would have a high overall intensity index if they scored high on all of the indicator factors and a low overall score if they scored low on all factors. While these two groups of high and low overall bond intensities would have internal consistency, individuals with medium intensity scores differ from each other in the types of bonds that they have. One individual with a medium intensity bond may participate in a variety of activities but form no emotional or cognitive ties to the place, while another medium

intensity individual may have low activity participation rates but feel a strong emotional bond to the place (perhaps developed through past activity participation).

Identifying Community Segments

The three factor analyses described above produce six factor scores for each individual respondent. Cluster analysis, using a k-means algorithm, is employed to identify groups of individual respondents with similar response patterns across the six factors. The cluster analysis identified six clusters, or community segments, based on similar response patterns to the six human / place bond factors. The six human / place bond community segments each represent from 16% to 22% of Darby and Conner residents.

Community Segment Characteristics

Table 18 summarizes the results of the cluster analysis, showing the characteristics of the human / place bond factors across the six community segments. In its first section, Table 18 shows the distribution of the community segments along with their overall human / place bond intensity index scores. The community segments are labeled according to their relative overall intensity. The six segments are listed below in order of ascending overall human / place bond intensity scores along with their most distinguishing component.

1. Overall bond index of -0.6, tangible values are most important;
2. Overall bond index of -0.2, multiple activity participation;
3. Overall bond index of -0.2, motorized activities are the primary bond component;
4. Overall bond index of 0.1, intangible values are most important;
5. Overall bond index of 0.2, nonmotorized activities; and
6. Overall bond index of 0.7, activities and attachment indices are all high.

Table 18 shows characteristics of these segments. The second section of table 18 lists the z-scores on each of the six human / place bond factors that are used to segment the sample of respondents. Note that the 'overall' column in Table 18 shows zeros for all z-scores because that is the overall average of the standardized scores. Community

segments with negative z-scores on human / place bond factors rate the items in it below the overall average while segments with positive scores rate the items above average.

Table 18: Sample Distribution, Overall Bond Intensity, and Strength of Indicator Factor Scores by Community Segment; Darby Case Study, 2007.

Segmentation Characteristics	Community Segment						Overall
	One	Two	Three	Four	Five	Six	
Percentage of overall sample	18%	16%	10%	22%	18%	16%	100%
Sample size	44	38	25	54	44	40	245
Bond intensity score (z-score, overall avg = 0, sd = 1)	-0.6	-0.2	-0.2	0.1	0.2	0.7	0.0
<i>Relative Strength of Indicator Factors:</i>							
Nonmotorized activities (z-score)	-- (-1.0)	+ (0.4)	Ø (0.1)	-- (-0.8)	++ (0.9)	++ (0.8)	0.0
Motorized activities (z-score)	- (-0.6)	+ (0.6)	+ (0.8)	- (-0.6)	- (-0.7)	++ (1.2)	0.0
Intangible values (z-score)	-- (-0.9)	- (-0.3)	- (-0.5)	++ (0.7)	Ø (0.1)	+ (0.5)	0.0
Tangible values (z-score)	Ø (0.1)	Ø (-0.1)	-- (-1.5)	+ (0.3)	+ (0.4)	Ø (0.1)	0.0
Functional attachment (z-score)	- (-0.4)	-- (-1.0)	- (-0.2)	+ (0.5)	Ø (0.1)	++ (0.9)	0.0
Symbolic attachment (z-score)	-- (-1.0)	-- (-1.0)	Ø (0.1)	+ (0.6)	+ (0.5)	++ (0.8)	0.0

The segmentation process identified three groups in the local community with relatively frequent participation in motorized activities on the Bitterroot National Forest. These include segments two, three, and six. The segmentation analysis also found one group, segment five, with very high nonmotorized activity rates but very low participation in motorized activities. The two remaining segments, one and four, do not participate nearly as much as other segments in any type of activity.

Figure 13 shows the distribution of human / place bond intensity index scores across the six community segments along with bar graphs at the top of each segment representing their relative size in the population. The graph shows that:

- Segments one, two, and three have wide overall bond intensity index score distributions.
- The three segments with higher human / place bond scores have more internally consistent scores.
- Segment one includes some very low individual overall intensity scores compared to other segments.
- Segments two and three share similar overall intensity scores and distributions as do segments four and five.

Figure 13: Percent Distribution of Bond Intensity Index Scores for Each Community Segment; Darby Case Study, 2007.

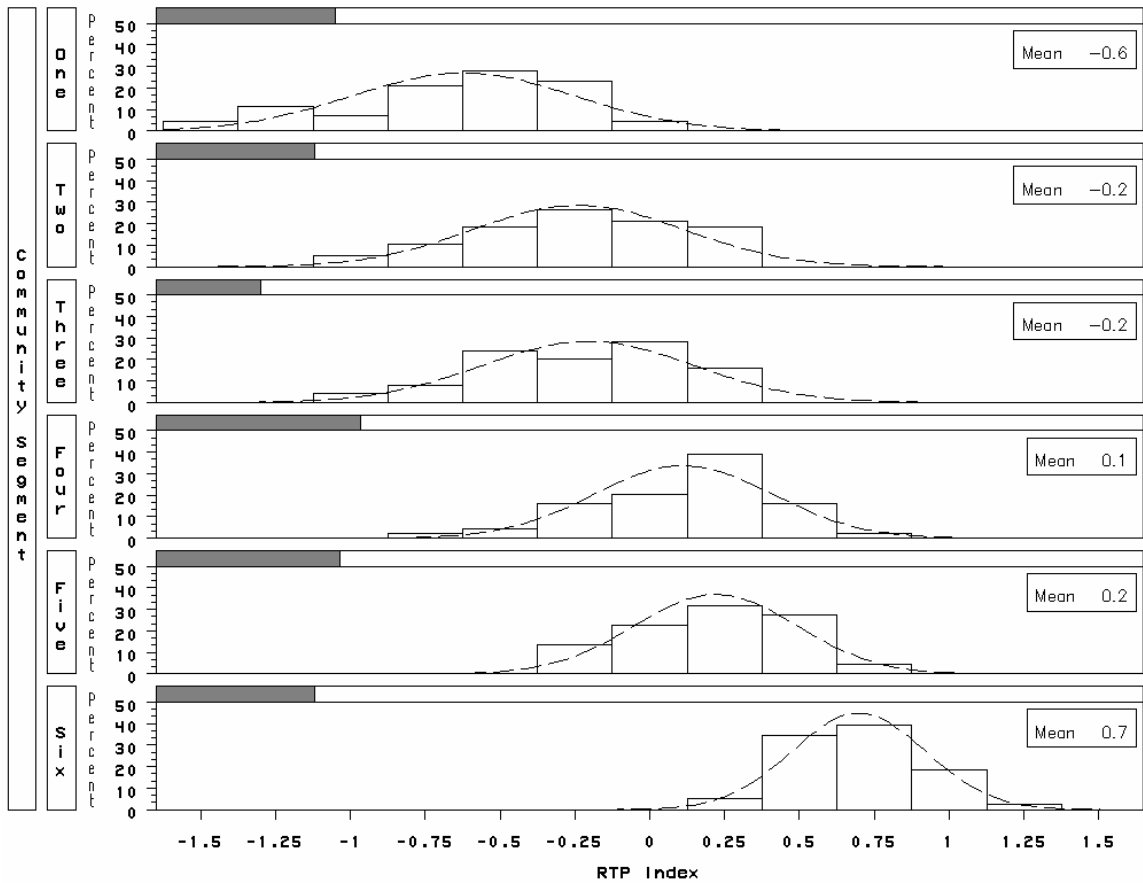


Figure 14: Percent Distribution of Respondent Age for Each Community Segment; Darby Case Study, 2007.

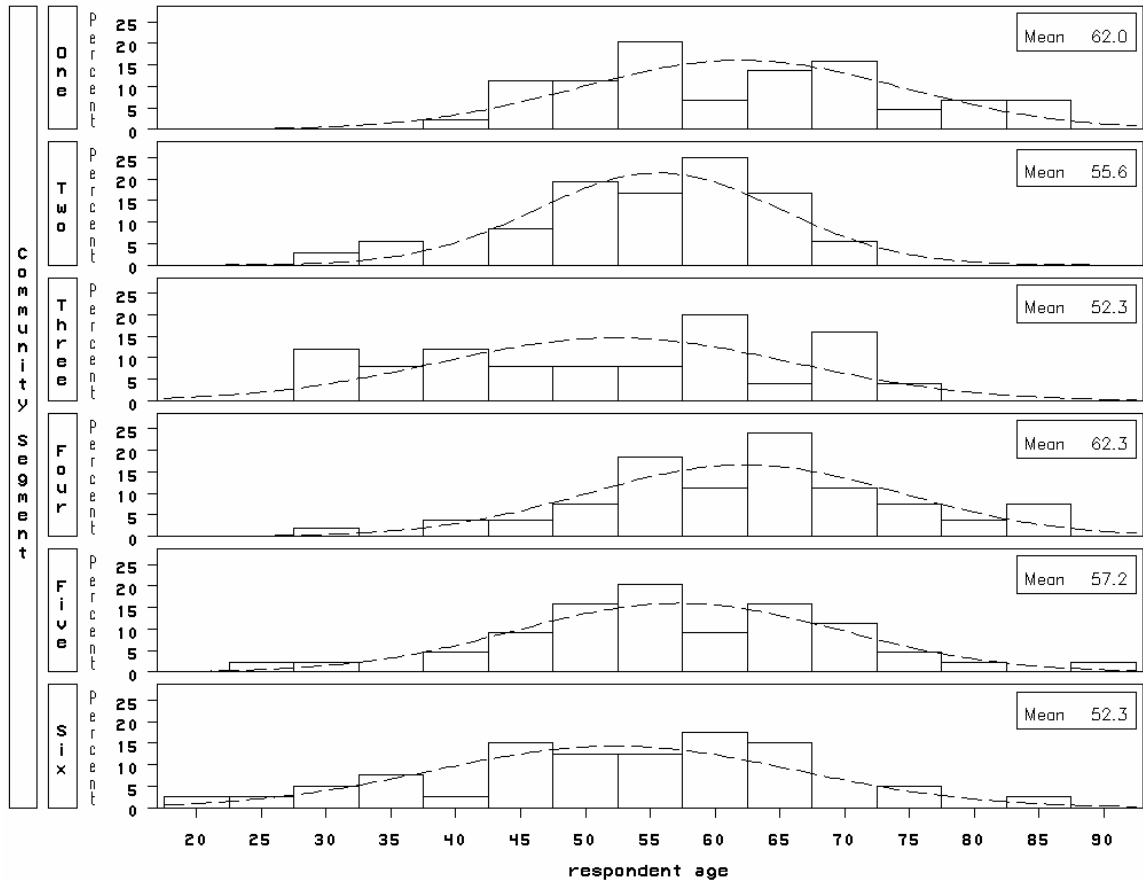


Table 19 shows demographic characteristics of the respondents across each of the six community segments. Sixty percent of the respondents in the overall sample are male. As the gender split should be about 50/50 in a normal population, this confirms that selecting names from the telephone directory tends to over sample males. The adjustment that was made to the random sampling process to mitigate this effect, as described in the methods section, was not completely effective. Interpretation of results should consider this possible gender effect bias. The average household size overall is 1.6, with almost a quarter of the households having children living at home. Most of the respondents across all of the segments indicate that they live in a rural area rather than ‘in town’ in Darby or Conner. Overall, respondents have lived less than half of their lives, on average, in their current community and in Montana.

Table 19: Demographics by Community Segment; Darby Case Study, 2007.

Q13 - Q19: Respondent Demographic Characteristics:	Community Segment						Overall
	One	Two	Three	Four	Five	Six	
Percent male	48%	67%	76%	56%	64%	60%	60%
Average household size	1.3	1.4	2.5	1.4	1.7	2.1	1.6
Households with children	16%	14%	52%	17%	23%	38%	24%
Home in rural area	93%	73%	68%	87%	73%	95%	83%
Years in Darby or Conner	16	20	32	18	19	23	20
Years in Montana	22	23	39	22	22	25	24
Portion of life in community	26%	36%	63%	28%	32%	47%	37%
Portion of life in Montana	35%	42%	75%	36%	39%	52%	44%

Table 20 summarizes activity participation in the past year on the Bitterroot National Forest and compares participation rates across the segments. The activities are rank ordered, listing the most popular activities first. Walking or hiking on the Bitterroot National Forest is the most popular activity listed on the survey and is enjoyed by over 80% of the respondents. Picnicking, fishing, and gathering plants, berries, and mushrooms are the other activities that are participated in by at least half of all respondents. Hunting and gathering firewood on the Bitterroot National Forest are also practiced by almost half of the respondents. The list of the most popular activities suggests a similarity to the Yakutat case study in the importance of the Bitterroot National Forest to local residents for obtaining basic subsistence-type needs from these public lands (the top activities include fishing, hunting, gathering plants, and collecting firewood), as well as for pursuing recreation opportunities.

Table 20: Activity Participation Rates by Community Segment; Darby Case Study, 2007.

Q1: Respondent Activity Participation Rates (in past year)	Community Segment - Percent Participation (%)						
	One	Two	Three	Four	Five	Six	Overall
Walking or hiking	57	95	76	74	98	95	82
picnicking	39	68	64	43	84	75	61
fishing	34	66	52	33	77	85	57
Gathering plants, berries, mushrooms	18	50	52	26	77	85	50
hunting	32	63	64	20	52	70	47
Gathering firewood	16	66	44	20	68	70	46
Camping in developed sites	11	42	48	20	59	58	38
Camping in undeveloped sites	11	45	28	17	61	65	37
Non-motorized boating, floating	18	39	44	22	55	48	36
ATV or other motorized trail use	11	61	68	9	7	88	36
Bicycling or mountain biking	7	37	20	11	48	53	29
Horseback riding	11	26	24	20	23	38	23
Cross-country skiing	18	21	12	6	32	28	19
Overnight backpacking	5	24	20	6	36	28	19
Motorized boating	5	34	20	9	2	43	18
Snowmobiling	2	26	40	4	0	48	17

Implications of Human / Place Bond Segmentation

The remainder of the chapter examines how local residents' human / place bonds with the Bitterroot National Forest correspond with their views on conditions and preferences for management options for the forest. The community segments are first compared on their opinions about other people's behaviors. They are then assessed for their opinions about current conditions and current management of the forest. Third, they are compared on their preferences for management options

Conditions, Impacts, and Interference from Others Table 21 presents the results from question 4 of the survey asking about perceptions of negative impacts. The majority of respondents across all segments feel that the Bitterroot National Forest has been negatively impacted by the inappropriate behaviors of other people (75% overall). In general, larger human / place bond intensity index scores correspond to more concern

about negative impacts. Members of segment five are most likely to perceive negative impacts (86%), while members of segment one are least likely (64%). Table 21 also provides a quantitative summary of the open-ended responses to question 4 by showing the number of responses by category of concern. The categories for the responses were developed during the analysis of the survey results. The most frequently cited type of concern about impacts (mentioned by 69 of the respondents) involves acts of littering, garbage dumping, and similar types of lack of respect for the place. The next most frequently mentioned type of impact is the involvement of environmental organizations, such as the Friends of the Bitter Root, in stopping traditional forest management or having too much influence on management decisions. Patterns of responses vary somewhat across community segments. Segments four and five are especially likely to mention concerns about motorized recreation. Segments two and three seem more likely to mention concerns about not enough logging and Forest Service management practices.

Table 21: Negative Impacts by Community Segment; Darby Case Study, 2007.

Q4: Behaviors and the types of impacts that most concern you	Community Segment						Overall
	One	Two	Three	Four	Five	Six	
BRF has been impacted by inappropriate behaviors of others:	64%	71%	72%	78%	86%	75%	75%
What are the behaviors and the types of impacts that most concern you? (frequency of open-ended written response by category):							
Litter, pollution, garbage dumping, lack of respect	13	9	0	17	19	11	69
Environmental orgs suing and stopping traditional culture, FOB, too much influenc on mngt	3	6	7	9	6	8	39
Off-road driving, excessive ATV use, impacts	6	5	1	12	11	3	38
Illegal ATV use, off designated trail	7	4	0	4	7	3	25
Vandalism	3	1	0	5	4	1	14
Lack of logging, no timber sales, dead and rotting - wasted timber	2	4	3	1	0	3	13
Careless with fire	1	2	0	2	4	4	13
Lack of stewardship, concern, land ethic among users	4	0	0	4	3	2	13
Poor management, management	0	3	3	2	0	4	12
Poaching	2	1	0	4	3	2	12
Powerful special interests, conflicts between interests	1	2	1	0	1	3	8
Poor managment leading to fire, forest fires in general	0	0	3	1	1	1	6
Noise (motorized)	1	2	0	0	0	2	5
Indiscriminate firearm, gun use, target practice	0	1	0	2	2	0	5
Clear cut logging	1	0	0	3	1	0	5
Logging	0	0	0	3	1	0	4
Growth of WUI	0	0	1	2	1	0	4
Predators	2	2	0	0	0	0	4
Over fishing	1	1	0	0	1	0	3
Harrassing wildlife	2	0	0	1	0	0	3
Fuel build-up	0	1	0	0	0	2	3
Poor management leading too excessive beetle kill	0	2	1	0	0	0	3
Horse use/camping in Wilderness	0	0	0	0	3	0	3
New comers, out-of-staters	0	0	1	1	0	0	2

While question 4 asked respondents to indicate their concerns about negative impacts to the forest, question 5 asked them to reflect on negative influences of other people on their own ability to use and enjoy the forest. Table 22 presents results from question 5 asking respondents to identify interferences with their own human / place bonds with the Bitterroot National Forest. The responses are arranged in descending order of perceived interference with human / place bonds. Overall, environmental organizations are most often mentioned as interfering with respondents' human / place bonds with the Bitterroot National Forest (41%). That is also true across each of the community segments except five. Members of segment five still sight environmental groups fairly often (32%), but they are more likely to mention motorized recreationists as interfering with their bonds with the Bitterroot National Forest (55%). The following are additional observations about interference across the segments:

- Members of segment one are least concerned in general about interference with their human / place bonds; 27% mention environmental organizations and 23% mention motorized recreation as sources of interference.
- Members of segment three are least likely to mention interference from motorized recreation use of the Bitterroot National Forest (4%).
- Members of segment three are most likely of the segments to mention interference from environmental organizations (68%), residents living near the forest boundary (28%), professional guides/outfitters (24%), and nonmotorized recreationists (12%).
- Members of segment five, perhaps the segment most sensitive to interference, are more likely than other segments to mention problems from motorized recreationists (55%), visitors from out of the area (27%), hunters (27%), anglers (14%), and commercial operators (14%).
- Members of segment six are the most likely of the segments to cite interference from managers and law enforcement (25%).
- Segment two members are a close second, with 21% citing interference from managers and law enforcement.

The following is a representative example of a segment four comment.

What changes to the local community would make you unhappy?

*People moving in trying to change the Bitterroot into California.
Homeowner Association telling people they have to be zoned for horses,
chickens, etc. They can't ride 4-wheelers or climb trees without permits.
(Darby segment four respondent)*

Table 22: Types of Interference and Problems by Community Segment; Darby Case Study, 2007.

Q5: Who has interfered with your relationship to the BRF?	Community Segment - Percent Response (%)						Overall
	One	Two	Three	Four	Five	Six	
Environmental organizations	27	53	68	28	32	55	41
Motorized recreationists	23	24	4	33	55	25	29
Visitors from out of local area	2	21	20	11	27	20	16
Residents living near the national forest boundary	11	18	28	13	18	15	16
Professional guides/outfitters	11	24	24	4	16	20	15
Hunters	9	8	12	9	27	10	13
Managers, law enforcement officers, ranger patrols	2	21	16	2	7	25	11
Commercial operators such as loggers or miners	7	0	4	13	14	10	9
Anglers	0	0	4	2	14	3	4
Nonmotorized recreationists	5	5	12	4	5	0	4

The MANOVA test assesses overall response effect of segment membership.

MANOVA Test (Wilks' lambda):	Test Value	F Value	Num DF	Den DF	Pr > F
	0.643	2.14	50	1052	<0.0001

Current Levels of Management, Services, and Facilities In Table 23 the results of respondents' evaluation of the level of current services and facilities on the Bitterroot National Forest are presented. The table indicates which community segments rate items statistically significantly different from 'about right.' All of the conditions for items in the list are rated low overall, except for the level of developed campsites and the level of law enforcement. Members of segment three are the only group to give a 'too high' rating on any of the items – they rate the level of law enforcement as 'too high,' and they

are also least likely of the groups to think that the other items are too low. Members of segment five are most likely to perceive items as being too low, in general.

Table 23: Views on the Level of Management Services and Facilities by Community Segment; Darby Case Study, 2007.

Q6: Current Management Services and Facilities	Community Segment						Overall
	One	Two	Three	Four	Five	Six	
Recreation facility maintenance	Low				Low	Low	Low
Road and trail maintenance	Low	Low	Low	Low	Low	Low	Low
Recreation travel information and regulation signs					Low		Low
Toilet facilities.		Low					Low
Primitive campsites							Low
Developed campsites							
Parking for recreation access		Low					Low
Law enforcement			High	Low	Low		
Education about appropriate behavior and stewardship	Low	Low		Low	Low	Low	Low
Consideration of local concerns in management decisions	Low	Low	Low	Low	Low	Low	Low

The MANOVA test assesses overall response effect of segment membership.

MANOVA Test (Wilks' lambda):	Test Value	F Value	Num DF	Den DF	Pr > F
	0.625	2.23	50	1030	<0.0001

Individual t tests with Bonferroni corrections for multiple comparisons found items marked 'Low' or 'High' to differ significantly from 0 - 'about right' at $p \leq 0.05$.

The next table (table 24) shows the results of respondents' evaluations of the currently recreation opportunities available on the Bitterroot National Forest. Overall, the community feels that hunting and fishing opportunities are currently too low. Because of more variation within groups than across the entire community, those items are not rated statistically significantly low by any of the individual segments, however. Members of segment three feel that current opportunities for ATV motorized recreation and snowmobiling uses are too low while, in contrast, members of segment four feel those same opportunities are currently too high. Not surprisingly, members of segment five also feel that current opportunities for ATV motorized recreation use are too high.

Table 24: Views on the Level of Current Recreation Opportunities by Community Segment; Darby Case Study, 2007.

Q7: Current Recreation Opportunities	Community Segment						Overall
	One	Two	Three	Four	Five	Six	
Hiking, backpacking							
Horseback riding				Low			
Bicycling or mountain biking							
ATV, motorized recreation			Low	High	High		
Fishing							Low
Hunting							Low
Snowmobiling			Low	High			

The MANOVA test assesses overall response effect of segment membership.

MANOVA Test (Wilks' lambda):	Test Value	F Value	Num DF	Den DF	Pr > F
	0.730	2.11	35	953	0.0002

Individual t tests with Bonferroni corrections for multiple comparisons found items marked 'Low' or 'High' to differ significantly from 0 - 'about right' at $p \leq 0.05$.

Preferences for Management Options Question 8 on the survey asked respondents to indicate their level of opposition or support for eleven different general management options for the Bitterroot National Forest. Figure 15 rank orders the overall responses to those options from most popular to least. The pattern shows the most popular management options being a mix of access alternatives for motorized/nonmotorized uses. The most popular option on the list is to 'provide more hiking and horse opportunities closed to motorized use' and the second most popular is to 'remove illegal motorized routes.' In contrast to these 'nonmotorized views,' the third most popular option is to provide more motorized access by opening gated roads for summer use. In general, it is more popular in the community to increase motorized access on existing travel routes than to create new access opportunities for motorized use.

Figure 15: Overall Level of Support for Management Options; Darby Case Study, 2007.

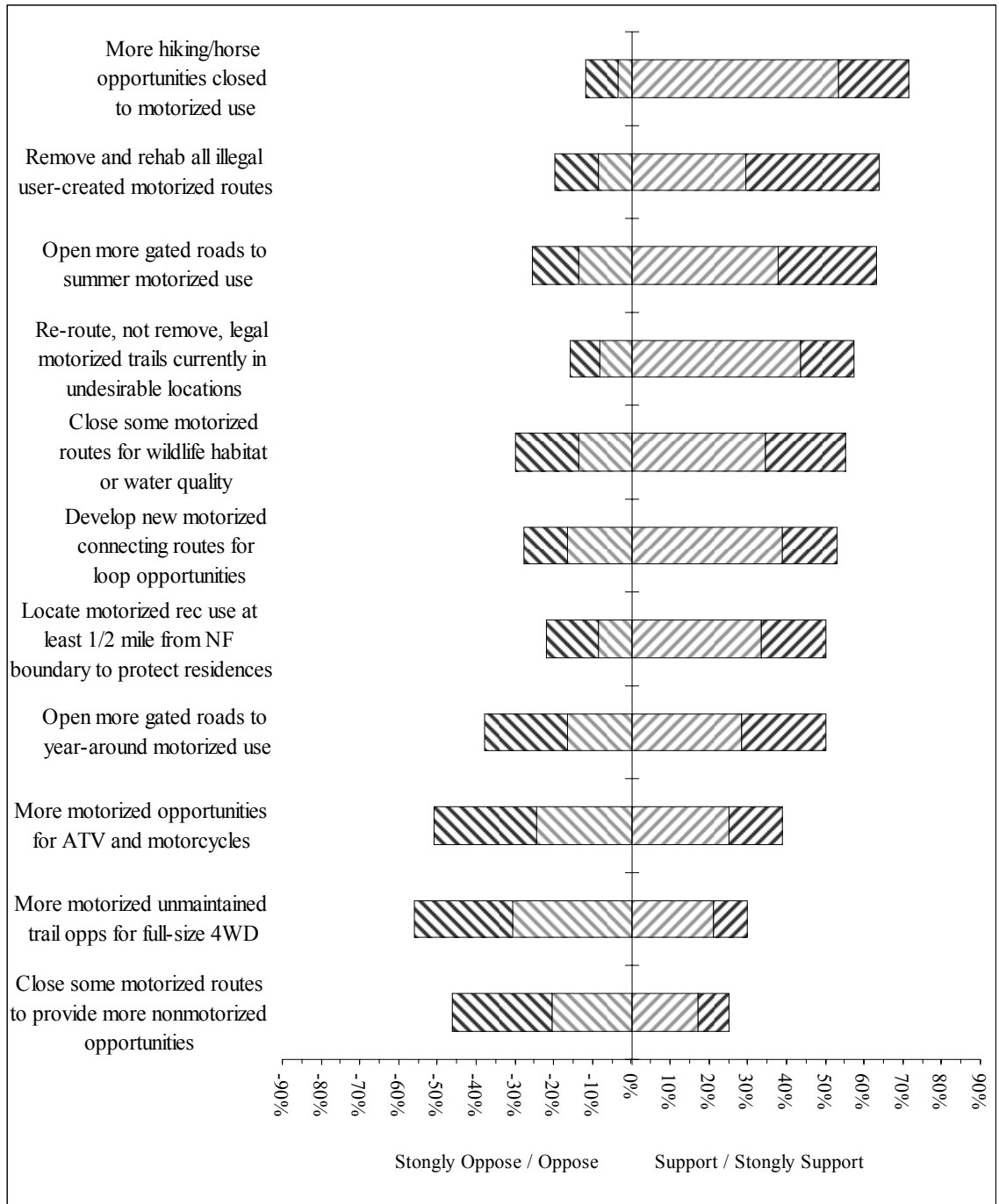


Table 25 shows statistically significant levels of support or opposition across the community segments for the 11 Bitterroot National Forest management options listed in Figure 15. Consistent with the figure, Table 25 shows that ‘providing more hiking/horse opportunities closed to motorized use’ has broad support across the segments – except for

segment three that neither supports nor opposes this most popular management option. Community segment three generally supports all options that would improve or protect motorized access while opposing all options that could limit motorized use - even to the extent that they are the only segment opposed to removing and rehabilitating illegal, user-created motorized routes. Only one other group (segment two, also a motorized user group) doesn't support it outright. The most active motorized user group, segment six supports removing illegal routes, although they tend to agree with the other two motorized groups on most issues related to improving motorized access.

Table 25: Opinions about Bitterroot National Forest Management Options by Community Segment; Darby Case Study, 2007.

Q8: Opinions about General Management Options	Community Segment						Overall
	One	Two	Three	Four	Five	Six	
More motorized opportunities for ATV and motorcycles			Support	Oppose	Oppose		
More motorized unmaintained trail opps for full-size 4WD	Oppose		Support	Oppose	Oppose		Oppose
More hiking/horse opportunities closed to motorized	Support	Support		Support	Support	Support	Support
Open more gated roads to year-around motorized use		Support	Support			Support	
Open more gated roads to summer motorized use		Support	Support			Support	Support
Close some motorized routes to provide more nonmotorized opportunities		Oppose	Oppose			Oppose	Oppose
Close some motorized routes for wildlife habitat or water quality			Oppose	Support	Support		Support
Locate motorized rec use at least 1/2 mile from NF boundary to protect residences			Oppose	Support	Support		Support
Develop new motorized connecting routes for loop opportunities		Support	Support				
Re-route, not remove, legal motorized trails currently in undesirable locations			Support	Support	Support	Support	Support
Remove and rehab all illegal user-created motorized routes	Support		Oppose	Support	Support	Support	Support

The MANOVA test assesses overall response effect of segment membership.

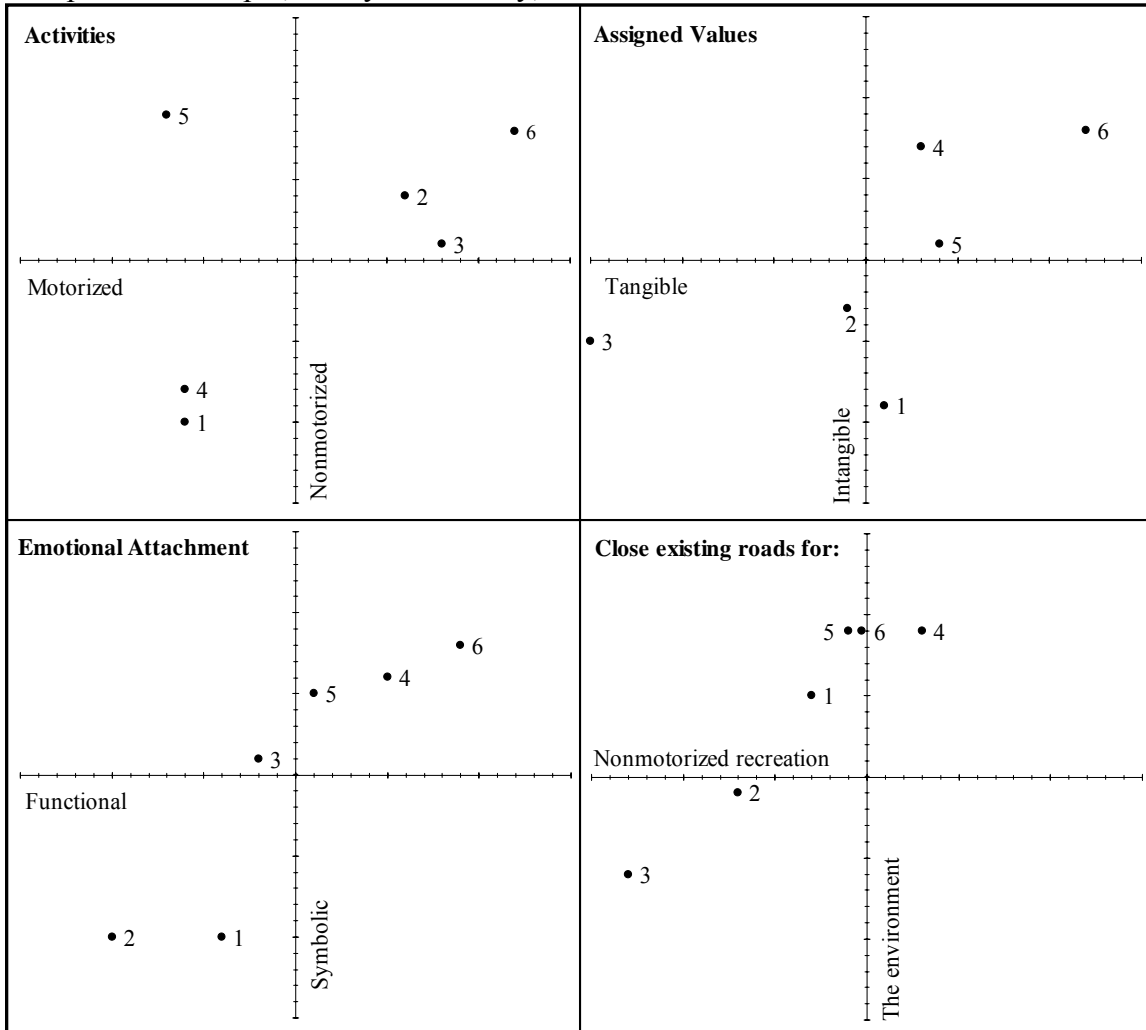
MANOVA Test (Wilks' lambda):	Test Value	F Value	Num DF	Den DF	Pr > F
	0.512	3.01	55	1064	<0.0001

Individual t tests with Bonferroni corrections for multiple comparisons found items marked 'Oppose' or 'Support' to differ significantly from 0 - 'not sure' at $p \leq 0.05$.

The following figures illustrate the link between human / place bond components and the amount of support for management options related to travel management. Figure 16 shows a series of four two-dimensional charts. The top two charts and the bottom left

chart plot the positions of each of the six Darby segments relative to the sub-dimensions of the three human / place bond components while the bottom right chart compares attitudes across two reasons for limiting motorized access. Figures 17 and 18 further illustrate these differences. In Figure 16, there are three Darby community segments that have similar patterns of activity participation (segments two, three, and six), with all three showing above average participation rates for both motorized and nonmotorized activities. These segments have much less in common on the other two types of human / place bond expressions. The three highest intensity segments cluster in the upper right quadrant of both the assigned values and the emotional attachment components. It is also the three highest intensity segments that show the highest level of support for closing roads to protect the environment. Segment four (the quiet user group) is most supportive of closing roads to enhance nonmotorized recreation, while segments two and three (two of the motorized user groups) are least supportive of closing existing roads for any reason.

Figure 16: Quad Plots of Bond Sub-Components and Management Preference Comparison Example; Darby Case Study, 2007.



The following two figures illustrate opinions about management options for motorized use that further clarify the relationships between bonds and attitudes shown above. The figures show the percentages of agreement and disagreement for each segment. Shorter bars indicate a larger percentage of ‘not sure’ responses, while segments with longer bars on both sides of the agree/disagree line have more internal disagreement. Figure 17 illustrates the diversity of opinions in the community surrounding access issues. It shows that most of the segments have fairly high internal agreement, with the majority of respondents favoring the removal of illegal user-created motorized routes. However, segments two and three show more internal disagreement, with respondents both agreeing and disagreeing on this option. Figure 18 also illustrates

diversity across segments with opinions about opening currently gated access routes. The option explored in this question is more moderate than the previous option, and unlike figure 16, this figure shows consistency across the three motorized user groups (segments two, three, and six) and less support from the other three groups for this motorized access policy.

Figure 17: Level of Support for Removing Illegal User-Created Motorized Routes by Community Segment; Darby Case Study, 2007.

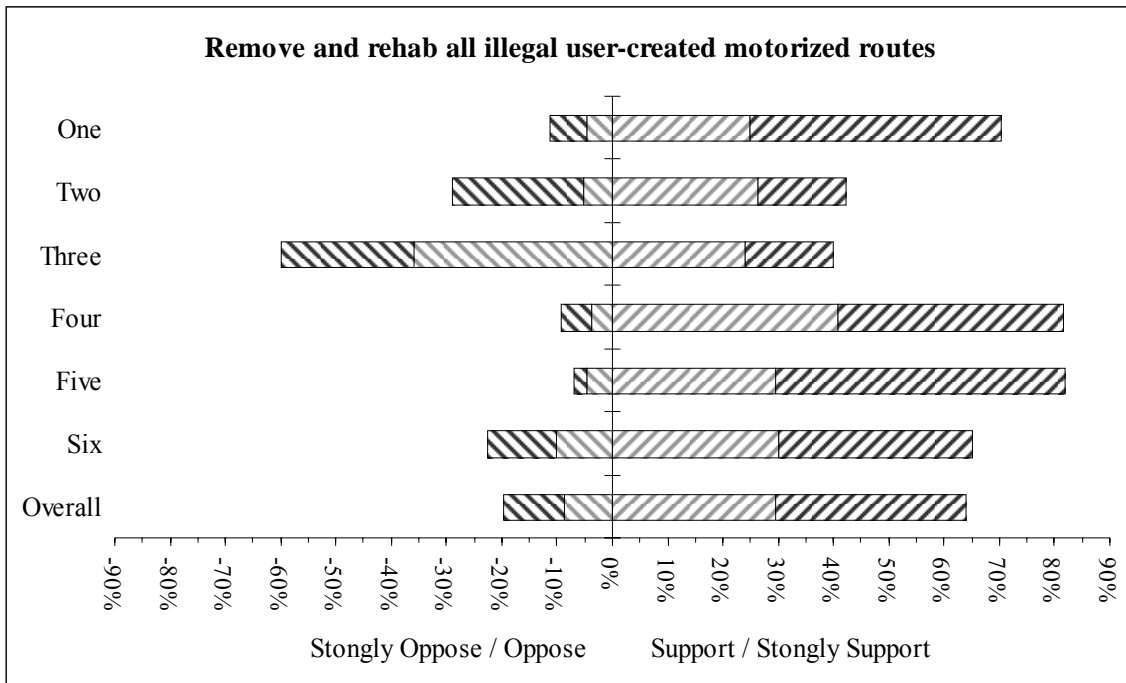
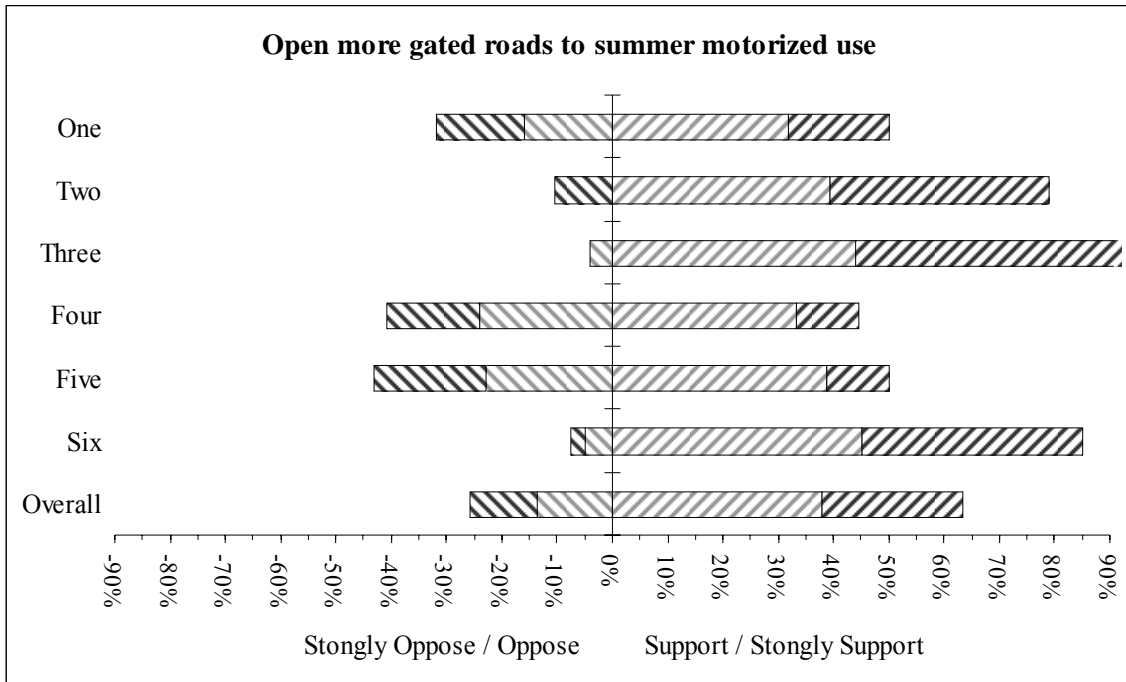


Figure 18: Level of Support for Opening More Gated Roads during Summer Months by Community Segment; Darby Case Study, 2007.



To further understand views on management of the Bitterroot National Forest, respondents were asked to offer written suggestions for improvements in management of the forest. Question 12 asked respondents to reflect on the most important things that need to be done to improve the Bitterroot National Forest. During analysis of the results the responses to question 12 were categorized to summarize the general types of suggestions. Table 26 presents the frequency responses to the categories that were developed. The most frequently mentioned type of suggestion is to conduct salvage logging to harvest already dead timber (38 respondents wrote in this type of comment). Following salvage logging in frequency are suggestions to limit the influence of environmental organizations in management decisions (31 respondents), conducting general fuel reduction (29), and general logging (28). Notice that many of the suggestions in Table 26 are related to fire, fuels, and timber management, and that these types of suggestions are made across all of the community segments. The segments seem to differ more on the types of treatments and the language they use to describe the treatments. For example, the idea of ‘salvage logging’ is especially popular with segment two respondents (11), while segment three members are more likely to talk about

increasing logging or harvesting in general, and segment four along with segment six members are more likely to mention 'fuel reduction.'

Table 26: Categories of Responses to Written Opinions about Improving the Management of the Bitterroot National Forest by Community Segment; Darby Case Study, 2007.

Q12: The most important things that need to be done to improve the BRF	Community Segment - frequency of response						Overall
	One	Two	Three	Four	Five	Six	
Salvage logging, harvest dead and burned timber, beetle killed timber, clean forest by removing (not burning) material	5	11	4	5	6	7	38
Limit consideration of environmental special interests (FOB) in management decisions	5	5	2	6	5	8	31
Fuel reduction	2	5	4	9	2	7	29
Harvest, more logging in general	4	5	10	2	3	4	28
Open gated roads, more access to forest, no more closures, more motorize access	1	8	4	1	1	10	25
Fire control, suppression, prevent	3	4	1	5	7	4	24
More law enforcement	4	3	0	7	7	2	23
More local control, more localized management of FS, let locals manage forest, increased consideration of local interests	1	4	4	0	4	6	19
Better management in general	1	1	3	2	3	5	15
Road, trail, maintenance in general	2	2	0	2	5	4	15
Better management of beetle epidemic, remove beetle kill before it spreads	2	2	1	2	2	4	13
Small diameter timber utilization, small scale selective logging	1	0	2	2	5	1	11
Manage for multiple, balanced use	2	3	1	1	2	1	10
Replant forest	3	3	1	1	1	0	9
Public stewardship education (e.g. in schools)	1	2	1	1	2	2	9
Weed control, native plant restore	0	0	0	2	3	3	8
Limit motorized use of BRF	4	1	0	0	3	0	8
Reduce management overhead costs, less waste, 'clean house', reduce FS personnel	1	2	0	2	2	0	7

A final look at the differences and similarities across community segments comes from responses to question Q11a asking what is special about living in Darby and Conner. Table 27 shows the number of times respondents mentioned specific categories in their written responses: ‘Being close to the national forest with easy access to the outdoors’ and ‘living in a rural area’ are the two most often mentioned categories (63 and 62 responses, respectively). However, like responses to other questions, these categories differ by community segment. Similar views are expressed across segments, but tend to reflect differences in types of human / place bonds by being articulated in different ways. For example, members of segment five are particularly likely to mention being near the Bitterroot National Forest and the outdoors, but less likely than other groups to mention living in a rural area. The idea of living in a small town is particularly popular with members of segments two and four. Members of segment three made fewer comments overall than other segments, but are more likely than most respondents to mention things like family, community, traditional logging, economy, and jobs in their comments.

Table 27: Categories of Responses to Written Opinions Regarding what is Special about Darby and Conner by Community Segment; Darby Case Study, 2007.

Q11a: What is special to you about living in the Darby or Conner Area?	Community Segment - frequency of response						Overall
	One	Two	Three	Four	Five	Six	
close to BRF, SBW, nature, easy access, outdoors, public lands	6	8	6	12	19	12	63
low population density, rural beauty, views, seeing the Milky Way, night ski, scenery	12	13	8	11	7	11	62
recreation opportunities	11	9	2	12	9	6	49
Wildlife	5	7	7	6	6	9	40
peace and quiet, quiet community	3	6	1	11	11	5	37
small town	4	4	0	11	10	8	37
the people	3	7	2	11	4	5	32
healthy ecosystem, clean environment	3	6	0	7	4	3	23
hunting (and fishing)	2	2	0	7	7	2	20
strong ties	5	2	2	2	2	5	18
open space	2	2	2	5	2	0	13
quality of life	2	2	0	2	1	4	11
community, shared values	2	2	0	4	0	2	10
not special anymore	1	0	2	3	1	3	10
low vehicle traffic	1	3	0	1	0	1	6
weather	3	0	0	1	0	2	6
attachment to (specific) place	1	2	1	0	2	0	6
small area of development, limited potential	2	0	1	2	0	1	6
camping	0	1	0	1	3	0	5
ability to get away	1	1	1	0	0	1	4
family, friends	1	0	0	1	1	1	4
low crime, feels safe	0	0	2	1	1	0	4
traditional logging community, historic traditional lifestyle	0	0	2	1	0	0	3
job, economy	0	0	3	0	0	0	3
	0	0	2	0	0	1	3

Darby Segment Profiles

The following descriptions consider characteristics of the six human / place bond factors as well as demographics and specific activity information. This overview provides general descriptions and identifies the unique qualities that define each segment. This section offers a summary for managers of the characteristics of the different segments of residents in the Darby case study, their concerns, and what is important to them. The following segment descriptions are arranged in order from lowest to highest overall intensity index scores.

Segment One Community segment one has the lowest overall intensity index with a score of -0.6. This segment represents 18% of Darby and Conner residents. These respondents are much less likely to participate in recreation activities on the Bitterroot National Forest than members of other segments. They have the lowest levels of symbolic attachment scores, and among the lowest levels of functional attachment. While they place the lowest importance of any of the segments on intangible values, they place above average importance on tangible values. Compared to others, segment one respondents are among the oldest in the sample, are more likely to be female, have the smallest average household size, are less likely to have children at home, are among the newest members of the community, and are relatively new to Montana.

Limit motorized vehicles in the Bitterroot Forest. Do something to make logging roads impassable and do something to restore the land changed by the roads back to the way it was. More emphasize on recreation and less on resources. The forest is a place to be and enjoy and experience something not possible other places. (Darby segment one respondent)

This lowest intensity segment is also the least likely to feel that the Bitterroot National Forest has been negatively impacted by the inappropriate behavior of other people. In fact, the general pattern shows that as the overall bond intensity increases across segments so does the concern of negative impacts to the forest (with the exception of the highest intensity group – segment six, that has an average rating of concern). Litter and lack of respect tops segment one's concerns. These residents generally feel that

maintenance of facilities and infrastructure is too low. They also tend to be more supportive of management options favoring nonmotorized activities over motorized activities.

Segment Two Community segment two, representing 16% of the population of Darby and Conner adult residents. On the individual components of the index, this group scores especially low on the two measures of attachment to place, about average on tangible values, and somewhat low on the intangible assigned values measure. Segment two members score above average on both of the activity participation dimension of the human / place bonds and are among the top three segments in participation rates for both motorized and nonmotorized activities. Members of this segment are younger than average, have smaller household sizes, and are least likely of the community segments to have children in their households. They are less likely than average to live in a rural area, and they have lived in their community and in Montana about the same amount of time as the average overall.

The roads that were used in logging years ago [need] to be unlocked and used for hunting and driving and hiking on. Cleaning up of the burnt areas from fires of 2000 (don't know if that is the correct year). I feel that government and environmentalists stood in the way for logging burnt trees in a timely manner. (Darby segment two respondent)

Like most other groups, members of segment Two rate environmental organizations as the greatest source of interference and problems with their bonds with local public lands. They rate environmental organizations more than twice as high (53% cite interference) as the next source – motorized recreationists, at 24%. This segment is more likely than others to feel that current levels of recreation access parking and toilet facilities are too low. Unlike segment three, segment two supports the management option of providing more trail opportunities closed to motorized use. Like their other neighbor, segment one, they tend to be neutral or ambivalent on many of the options supported or opposed by segments with higher overall bond intensity scores.

Segment Three The third community segment also has a below-average human / place bond intensity score, about equal to the average intensity score of segment two members (-0.2). This is the smallest of the six segments, representing 10% of adult members of the community. This group has above average activity participation rates, especially for motorized activities, on which this group had the second highest participation rate. Members of segment three score the importance of both types of assigned values well below average – scoring the importance of tangible values particularly low, and lower than any other group. They also score symbolic attachment somewhat low, but score slightly above average on functional attachment. Members of this group are the youngest and are the most likely to be male. They have an above average household size and are more than twice as likely as the overall average to have children in their households. They are more likely than members of other segments to live in town rather than a rural area. They have lived in Montana and their community longer than any of the other segments, and have spent 75% of their lives in Montana (compared to the next highest average of 52% of life in Montana for segment six).

Give the Bitterroot National Forest back to the local hard working families that have lived here for many generations!....I lost my good sawmill job. The whole culture of the area has changed since 1998. The economy is bad now. Recreation related jobs don't support families. Fires have devastated the area. Sound Forest Management has become a thing of the past. Our forest is dying because we stopped logging. (Darby segment three respondent).

Segment three is fairly consistent in its views on problems and strong in its views about management. While 72% of segment three members feel the forest has been negatively impacted (about average across the community), 68% feel that environmental organizations are to blame (the highest percentage across segments). They are also not too particularly fond of residents living near the forest boundary, professional guides/outfitters, and visitors from outside the area (see table 22). While 29% of the overall community, along with similar or higher percentages for all other segments, feel that motorized users are one source of problems, only 4% of segment three cite this type of problem. While this group is fairly neutral on current conditions, they do feel that road

and trail maintenance and consideration of local's views is too low. They are the only segment to feel that the current level of law enforcement is too high. Interestingly, for all of the concern across the community about access issues, they are the only segment to feel that current local opportunities for both ATV and snowmobile motorized use are too low. This group stands alone in their complete opposition to any management options that might reduce motorized recreation opportunities, even the removal of illegal routes.

Segment Four Community segment four represents the largest portion of Darby and Conner adult residents, with 22% of the overall sample. On the individual human / place bond components, members of segment four score considerably below average on both types of activity participation while they have among the highest scores for the importance of values (especially intangible values) and attachments to place. Along with segment one, this group has the oldest members (average age of 62). They have among the smallest household sizes and lowest percentage of households with children living at home. This group is slightly more likely than average to live in a rural area rather than in town. They have lived in their community and in Montana slightly less than the average number of years and considerably less than the average lifetime percentage.

I used to hike, backpack, ride horses, fish and cross country ski. However, at 81 with 2 replaced knees I only hike now. I know private places to park and hike and avoid contact with others so I really don't know the answer to a lot of these questions. (Darby segment four respondent)

To summarize I strongly oppose much of current policy. I believe the Forest Service has lost sight of what it was formed to do & places far too much emphasis on support for the environmental lobby-instead of those of us who pay the bills - silent majority! (Darby segment four respondent)

Segment four represents a low-use, older segment of the community that remains connected to these public lands. A large majority of them feel the forest has been negatively impacted (78%), and they are most likely to attribute negative impacts to motorized recreationists (33%), followed by environmentalist, local residents, and commercial operations (see table 22). This group has average levels of concern about current management services and facilities, but along with the quiet users (segment five),

are especially likely to feel that current levels of law enforcement are too low. They are also similar to the quiet user group in feeling that there are currently too many opportunities available for ATV use, but are the only group to also feel that snowmobile opportunities are too high. They would like to see more equestrian trails on the forest. This relatively low-use group consistently supports the types of management options also supported by the quiet user group.

Segment Five Community segment five represents 18% of adults in the local community. Members of this group have the highest score on the nonmotorized activity factor, but the lowest score on the motorized activity factor. They rate the importance of intangible values slightly above average, while rating the importance of tangible values the highest of any group. This group scores slightly above average on functional attachment and considerably above average on symbolic attachment. This group is about average in terms of age, gender, household size, and percentage of households with children at home. They are somewhat less likely than average to live in a rural area, and have lived in their community and in Montana slightly less than the average amount and percentage of years.

Less motorized use, fewer open roads, more decommissioning of unneeded roads. More law enforcement!! This willy-nilly, "in your face" audacity of OHV users must be stopped; if they don't want to obey the rules, they shouldn't be allowed to use the forest; they must learn to police & control themselves better. The firewood program on the forest is a joke; few cutters obey the rules, and no one on the forest is enforcing the rules; the whole program needs to be revamped. (Darby segment five respondent)

Segment five could be considered the most sensitive in the community to being negatively impacted by conditions or others' behaviors. The great majority (86%) do feel that the forest has been negatively impacted, and 55% of them cite motorized recreationists as the source. They also cite high levels of negative impact from environmental groups (32%), non-local visitors (27%), and guides/outfitters (27%). This group is most likely to feel that current levels of management services and facilities are too low. They also feel that current opportunities for motorized ATV use are too high.

Segment five is fairly consistent in their support for limiting motorized use, although they remain neutral on a number of the options supported by motorized users.

Segment Six Members of segment six comprise 16% of the overall sample, and have the highest average human / place bond intensity index score of any segment. They report among the highest participation rates in nonmotorized activities, and they have the highest participation rates on the motorized activity factor (considerably higher than any other segment). They score among the highest on the intangible values factor and slightly above average on the tangible values factor. Segment six scores the highest of any segment on both types of attachment measures – functional and symbolic. Members of this group are among the youngest respondents, come from larger than average households, and are more likely to have children living at home than most other segments. They are more likely than any other segment to live in a rural area, and they have lived in their community and in Montana longer than average.

Talk to the old people. Stand up to the environmentalists. (Darby segment six respondent)

More opportunities to use ATV's to access hunting areas or at least permit ATV/trucks to go retrieve downed game behind locked games-an ATV is a poor man's horse. Remove fallen trees that litter so many back roads making them impassible. These were from the 2000 fire. (Darby segment six respondent)

Three-quarters of the members of segment six feel that the forest has been negatively impacted (about average for the community). This segment cites environmental organizations as the source of problems (55%) twice as often as they cite any other source. Relative to other segments, they are fairly satisfied with current management facilities and opportunities and with current recreation opportunities. Like segment two, they are a bit more neutral on some of the motorized options than segment three.

Summary of Management Concerns

There are a number of insights about residents of the communities of Darby and Conner and their concerns about management of the Bitterroot National Forest revealed in the results. This section summarizes and interprets some of that information to guide planning discussions. This summary focuses on the specific issue of motorized / nonmotorized recreation management. This is not the only issue that can be explored in the study results, and the following summary can be used as an example of how to interpret the data and develop further understanding of local residents' concerns and views about management of the forest. It is hoped that this increased understanding will ultimately promote constructive discussions of these contentious issues during collaborative processes.

One of the primary challenges for managers in travel planning is to determine an appropriate balance between motorized and nonmotorized designations on a finite number of routes. Most recreationists, accessing the forest either by motorized or nonmotorized means, seek similar types of setting and experience opportunities, destination types, scenery, travel loops, and access for other activities. Their choice of travel method, however, can impact other users. Because motorized use is more intrusive than nonmotorized use in terms of noise, speed, and possibly resource damage, this type of activity typically causes differential conflict having greater impact to nonmotorized users than vice versa.

Another of the challenges for managers in developing a comprehensive travel management plan is to consider the widely varied interests and opinions of local residents, many of whom have intense human / place bonds and, therefore, feel the effect of management decisions whether or not they are recreation users of these public lands. The agency would prefer to use a collaborative process with a system wide, forest-level perspective, such as planned for the Bitterroot National Forest to address these varied concerns. On-going involvement of the public in travel planning is a key component of the new Forest Service agency-wide travel management rule and will contribute to greater public acceptance of the resulting management plan.

The majority of the Darby case study respondents are concerned that these lands have been negatively impacted by others' behaviors (75% agree). As in the Yakutat case

study, the category of most concern to local people is acts of disrespect to the public place – littering, dumping, vandalism, carelessness, etc. Many people are also concerned about the effects of environmental organizations on the forest planning process and the effects of irresponsible motorized use causing wildlife disturbance, erosion, and social impacts. The most popular management options for addressing concerns about current conditions on the Bitterroot National Forest include ‘providing more nonmotorized trail recreation opportunities,’ ‘removing illegal motorized routes,’ and ‘opening currently gated roads for summer motorized use.’ Many of these results, along with numerous written comments, reflect a widespread debate about the types and amounts of access that are appropriate and allowed on National Forest System public lands.

In many ways the local issues surrounding motorized/nonmotorized access and planning are a reflection of the underlying human / place bonds of the residents. The place bond values are deep seated and represent the framework for how opinions are formed about specific issues. The segments show statistically different response patterns (tested using MANOVA models) to five different types of questions about current conditions and management options on the forest. Different types of human / place bonds are revealed in each of the six community segments identified in the study. The results of the study, while reinforcing the relevance of the issue of access to public lands, also reveal differences in the way this problem is framed and discussed across different segments of the local population. The following quotes from members of the three motorized user segments describe typical access views.

Locked Gates! Everywhere. Kelly humps going up everywhere where we hunt and pick berries. (Darby segment six respondent)

Roads that go through private property to get to forest land. One woman stops cars and tells you she is trying to close the road. Some land owners think a drift fence is their property line even if it is on Forest Service land. They accuse you of riding their fence line. (Darby segment three respondent)

Hunters/visitors that sit on our property line adjacent to the National Forest. (Darby segment two respondent)

The access issue is characterized in the first two comments as a gated-road problem. In fact, the opinion that too many existing roads have been closed to the public is common in the community. The majority of the public, including segments two and six, feel that current opportunities for ATV motorized recreation are about right or too high. Overall, the community also opposes providing more 4WD trails. However, the community also feels there are not enough hunting and fishing opportunities (which might be related to access), and in general, the community supports opening more gated roads in the summer and opposes closing any more roads to provide nonmotorized opportunities. The community, overall, does favor closing roads to protect the environment. While support for access to the existing road system is wide-spread, it is really only segment three that supports increasing the amount of *trails* for motorized use.

The differences between segments are readily apparent when comparing views about management options. For example, community segments four and five think the current level of law enforcement is too low while segment three respondents believe the current level is too high (see Table 23). The two segments with the most intense human / place bonds with local Bitterroot National Forest lands (segments five and six) have very different perspectives on the place and on appropriate management. Segment five members generally support less motorized access, while segment six members generally support more motorized access (see Table 25). The following quotes demonstrate different perspectives about living in Darby from the two highest intensity segments:

What is special to you about living in the Darby or Conner Area?

Moved this far out to enjoy the pristine environment, peace, animals and solitude. (Darby segment five respondent)

What could be done to improve your community?

Go back to our saw-mills and family values, and the sweet smell of fresh cut pine when you entered Darby. (Darby segment six respondent)

Segment three members strongly oppose any reduction in motorized access – they oppose removing illegal user-created motorized routes, while most other segments, including six, favor removing illegal routes. The following comments illustrate these differences.

What can be done to improve management of the Bitterroot National Forest?

Fewer restrictions and more open to public use. (Darby segment three respondent)

Motorized use to remain on existing roads that are maintained for the use. Stop motorized use on pack trails especially in the proposed wilderness areas. Proposed wilderness should get special consideration by the Forest Service. (Darby segment five respondent)

Gates down. I'm too old to walk behind the darn gates. Let me enjoy God's Mother Nature. (Darby segment six respondent)

The results of the Darby case study have shown similar patterns of bonds and attitudes about management across the local community as the Yakutat case study. The community segmentation results for both studies presented in this chapter have demonstrated an ability to portray differences in opinions about management of local public lands based on the public's bond with those specific places. In addition to presenting results from two community case studies, the chapter also describes a favorable post-study evaluation of the human / place bond research application by managers involved in the Situk River planning process described in the Yakutat case study. The Darby case study does not include a post-study evaluation by managers. Not obtaining this feedback from those involved in the process is a limitation of the Darby study. The post-study evaluation in this case has not been possible because managers and the public have not been involved in the application of the research results.

One of the differences in the two case studies is the level of involvement of managers in the research design, implementation, and application. In the Yakutat case, managers from multiple agencies involved in the Situk planning process, and from multiple levels of local, state, and federal jurisdictions, sought out social science research and actively participated in the study design, implementation, and application. In the Darby case study, the Bitterroot National Forest, Darby district ranger was the only agency representative involved in the approval and design of the study. While the research in Yakutat came at the request of managers, a different tone was set in the Darby case where the district ranger granted permission for the research but was not an advocate

of the process to address his current planning information needs. In the Yakutat case, managers were involved in the evaluation and feedback throughout the research process. They commented and participated in the development of the study plan, survey instruments, and several drafts of results and final reports. In the end, although the final report was detailed and complicated, the managers had a good working knowledge of its contents and implications.

It has been more difficult in the Darby case study to develop a suitable report for managers or to integrate the finding into the forest planning process. The Trapper-Bunkhouse stewardship project plan, the focus of the Darby Clubhouse meetings which informed the Darby case study research, removed the travel component prior to the completion of the study so there is no longer a need for the research to inform that specific planning project. The Bitterroot National Forest is moving forward with travel planning on a forest-wide basis and the information in this study may prove useful for developing the Darby Ranger District component of the plan. The challenge remains to develop a suitable report to managers from this case study research to inform the new planning process. The following final chapter of the dissertation evaluates the utility of this research approach and other lessons learned from the application of the two case studies.

DISCUSSION

This chapter evaluates the human / place bond research approach described above. The process is intended to help public land managers and who must adapt to multiple demands for natural resources by developing better planning models for considering diverse public interests. It is also intended to help members of the public - to serve as a tool to allow neighbors to become better accounted and to better understand each others interests and concerns prior to engaging in a public planning process. The Yakutat and Darby case studies of human / place bonds demonstrate a method for developing understanding of these public interests that goes beyond consideration of recreation experiences, opportunities, and setting attributes typically found in US Forest Service recreation planning. The human / place bond research approach to informing public land management decisions focuses on understanding the multiple components of the ties that people form with nearby wildland places. As we increasingly recognize the legitimacy of competing demands for public resources, it is apparent that public interests in lands protected for their wildland values often go beyond on-site recreation experiences. This model seeks to offer a better account of these multiple interests in planning situations.

In the early stages of inquiry in the Yakutat case study it became apparent that the human / place bonds between local residents and their special places on public lands are imbedded in history and culture, and include perspectives involving identity, tradition, subsistence, and livelihood. The issues that are important to these local residents differ from those that are important to most recreation visitors to the Situk (Christensen, Watson, and Whittaker 2004). The human place bond research approach is designed to more fully account for the types of issues relevant to the general population of a small, local community – at a level that goes beyond what is typically considered in recreation visitor studies.

A growing interest in conceptualizing the link between the public and public lands as ongoing, dynamic human / place bonds reflects increasing awareness of the variety of the publics' interactions with public wildlands that have not been well accounted for in traditional recreation planning models, which typically focus on on-site activities while possibly ignoring other important aspects of place bonds. A focus on providing a spectrum of recreation opportunities is appropriate in wildland planning situations, but

diverse interests of the public in these places goes beyond recreation opportunities and should be more fully considered in accounting for the public good. The human / place bond research approach may complement the more traditional focus in planning situations like those on the Yakutat and Darby Ranger Districts. A traditional focus on recreation settings and experiences may be used to evaluate concerns of recreation visitors while a human / place bond focus more appropriately accounts for the general public's interest in these places. Bounding the general population to a local geographic community in these case studies increases the relevance of the information, as it is focused on bonds with specific places at a relatively small scale.

Evaluating the Human / Place Bond Research Approach

The two general goals of this dissertation are explored within consecutive case studies in local communities faced with contentious public land management issues. The first goal is to evaluate the approach. This may be judged by its ability to segment a community based on human / place bonds between the public and local wildlands and to consider how human / place bonds influence preferences for those specific public places. The results presented in the previous chapter support the conclusion that this approach may contribute to achieving this segmentation goal. The second goal is to evaluate and improve the research application in the context of public wildland management planning efforts in the Western US. The case study context provides the ability to explore the usefulness of the human / place bond research approach and the information it generates to increase understanding and cooperation in real wildland planning situations.

Applying Understanding of Human / Place Bonds

Each of the case studies presented above provides evidence to support the first goal of the dissertation to determine the ability of the research approach to distinguish attitudes about management based on human / place bonds. These bonds are individual experiences that tend to share common characteristics with other individuals' place bonds in their social group. It is the shared aspects of human / place bonds that lead to a successful segmentation study that identifies real and meaningful groups of residents in the local community. The segmentation of a community into relatively large groups

would not be meaningful or effective if human / place bonds were not shared across individuals. The two case studies segment communities based on residents' human / place bonds with nearby public wildland places. The segmentation solutions reveal meaningful divisions in the communities based on differences across all three components of expression of human ties to place. The Yakutat and Darby case studies identify five and six segments or communities, respectively, of like-minded or like-valued individuals (Lélé and Norgaard, 1996) within their geographic communities. Each of these 'communities of interest' has different human / place bonds with local public lands and each has statistically significant differences in concerns about conditions and perceptions of appropriate management.

Relying on any one or two of the three types of segmentation indicators alone to understand attitudes about management of these special places would not provide the insights about local communities that are revealed using the more comprehensive human / place bond research approach. For example, each of the case study planning situations includes controversial issues about specific recreation activities on local national forest ranger districts. Identifying management solutions based on considering the views of participants versus non-participants in these activities would fail to account for the diverse concerns and opinions across the local community. Recall the differences of opinions between the two sport fishing groups in Yakutat regarding management options like limiting sport fishing bag limits and prohibiting sport fishing below the lower landing; or the example of the differences across the three motorized user groups in Darby regarding removal of illegal, user-created routes. In both cases, the attitudes about appropriate management options seem more directly related to overall types of human / place bonds than to activity participation alone. Community segments that participate in these activities, but also have bonds composed of high scores on indicators of components other than activity participation behavior seem to adopt attitudes toward management that reflect a stronger land ethic or stewardship orientation than segments whose bonds are based primarily on only one or two specific types of bond expression, particularly participation in the controversial activity and/or functional place attachment.

In the Yakutat study, segments two and five are most likely among community members to currently participate in personal sport fishing. One of the primary

differences between these two groups is the predominance of other factors in their bonds to the Situk River. The bonds of segment two are based on recreation activity behavior and functional attachment, while those of segment five are based on high rankings on all activities, values, and symbolic attachment, with a lower score only on measures of functional attachment. Attitudes about management seem to reflect these different focuses toward the river. Segment two, with a primary focus on activities and a functional dependence on the resource to provide personal sport fishing opportunities, supports more sport fishing and less motorized use which may interfere with their recreational experience. Segment five, with a complex bond type having high levels of symbolic attachment and assigned values, as well as participation in a greater variety of activities favors lower levels of sport fishing use but is less likely to support restriction of motorized boating. This group may take a more practical view on motorized use to access the river for subsistence and commercial activities. They may favor lower levels of sport fishing because the current scale of resident and nonresident recreational fishing interferes with their traditional activities and may conflict with the importance they place on family/cultural values. Most segments of the community, with the exception of segment two, are supportive of prohibiting sport fishing below the lower landing where the commercial and subsistence fishing is located. This area of the river is a major source of conflict between different types of user groups. But only segment two, with its singular focus on sport fishing, is opposed to addressing that conflict through spatial allocation, which would displace them to the upper river.

The Darby case study results also demonstrate this difference in stewardship orientation across the segments. The Darby results identify three segments with relatively high levels of motorized activities: two, three, and six. Members of segment three have lived in the area the longest of all segments, but their bonds with the Darby Ranger District do not represent the intensity or complexity of some of the other segments, particularly segment six with the highest level of off-road motorized use. While these two segments, along with segment Two share a common activity, the nature of their bonds and opinions about management of motorized recreation vary considerably. Segment three is the only group that feels motorized recreation opportunities are currently too low and that law enforcement is currently too high. They

also are the only group with significant opposition to removing illegal motorized routes. Like segment two in the Yakutat case, segment three in the Darby case has bonds based overwhelmingly on a single, controversial activity focus, and like Yakutat segment two, segment three in the Darby case study is the strongest in their views among the local community in their opposition to any management action that could reduce their motorized recreation opportunities on the forest, regardless of reason including resource protection. Managers should consider, however, that given suitable alternative locations for their activity participation, these medium intensity, activity-oriented groups may be more able to re-locate and develop new bonds than segments of the community with more emotionally-charged bonds to a particular place. In travel planning situations, energy is often focused on a specific trail or area in which opposing sides take positions and do battle. Identifying and presenting alternative locations for appropriate, but controversial activities such as OHV use, up-front as good faith incentives to compromise might effectively refocus anger or temper extreme views. If alternative locations are not readily identifiable, then the debate is really about the appropriateness of the activity, itself, on public lands. This is the debate the motorized use advocates may actually be most concerned and angry about. If they fear that their activity is threatened as a whole they will feel more compelled to fight every location battle rather than consider compromise.

Segment three of Yakutat residents is also interesting. They are the oldest group, with the lowest rate of current participation in sport fishing, but the highest level of past participation. Their bonds with the Situk are based on high levels of symbolic attachment and high assigned values – particularly the intangible values. Consistent with Williams and Vaske's (2003) view that functional attachment is fostered by ongoing experiences, segment three has the lowest level of functional attachment in the community (although members have high past participation rates and they likely had higher functional attachment during past life stages when they were actively using the river). Despite low levels of current use, this group has the strongest views about the current situation and need for management intervention. Across the board, they favor less recreation use, less motorized use, and more management intervention to address current conditions. Their views may reflect the theoretical orientation of Proshansky et al. (1983) who say that the

farther one is removed from direct experience in a place the more idealized the setting becomes in their mind. This group may be more likely to experience conflict than other groups as they compare their stereotyped memories to their perception of current conditions. This conclusion is supported by qualitative data from some managers of the Situk who feel that there is a lot of misperception about the extent of litter and damage to resources within the watershed, with many community members overly concerned about a relatively minor problem. Because of their relatively low current activity participation, this group would be less impacted, personally, by reducing use or other direct management actions than many residents in the community. Therefore, given that the Situk is very important to them, it is not surprising that they have strong opinions about management. Unlike segments whose bonds are primarily functional and behavioral in expression, segment three (with high symbolic bonds) appears to be much more oriented toward stewardship of the land and a desire for management to protect the resource rather than open it to more use. From a manager's perspective, this group can represent an ally in resource protection efforts, but also an adversary toward attempts to accommodate diverse public interests. Because of the importance they place on the resource but the relative lack of recent direct experience, segment three might be especially receptive to, and effectively targeted with, education about conditions and management concerns.

It is the narrow focus of the bonds of segment two in the Yakutat case study and segment three in the Darby case study that are related to relatively strong opinions and seem least likely to compromise or consider management options that restrict their freedom, even if it is to protect the resource. A typical planning process would consider all sport anglers or all motorized users as one stakeholder group with a common set of interests and concerns. In both case study communities the human / place bond research approach identifies multiple community segments on each side of a seemingly dichotomous controversy, and each of these communities of like-minded/like-valued individuals have different types and intensities of human / place bonds with their local public lands, concerns about the resource, and opinions about management solutions.

As the literature on human / place bonds with public places suggests and these study results support, individuals with different levels of complexity and intensity of bonds also have different opinions about management. These differing bonds may

influence receptiveness to compromise and stewardship in contentious planning situations – even within the same activity group. In these case studies, community segments with intense bonds seem to care more about the overall condition of these public places and favor stewardship oriented management even at the expense of their own freedom to recreate. It is these high intensity groups that might represent managers' best allies in resource protection. They may have the most realistic perceptions of current conditions, care deeply about the place, and be willing to sacrifice personal benefit for the greater public good. Residents with bonds more focused on a single activity seem to care more about the space as a backdrop providing the opportunity needed for their activities.

A study design that does not consider multi-dimensional human / place bonds would not account for the diverse views across a local population and would not adequately explain the community divisions in opinions about the controversial planning issues. The case studies suggest the utility of the human / place bond approach to identify distinct communities of interest within geographic communities and to provide meaningful insight about public opinions in contentious natural resource planning situations. It is important, however, to interpret the results about these community divisions within the limitations of the research methods and our ability to simplify complex situations. The community segments that are identified do not represent homogeneous groups with consistently held experiences and opinions. Rather, this research identifies 'clusters' of the population with characteristics more in common than with other members of the population. The borders of these clusters are imprecise and porous - the segmentation results offer insight about the structure of the community, but membership and characteristics of these groups should not be interpreted too literally. These segments are not stakeholder groups, with tightly held interests, but rather 'clusters' of interests with more fuzzy, ill-defined, boundaries between groups. The segmentation results are not the ultimate representation of how people feel about a place and its management, but they do offer us insight and nuanced understanding about the structure of these relationships.

Understanding the differing orientations and structures of community segments does not answer the question for managers about how to deal with this knowledge in resource allocation decisions. This research does not suggest that it would be appropriate

to prioritize segment desires based on stewardship orientation or ignore those segments with low-intensity bonds. Rather, following the marketing model described in the first chapter, it suggests a course to take that would target those segments seemingly lacking a land ethic in an attempt to strengthen their human / place bonds for the benefit of public resources. For example, Wondolleck and Yaffee (2000) suggest that more effectively involving the public in land use planning is not only important for developing future community capacity for problem solving, but can also shape the values that people assign to natural resources and foster a sense of responsibility toward the public good, thereby improving future community capacity to make better decisions for the overall public good. Managers may need to make a special effort to reach out to and foster relationships with certain community segments in an attempt to improve their stewardship orientation based on the nature of their bonds with specific public places. For example, in addition to trying to raise the importance of values and a sense of stewardship through special efforts to involve the Darby segment three in collaborative efforts, opportunities might also exist to reach this segment through educating their children about the natural environment in school as this group is the most likely to have children in their household. Managers might also seek to build alliances between segments that are more likely to put ecosystem health in front of personal agendas, and use those alliances to apply peer pressure to segments less inclined to exhibit stewardship or retain a land ethic. There also seems to be an opportunity to educate segments that care deeply about the place but may lack the first-hand experience to form realistic expectations about conditions and management concerns.

Assessing the Application

A general goal in this dissertation is to assess the ability of the human / place bond approach to inform discussion and build understanding in support of contentious public planning situations. The overall dissertation uses an imbedded design that includes generalizability to the population of local residents and to similar planning processes. The intent of evaluations of the application is to increase the relevance of the information to managers and the public. Evaluations by those who have used the process can improve subsequent applications. Evaluations assess whether managers and

stakeholders feel that the process could facilitate public input, mutual understanding, and acceptance of management solutions - a set of criteria for successful public participation supported in the natural resource planning literature described above. The evaluations from managers and stakeholders in the Yakutat case study are favorable, with the research being rated positively on all of the elements of successful public input. The elements of 'improving acceptability of the plan' and 'increasing understanding among the community' are seen as the greatest benefits of the human / place bond research approach by the Situk River collaborative planning group.

Cost Efficiency The benefits of this information will not be realized if its application is not practical, efficient, and otherwise relevant to real world planning situations. The cost of conducting this type of study can be relatively low. The greatest expenditure other than labor is the materials needed to conduct a quantitative survey. For a mail based survey, materials include printed questionnaires, cover letters, postcard reminders, outgoing and return envelopes, and outgoing and return postage. In the Darby case study, 245 completed questionnaires were collected from a mail type survey for a total cost of materials of \$1,963, or about \$8 per returned survey in 2006 US dollars. The survey process spanned eight weeks and required the part-time work of one person. In the Yakutat case study, rather than conducting a mail based survey, the questionnaires were administered in person by handing them out directly to members of the community and retrieving them a short time later the same day. This survey method was used because background investigation indicated that past mail surveys in the community had received very poor response. The survey method used in Yakutat required less than a third of the cost of materials of the Darby survey, and data collection was completed in five days rather than the two months required for the Darby mail based questionnaire. In addition, administering the survey in person gives the researcher more control over who actually answers the questions. The tradeoff in this method is the increase in labor needed to administer surveys in person, with the Yakutat survey requiring four interviewers working for about 40 hours each.

In the US Forest Service, the skills needed to design and administer survey questionnaires, conduct statistical analysis, and report results would typically be available

through the social scientist at the regional or research station level or from colleges and universities with programs emphasizing the social sciences in natural resource management. The skills of district and forest level employees could supplant much of the need for direct, on-site involvement of an agency social scientist. If the planning environment in the Forest Service continues to grow more contentious, the agency may find a greater need for employees trained in the social sciences at the district and forest level, much like currently common positions in biology, geology, botany, silviculture, and other professional disciplines. A change in disciplinary focus of this type would improve the ability of district rangers to develop human / place bond studies in-house as part of their planning processes.

Conclusions

Researchers working with managers of public wildland resources should recognize and understand citizens' human / place bonds and develop ways to incorporate consideration of these bonds into meaningful conflict resolutions and more acceptable resource allocation decisions. Management solutions receiving the most support in messy natural resource planning situations may be those that open the line of communication, increase mutual understanding, and encourage cooperation among the stakeholders. Christopher Lasch (1987) advocates a more civic community decision-making process and feels that we must acknowledge the humanity in our opponents and work toward common goals found through collaboration. Evidence presented in this dissertation suggests that the human / place bond research process may help us to understand and connect to the common humanity shared among all community members. Lélé and Norgaard (1996) say that social science can facilitate public interaction and collaboration through the development of mutual understanding. They indicate that it is the role of scientists to help identify like-minded/like-valued communities and to understand the differential concerns of these communities and the effects of various policies on them. This dissertation argues that applying social science through a human / place bond research approach uncovers the types of shared values and goals that define like-minded communities, and therefore, may improve upon the practice of identifying stakeholders on the basis of dichotomies in controversial issues.

Implementing Human / Place Bond Research

The research in this dissertation follows a comprehensive study design that is designed to identify human / place bond segments and increase understanding about the publics' preferences for management of nearby public lands. It also may facilitate the transfer of that understanding to decisions makers, stakeholders, and the general public. The dissertation has argued that developing this information can be made efficient through flexibility in design (e.g., the incorporation of input from public meetings as qualitative data used to inform the Darby quantitative survey rather than requiring a more expensive set of formal qualitative interviews as used in Yakutat). This process has been refined through iterative case studies which have helped to identify a set of recommended procedures. The human / place bond research approach can be conceptualized in five general phases, listed in the outline below:

1. Problem Definition
 - a. Interview resource managers and planners to determine information needs.
 - b. Conduct a background investigation of relevant historical documents, media articles, meeting notes, previous studies, public comments, etc.
2. Develop Deeper Understanding
 - a. Collect qualitative data from community members and local leaders to understand their human / place bonds with a public place and their concerns about its management.
 - b. Collect qualitative data from local experts to develop understanding of important human / place bond components and local terminology along with insight on controversial management issues.
 - c. Analyze qualitative data to identify emergent topics and range of opinions, and to develop depth of understanding.
 - d. Document the investigator's understanding of the qualitative findings. Incorporate feedback from managers to refine the understanding.
3. Generalizable Understanding of a Local Community

- a. Develop a quantitative questionnaire based on knowledge gained in steps one and two. Include reviews by managers to refine the instrument.
 - b. Conduct a survey of a statistically generalizable sample of the population of residents in the local community.
 - c. Factor analyze activity, assigned value, and place attachment items to identify underlying human / place bond subcomponents.
 - d. Cluster analyze respondents using their scores on multiple human / place bond factors to identify community segments and calculate average overall human / place bond intensity scores.
 - e. Assess relationships between a respondent's membership in a particular human / place bond segment and their preferences for conditions and management of public lands
4. Application of Research
- a. Develop a comprehensive report to managers and interested members of the public documenting qualitative and quantitative results. Consider draft report reviews by managers to refine the application.
 - b. Develop an executive/community summary of important results. This document should provide a bridge between science and the lay public.
 - c. Present and interpret findings and results to managers and the community during a public meeting.
 - d. Continue dialogue between scientists and managers, advise on monitoring strategies
5. Evaluation, Improvement, and Broader Generalizability
- a. Obtain formal evaluation by managers and stakeholders involved in the process based on criteria for successful public participation.
 - b. Conduct follow-up interviews with managers – focus on application and improving the methods.
 - c. Identify broad lessons learned with possible applicability beyond the local case study.
 - d. Design future case studies to build on current generalizable knowledge and past case study experience.

This outline serves as a guide for the steps involved in conducting a human / place bond case study, as well as a guide for continued refinement of the process through lessons learned from successive applications. The outline is a starting point for continued refinement rather than a set list of necessary steps in a rigidly defined process. The outline, ending in evaluation by the participants, includes a feedback loop that will continue to push for the improvement of social science as a tool for public input to contentious wildland planning situations.

Influence on the planning process

All public places cannot serve all purposes to all people so it is necessary to allocate uses at least partially based on the compatibility with the public purpose of the place and the potential for conflict with other legitimate uses. This type of information may help guide managers to make those decisions by developing understanding of how important specific places are to different groups of citizens, why they are important, and what would be required of possible substitute locations. The most appropriate time to implement the type of research described here would be prior to a formal planning process or community collaborative effort is implemented. If planners conduct this type of study prior to a collaborative planning process it could provide a somewhat objective basis for determining the major types of local stakeholders that should be represented, at a minimum, during a collaborative process. The results may also be used to assess the overall equity of resource allocation on the landscape beyond each small scale planning project. This information seems likely to be most effective during the pre-planning phase, serving as a complement to other supporting documentation usually gathered by botanists and silviculturists, for example. Developing this information prior to planning meetings could provide moderating input to discussions that become polarized. It provides a clearer view of the major types of local interests in the population, as well as shedding light on some of the characteristics of citizens holding relatively extreme views compared to those with moderate stances that are more likely to reach agreement.

Emphasizing the proportions of various stakeholder groups suggested by the research may not be a useful or appropriate application of the data. As the overall modeling process tends to simplify complex situation, relying too closely on the

statistical results could prove a mistake. Estimates of the proportions of these stakeholder groups would be less useful and less accurate than the more generalized descriptive results about human / place bond types and their related attitudes about management. The strength of this research may be to identify major types of community interests and their underlying shared interests.

The information from a human / place bond study could be useful during the planning process to managers, organized stakeholders, and the general public to improve understanding of local views during debate and planning. This research could help break down inaccurate stereotypes that lead to planning gridlock by identifying more moderate stances within traditional stakeholder groups along with common views and activities shared between seemingly opposed groups. The research approach tends to be top-down in nature and the quantitative results represent a statistical estimate of a “snapshot in time.” Despite the expert-based nature of the approach, it can provide an opportunity for the whole community to learn about prevalent views on management using objective descriptive criteria within a non-threatening environment. In this light, the human / place bond research may be a complement to, but not a replacement for, local grassroots participation in the public planning process.

Additional Research Needs

A social science research model has been described that is designed to inform debate on public resource management issues using an incremental, case study design. Future studies may continue to develop knowledge about the conceptual foundations of human / place bonds and their application in public land management planning processes. This conceptual model would benefit from a better understanding of the cause/effect relationships between bond components of expression as well as between bonds and preferences. The case studies presented in this dissertation provide opportunities for gaining localized, as well as generalizable, understanding of human / place bonds to specific public wildland places. However, because of the localized and applied nature of this research approach, there is difficulty in furthering the development of a generalizable theoretical foundation from these study results. To pursue the goal of theoretical advancement it may be necessary to modify the study design by standardizing survey

instruments and methods, as well as targeting larger populations, at the expense of relevance to local planning situations.

Future research to improve conceptual understanding of human / place bonds should focus on developing understanding about the measurement and interaction among behaviors, cognitions and affections. While the research results support a link between these components, the theoretical basis for their interactions and the relationships of bonds to attitudes about management of public lands deserve additional consideration. These case studies did not attempt to advance the theoretical consideration of appropriate indicators of the constructs of human expression. The choice of indicators to represent the domains of expression in this dissertation, while not without theoretical support, is the subject of debate in the literature. The measurement of emotional expression of bonds is particularly in need of further understanding. The research presented here considered measures of both symbolic and functional place attachment as indicators of this emotional domain, while other studies have treated functional attachment as an indicator of behavioral intent. Items within the functional attachment scale are also closely related to the cognitive measures of tangible values. The symbolic attachment scales measure concepts that are closely related to measures of intangible values. The research approach developed here has an applied emphasis and the choice of indicators to represent domains of expression was influenced more heavily by the practical needs of managers than by the desire for theoretical advancement of these measurement issues. It is likely that there is overlap in the domains that are represented by the indicators in this research and further research would help to clarify these relationships.

The methodology described in this dissertation may help to increase understanding in a variety of situations where land management issues are affected by local human / place bonds. It is flexible in design and should be tested for its suitability among a wider variety of populations. Of particular interest would be an assessment of the use of this type of understanding for recreation visitors who are not from the local area. Would human / place bonds (beyond activity participation behavior) play a significant role in the opinions about management among long-distance destination visitors to national parks, wilderness areas, and other public lands? How important on a national level are citizens' bonds with public places that are thought to have high

intangible, existence values, but that are unlikely to be visited by the public (e.g., the Arctic National Wildlife Refuge). The case studies presented here focus on populations of individuals in the Western US with frequent experiences with the public lands being studied. To what extent are experiences dominant in the formation of human / place bonds and their role in understanding opinions about management?

Studies following the applied human / place bond research approach should be tailored to meet the practical needs of managers and the public, and to efficiently develop the knowledge needed to make better, more agreeable land management decisions. The study design used in these case studies can be labor intensive, and therefore, expensive to implement if skills are not available in-house or in the local community. However, the process is also flexible in design and could be creatively implemented within the constraints of limited planning resources. In Yakutat, for example, the fieldwork to collect survey responses was conducted by a team that included the outside researcher along with three local residents that worked part time for one of the managing agencies. The most effective and efficient method of delivering and collecting survey instruments from a random sample of the public will vary, and will depend on local culture and geography as well as on larger trends in information delivery technology. Future research could help determine the trade-offs involved in implementing case studies following various survey data collection methods such as internet-based questionnaires.

Research on methods is also needed that would explore tradeoffs imposed by limits to planning resources that prevent following the comprehensive design that includes both qualitative and quantitative data collection phases. To obtain qualitative data in the Darby case study a public meeting process was used rather than interviews (as in the Yakutat study), but both methods provide primary data. There is usually less expensive secondary data available that might provide sufficient background information for the design of the quantitative survey, but there will certainly be a tradeoff between cost and relevance.

At a more fundamental level, research could help to assess the overall contribution of this information by comparing public collaborative planning processes that do and do not include a human / place bond study. The challenge to implementing this type of social science remains to effectively integrate the findings and knowledge

about local human / place bonds within public debates, collaborative planning, and public land management decisions. Public processes that do use this type of social science should continue to seek feedback from citizens and managers exposed to its use so that its application may continue to improve from the benefit of the lessons learned by others.

Final Considerations

While this work has described a theoretical framework for accounting for the multiple components of expression of human / place bonds, the choice of indicators used in the questionnaires to represent these components is not just about how we measure and understand citizens' bonds to public places. There are also normative considerations about how we as a society choose to account for and protect these bonds. Do we focus on providing the most opportunity for the greatest number and variety of recreationists, with opportunities for all types of recreation in all places? Or, do we acknowledge the importance of other types of bonds to public places, those with value based on the ability to find solitude, and those based on knowing that natural places exist and are protected whether or not they are ever visited? Viewing conflicts over use and opinions about management options for public natural resources from the perspective of human / place bonds essentially means accounting for the diversity of contested place meanings beyond those of recreation users to include all members of the public. The political process determines whose meanings are legitimate, appropriate, and worthy of protection in public resource allocation decisions. It is also ultimately a political process that empowers managers to make choices reflecting the will of the administration, the desires of the public, and the manager's own perspectives and biases. The information from this research is intended to inform rather than prescribe those political and normative management decisions.

Rapid changes in the American West are resulting in greater diversity of human / place bonds within local communities of place. These differences are especially apparent between newcomers and old timers, who tend to form distinctly different types of bonds with local public lands based on culture, histories of behavior, attachments and assigned values. This new versus old dichotomy is especially apparent in the Yakutat case study where the community experienced a rapid and profound population change from a single

dominant culture to a population of diverse ethnicities in less than a half century. This diversity of human / place bonds contributes to contentious planning situations. Using the social science methods described in this dissertation may help to alleviate misunderstandings by uncovering common values and interests that will contribute to greater cooperation and stronger interpersonal relationships among citizens. In contentious recreation planning situations, such as those focused on determining the appropriate accommodation of off-road motorized use on public lands, this research has suggested that opinions among local residents are seldom simple reflections of activity participation. Their opinions appear related to their human / place bonds. In both of the case studies presented here, segmentation of local communities based on these bonds identifies groups that statistically differ in their views about management options for local public wildlands. These groups might not be identified or understood using less comprehensive methods for measuring individuals' ties to public places.

The case studies described here suggest that the human / place bond research approach may help to improve understanding of attitudes about management of public lands. As collaborative processes are expensive to participants in terms of labor, time, and travel, the use of social science investigations can improve representation by providing widespread, meaningful, and efficient public input to the planning process. The understanding gained from this research may ultimately improve dialogue among stakeholders and managers, thus leading to better interpersonal relationships and more cooperative solutions. It is hoped that including the social science approach described in this dissertation to inform a planning effort, whether or not it includes a collaborative process, will reduce conflict over management by informing policy debate in contested public wildland management decisions.

References

- Albæk, E. (1995). Between knowledge and power: Utilization of social science in public policy making. *Policy Sciences* 28, 79-100.
- Altman, I., Low, S. M., eds. (1992). *Place Attachment*. New York: Plenum Press, 310 p.
- Babbie, E. (2004). *The Practice of Social Research, Tenth Edition*. Belmont, CA: Wadsworth Publishing Company, 493 p.
- Beckley, T. M. (2003). The Relative importance of sociocultural and ecological factors in attachment to place. *In: Understanding Community-Forest Relations*. Portland, OR: US Forest Service, Pacific Northwest Research Station. General Technical Report PNW-GTR-566, pp. 105-126.
- Berg, B. L. (2004). *Qualitative Research Methods for the Social Sciences, Fifth Edition*. Boston: Pearson Education, 336 p.
- Borrie, W. T.; Christensen, N. A.; Watson, A. E.; Miller, T. A.; McCollum, D. W. (2002). Public purpose recreation marketing: a Focus on the relationships between the public and public lands. *Journal of Park and Recreation Administration* 20(2), 49-68.
- Bosworth, D. (2004). Four Threats to the Nation's Forests and Grasslands. Speech delivered to the Idaho Environmental Forum, Boise ID: January 16th.
- Brod, R. L., Christensen, N. A. (1998). Logistic regression modeling of differential racial views of tourism development on a Montana Indian reservation. *Tourism Analysis* 2, 143-160.
- Brown, G. G., Reed, P., Harris, C. C. (2002). Testing a place-based theory for environmental evaluation: an Alaska case study. *Applied Geography* 22, 49-76.
- Butz, D., Eyles, J. (1997). Reconceptualizing senses of place: Social relations, ideology and ecology. *Geografiska Annaler, Series B, Human Geography* 79(1), 1-25.
- Cheng, A. S., Kruger, L. E., Daniels, S. E. (2003). "Place" as an integrating concept in natural resource politics: Propositions for a social science research agenda. *Society and Natural Resources* 16, 87-104.
- Christensen, N. A., Nickerson, N. P. (1996). Three Communities Explore Tourism: Glacier County, Deer Lodge and Livingston MT. Missoula, MT: Institute for

- Tourism and Recreation Research, School of Forestry, The University of Montana, Research Report 47, 50 p.
- Christensen, N. A., and Watson, A. E. (2006a). Off-Road Vehicle Management on the Bitterroot National Forest Under the New Forest Service Travel Management Rule: An Assessment of Conditions and Management Approaches. Missoula, MT: USDA Forest Service, Rocky Mountain Research Station, Bitterroot Ecosystem Management Research Project, 62 p.
- Christensen, N. A., Watson, A. E. (2006b). The Situk River, Yakutat Resident Study: A Report on Local Relationships to Place. Missoula, MT: USDA Forest Service, Aldo Leopold Wilderness Research Institute, 161 p.
- Christensen, N., Watson, A., Whittaker, D. (2004). Situk River 2003 Recreation Visitor Study. Missoula, MT: USDA Forest Service, Aldo Leopold Wilderness Research Institute, 262 p.
- Cortner, H. J., Moote, M. A. (1999). *The Politics of Ecosystem Management*. Washington, D.C.: Island Press, 179 p.
- Davenport, M. A., Anderson, D. H. (2005). Getting from sense of place to place-based management: an Interpretive investigation of place meanings and perceptions of landscape change. *Society and Natural Resources* 18, 625-641.
- Dillman, D. A. (2007). *Mail and Internet Surveys: The Tailored Design Method*. Hoboken, NJ: John Wiley and Sons, Inc., 523 p.
- Eisenhauer, B. W., Krannich, R. S., Blahna, D. J. (2000). Attachments to special places on public lands: an Analysis of activities, reason for attachments, and community connections. *Society and Natural Resources* 13, 421-441.
- Flyvbjerg, B. (2001). *Making Social Science Matter: Why Social Inquiry Fails and How it can Succeed Again*. Cambridge, UK: Cambridge University Press, 201 p.
- Gerring, J. (2004). What is a case study and what is it good for? *American Political Science Review* 98(2), 341-354.
- Gieryn, T. (2000). A Space for place in sociology. *Annual Review of Sociology* 26, 463-496.
- Giuliani, M. V., Feldman, R. (1993). Place attachment in a developmental and cultural context. *Journal of Environmental Psychology* 13, 267-274.

- Grossman, L. (1977). Man-environment relationships in anthropology and geography. *Annals of the Association of American Geographers* 67(1), 126-144.
- Gunderson, K., Watson, A. (2007). Understanding place meanings on the Bitterroot National Forest, Montana. *Society and Natural Resources* 20, 705-721.
- Gustafson, P. (2001). Meanings of place: Everyday experience and theoretical conceptualizations. *Journal of Environmental Psychology* 21, 5-16.
- Hair, J. F., Black, W. C., Babin, B. J., Anderson, R. E., and Tatham, R. L. (2006). *Multivariate Data Analysis, 6th Edition*. Upper Saddle River, NJ: Pearson Prentice Hall, 899 p.
- Hammit, W. E., Backlund, E. A., Bixler, R. D. (2004). Experience use history, place bonding and resource substitution of trout anglers during recreation engagements. *Journal of Leisure Research* 36(3), 356-378.
- Hay, R. (1998). A Rooted sense of place in cross-cultural perspective. *The Canadian Geographer* 42(3), 245-266.
- Haynes, R. W. (2005). *Developing an Agenda to Guide Forest Social Science, Economics, and Utilization Research*. Portland, OR: Pacific Northwest Research Station, USDA Forest Service, PNW-GTR-627, 56 p.
- Helms, M. W. (1978). On Julian Steward and the nature of culture. *American Ethnologist* 5(1), 170-183.
- Hendee, J. C., Stankey, G. H., Lucas, R. C. (1978). *Wilderness Management*. Washington, DC: USDA Forest Service, miscellaneous pub. no. 1365, 381 p.
- Jarowski, C., Uysal, M., Williams, D. R. (1997). A theoretical analysis of host community resident reactions to tourism. *Journal of Travel Research* 36, Fall, 3-11.
- Jorgensen, B. S., Stedman, R. C. (2001). Sense of place as an attitude: Lakeshore owners attitudes toward their properties. *Journal of Environmental Psychology*, 21, 233-248.
- Kaye, R. (2006). *Last Great Wilderness: The Campaign to Establish the Arctic National Wildlife Refuge*. Fairbanks: University of Alaska Press, 283 p.

- Kruger, L. E. (2003). A Focus on community-forest relationships. *In: Understanding Community-Forest Relations*. Portland, OR: US Forest Service, Pacific Northwest Research Station. General Technical Report PNW-GTR-566, pp. 1-6.
- Kruger, L. E., Shannon, M. A. (2000). Getting to know ourselves and our places through participation in civic social assessment. *Society and Natural Resources* 13, 461-478.
- Kyle, G., Graefe, A., Manning, R., Bacon, J. (2003). An Examination of the relationship between leisure activity involvement and place attachment among hikers along the Appalachian Trail. *Journal of Leisure Research* 35(3), 249-273.
- Kyle, G., Graefe, A., Manning, R., Bacon, J. (2004). Effects of place attachment on users' perceptions of social and environmental conditions in a natural setting. *Journal of Environmental Psychology* 24, 213-225.
- Kyle, G. T., Mowen, A. J., Tarrant, M. (2004). Linking place preferences with place meaning: an Examination of the relationship between place motivation and place attachment. *Journal of Environmental Psychology* 24, 439-454.
- Laguna, F. de (1972). *Under Mount Saint Elias: The History and Culture of the Yakutat Tlingit*. Washington DC: Smithsonian Institution Press, 1,395 p.
- Lasch, C. (1987). Fraternalist Manifesto (essay). *Harpers Magazine* April, 17-20.
- Lélé, S., Norgaard, R. B. (1996). Sustainability and the scientist's burden. *Conservation Biology* 10(2), 354-365.
- Little, P. E. (1999). Environments and environmentalism in anthropological research: Facing a new millennium. *Annual Review of Anthropology* 28, 253-284.
- Low, S. M., Altman, I. (1992). Place attachment: a Conceptual inquiry. *In: Altman, I. and S. Low, eds. Place Attachment*. New York: Plenum Press, pp. 1-12.
- Manning, R. E. (1986). *Studies in Outdoor Recreation*. Corvallis: Oregon State University Press, 166 p.
- Manzo, L. C. (2003). Beyond house and haven: Toward a revisioning of emotional relationships with places. *Journal of Environmental Psychology* 23, 47-61.
- Marston, E. (2001). The Quincy Library Group: a Divisive attempt at peace. *In: Brick, P., D. Snow, and S. Van de Wetering, eds. Across the Great Divide*. Washington DC: Island Press, pp. 79-90.

- McCool, S. F., Guthrie, K. (2001). Mapping the dimensions of successful public participation in messy natural resources management situations. *Society and Natural Resources* 14, 309-323.
- Moseley, C. (2001). The Applegate partnership: Innovation in crisis. In: Brick, P., D. Snow, and S. Van de Wetering, eds. *Across the Great Divide*. Washington DC: Island Press, pp. 102-111.
- Orlove, B. S. (1980). Ecological anthropology. *Annual Review of Anthropology* 9, 235-273.
- Ostrom, E. (1998). A behavioral approach to the rational choice theory of collective action: Presidential address, American Political Science Association, 1997. *American Political Science Review* 92(1), pp. 1-22.
- Parasuraman, A. (1986). *Marketing Research*. Reading, MA: Addison-Wesley Publishing Company, 831 p.
- Proshansky, H. M., Fabian, A. K., Kaminoff, R. (1983). Place identity: Physical world socialization of the self. *Journal of Environmental Psychology*, 3, 57-83.
- Rasker, Ray (2001). Your next job will be in services. Should you be worried? In: Brick, P., D. Snow, and S. Van de Wetering, eds. *Across the Great Divide*. Washington DC: Island Press, pp. 52-57.
- Relph, E. C. (1976). *Place and Placelessness*. London: Pion, 156 p.
- Riebsame, William E. (2001). Geographies of the new West. In: Brick, P., D. Snow, and S. Van de Wetering, eds. *Across the Great Divide*. Washington DC: Island Press, pp. 45-51.
- Schreyer, R., Jacob, G. R., White, R. G. (1981). Environmental meaning as a determinant of spatial behavior in recreation. *Proceedings of Applied Geography Conference*, vol. 4, pp. 294-300.
- Scoones, I. (1999). New ecology and the social sciences: What prospects for a fruitful engagement? *Annual Review of Anthropology* 28, 479-507.
- Shindler, B., Neburka, J. (1997). Public participation in forest planning: Eight attributes of success. *Journal of Forestry* January, 17-19.

- Snow, D. (2001). Montana's Clark Fork: a New story for a hardworking river. *In: Brick, P., D. Snow, and S. Van de Wetering, eds. Across the Great Divide.* Washington DC: Island Press, pp. 91-101.
- Spradley, J. P. (1979). *The Ethnographic Interview.* New York: Hold, Rinehart and Winston, 247 p.
- Stedman, R. C. (2002). Toward a social psychology of place: Predicting behavior from place-based cognitions, attitudes, and identity. *Environment and Behavior* 34(5), 561-581.
- Stedman, R. C. (2003a). Sense of place and forest science: Toward a program of quantitative research. *Forest Science* 49(6), 822-829.
- Stedman, R. C. (2003b). Is it really just a social construction?: the Contribution of the physical environment to sense of place. *Society and Natural Resources* 16, 671-685.
- Steward, J. H. (1955). *Theory of Culture Change.* Urbana: University of Illinois Press, 245 p.
- Stokols, D. (1990). Instrumental and spiritual views of people - environment relations. *American Psychologist*, 45(5), 641-646.
- Stokowski, P. A. (2002). Languages of place and discourses of power: Constructing new senses of place. *Journal of Leisure Research* 34(4), 368-382.
- Tashakkori, A., Teddlie, C. (1998). *Mixed Methodology: Combining Qualitative and Quantitative Approaches.* Thousand Oaks, CA: Sage Publications, 183 p.
- Toupal, R. S. (2003). Cultural landscapes as a methodology for understanding natural resource management implications in the Western United States. *Conservation Ecology* 7(1), 12 p.
- Tuan, Y. (1974). *Topophilia: A Study of Environmental Perception, Attitudes, and Values.* Englewood Cliffs, NJ: Prentice Hall, 260 p.
- Tuan, Y. (1976). Humanistic geography. *Annals of the Association of American Geographers* 66(2), 266-276.
- Tuan, Y. (1977). *Space and Place: The Perspective of Experience.* Minneapolis: University of Minnesota Press, 235 p.

- US Forest Service, Yakutat Ranger District (1999). Situk River Meeting Summary, 3/11 – 3/12.
- US Forest Service, Yakutat Ranger District (2002). Situk River Watershed Cooperative Management Framework, 5 p.
- US Forest Service, Yakutat Ranger District (2003a). Situk River Meeting Notes, from 1999 through 2003. Downloaded At:
www.fs.fed.us/r10/tongass/districts/yakutat/situk/
- US Forest Service, Yakutat Ranger District (2003b). Situk River Watershed Partners Action Plan – 2003.
- Vogt, C. A., Williams, D. R. (1999). Support for wilderness recreation fees: The Influence of fee purpose and day versus overnight use. *Journal of Park and Recreation Administration* 17(3), 85-99.
- Walker, P., Fortmann, L. (2003). Whose landscape? A Political ecology of the 'exurban' Sierra. *Cultural Geographies* 10, 469-491.
- Warren, G. A. (1985). Activities, attitudes, and management preferences of recreationists on the Arctic National Wildlife Range, Alaska. Paper presented at the National Wilderness Research Conference, Fort Collins, CO, July 23-26.
- Watson, A., Glaspell, B., Christensen, N., Lachapelle, P., Sahanatien, V., and Gertsch, F. (2007). Giving voice to wildlands visitors: Selecting indicators to protect and sustain experiences in the eastern Arctic of Nunavut. *Environmental Management* 40, 880-888.
- Watson, A. E., Niccolucci, M. J., Williams, D. R. (1994). The Nature of conflict between hikers and recreational stock users in the John Muir Wilderness. *Journal of Leisure Research* 26(4), 372-385.
- Watson, A. E., Patterson, M., Christensen, N. A., Puttkammer, A., Meyer, S. (2004). Legislative intent, science, and special provisions in Wilderness. *International Journal of Wilderness* 10(1), 22-26.
- Weinstein, A. (2004). *Handbook of Market Segmentation: Strategic Targeting for Business and Technology Firms, Third Edition*. New York: Haworth Press, 241 p.

- Weinstein, A. (1987). *Market Segmentation: Using Demographics, Psychographics, and Other Segmentation Techniques to Uncover and Exploit New Markets*. Chicago, Ill.: Probus Publication Company, 296 p.
- Williams, D. R. (2002). Leisure identities, globalization, and the politics of place. *Journal of Leisure Research* 34(4), 351-367.
- Williams, D. R. (2004). Environmental psychology: Human responses and relationships to natural landscapes. In: *Manfredo, M. J., Bruyere, B. L., Field, D. R., and Brown, P. J., eds. Society and Natural Resources: A Summary of Knowledge, Prepared for the 10th International Symposium on Society and Resource Management, Keystone, CO*. Jefferson, Missouri: Modern Litho, Chapter 20, pp. 337-348.
- Williams, D. R., Patterson, M. E., Roggenbuck, J. W., Watson, A. E. (1992). Beyond the commodity metaphor: Examining emotional and symbolic attachment to place. *Leisure Sciences* 14, 29-46.
- Williams, D. R., Vaske, J. J. (2003). The measurement of place attachment: Validity and generalizability of a psychometric approach. *Forest Science* 49(6). 830-840.
- Wilson, R. K. (1999). 'Placing nature': the Politics of collaboration and representation in the struggle for La Sierra in San Luis, Colorado. *Ecumene* 6(1), 1-28.
- Wondolleck, J. M., Yaffee, S. L. (2000). *Making Collaboration Work: Lessons from Innovation in Natural Resource Management*. Washington DC: Island Press, 277 p.
- Yin, R. K. (2003). *Case Study Research: Design and Methods, Third Edition*. Thousand Oaks, CA: Sage Publications, 179 p.
- Yung, L., Freimund, W. A., Belsky, J. M. (2003). The politics of place: Understanding meaning, common ground, and political differences on the Rocky Mountain Front. *Forest Science* 49(6), 855-866.

Appendix A

Yakutat Case Study Qualitative Interview Guide

Interview Guide for Residents of Yakutat, Alaska about the Situk River

Hello, I'm Neal Christensen. I am working with the Situk River Management Partners to develop understanding of local residents' relationships with the Situk River and their opinions about its management.

The Situk River Management Partners cooperatively manage the Situk and include the US Forest Service, the Alaska Department of Fish and Game, the Yakutat Tlingit Tribe, and the City and Borough of Yakutat.

I will keep your identity confidential. You will not be associated with this interview, and your name will not be used in any presentations or reports. I would like to record the interview so that I can accurately report what you said. Is that alright with you?

RESPONDENT # AND DATE (RECORD ON TAPE)

First, I would like to ask a few general questions about you.

1. How much of the year do you usually live in Yakutat?
2. How many years have you lived in Yakutat?
3. Are you Native American or nonnative?

I would like to find out about your relationship with the Situk River and what it means to you.

4. In what ways is the Situk River important to you?
(for example economic, quality of life, sense of well-being, resource use, recreation, culturally, spiritually, family or clan history/identity)
 - Are there any other ways the river is important to you?
5. What types of activities have you done on or around the Situk?
 - Recreation (for example floating, fishing, hunting, picnicking, hiking, camping)
 - Subsistence (for example fishing (type), hunting, gathering)
 - Commercial (for example guiding, outfitting, fishing)
 - Other.....
6. Do you benefit from other peoples' activities or harvests tied to the Situk

(for example sharing of subsistence, tourism, family commercial business)?

I would like to find out about how other users and management affect your relationship with the Situk River that you just described.

7. Considering both local and nonlocal uses, how do you feel about other peoples' activities on the Situk (for example types of use include nonresident recreation fishing, catch and release fishing, tourism, commercial, subsistence, local recreation)
 - Too much use?
 - Inappropriate use?

8. What are your opinions about the four agencies and their Partners group that manage the Situk (FS, AKFG, YTT, CBY)? Which agencies....
 - Do you trust
 - Represent your interests
 - Are sincere and honest in protecting the watershed
 - Are fair, equitable

9. How could the Situk River be managed to better meet local needs of Yakutat residents (for example topics include Hubbard Glacier, boating, motorized use, access trails and roads, ATV, fisheries, use limits, biology)?
 - Are there any other ways the agencies could manage the river better?
 - Most important
 - Options

10. Who would benefit or loose if management made the types of changes that you would like to see?

If you are interested in the results of this study, I will present them at the Situk Management Partners meeting sometime next year. We will advertise around town and in the local newspaper, and open that meeting to the public.

Appendix B

Yakutat Case Study Quantitative Questionnaire

Situk River



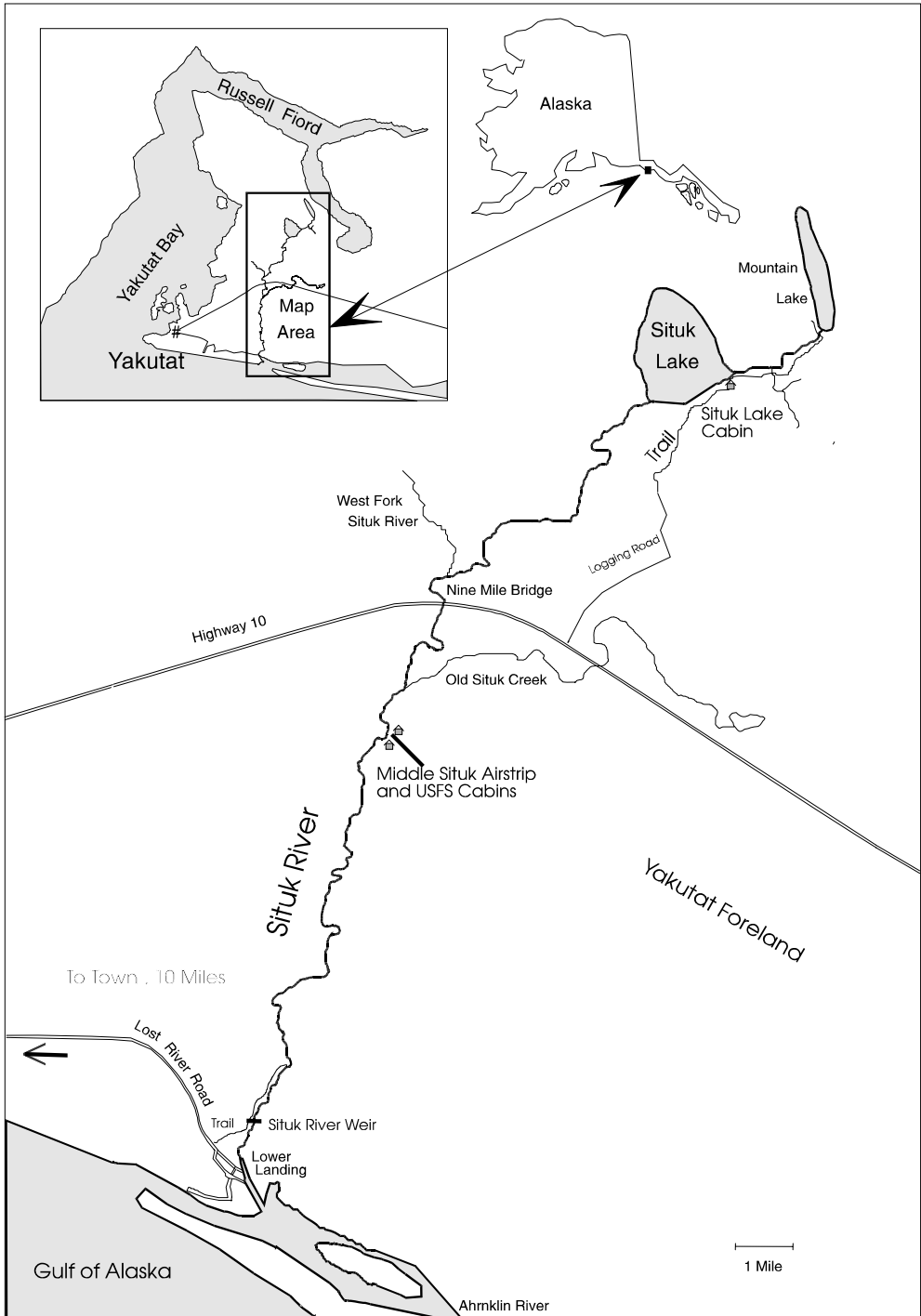
Yakutat Resident Survey

We care about your opinion...

2005



Aldo Leopold Wilderness Research Institute
P.O. Box 8089
Missoula, Montana 59807



Thank you for taking the time to complete this survey. Please answer every question to ensure the accuracy and value of the study results. Participation in this study is voluntary and your answers will remain anonymous. It is important that the answers to these questions be given by the person who was chosen for this survey.

Q1. Which of the following activities have you personally done along the Situk River? *(Check all that apply)*

	In the past year	or	In your lifetime
Walking or hiking	<input type="checkbox"/>		<input type="checkbox"/>
Subsistence fishing	<input type="checkbox"/>		<input type="checkbox"/>
Recreational or personal fishing	<input type="checkbox"/>		<input type="checkbox"/>
Commercial fishing	<input type="checkbox"/>		<input type="checkbox"/>
Guiding or outfitting	<input type="checkbox"/>		<input type="checkbox"/>
ATV riding	<input type="checkbox"/>		<input type="checkbox"/>
Harvesting eggs	<input type="checkbox"/>		<input type="checkbox"/>
Gathering plants, berries, mushrooms	<input type="checkbox"/>		<input type="checkbox"/>
Non-motorized floating, boating	<input type="checkbox"/>		<input type="checkbox"/>
Motorized boating	<input type="checkbox"/>		<input type="checkbox"/>
Camping	<input type="checkbox"/>		<input type="checkbox"/>
Picnicking	<input type="checkbox"/>		<input type="checkbox"/>
Photography	<input type="checkbox"/>		<input type="checkbox"/>
Hunting	<input type="checkbox"/>		<input type="checkbox"/>
Other (specify):	<input type="checkbox"/>		<input type="checkbox"/>

Q2. Do you feel the Situk River has been negatively impacted by inappropriate behaviors of other people? *(Circle one)*

1. Yes 2. No *(go to Q3.)*

If yes, what are the impacts and the types of behavior that caused them? *(Write on the back cover if you need more room to explain)*

Q3a. Has any person, group of people, or organization ever interfered with your relationship with the Situk River? (*Check all that apply*)

- Commercial fishers
- Subsistence fishers
- Motorized boaters
- Managers, law enforcement officers, ranger patrols
- Other (specify) _____
- Non-local sport anglers
- Local recreationists
- Professional river guides

b. Please describe the problems or types of interference. (*If there were none, go to Q4. Write on the back cover if you need more room to explain*)

Q4. How **important** is the Situk River to you, personally, for each of the following reasons? (*Circle one scale number for each that best represents your opinion*)

	<u>Not at all</u> <u>Important</u>	<u>Slightly</u> <u>Important</u>	<u>Moderately</u> <u>Important</u>	<u>Very</u> <u>Important</u>
Recreation, leisure, relaxation	0	1	2	3
Economic, commercial benefits	0	1	2	3
Protection of the environment	0	1	2	3
Spiritual values	0	1	2	3
Opportunities to be alone	0	1	2	3
Subsistence activities	0	1	2	3
Traditional, cultural activities	0	1	2	3
Defining who you are	0	1	2	3
Appreciating family history	0	1	2	3

Q5. Evaluate the **amount** of the following aspects of Situk River management, services and facilities.
(Circle one scale number for each that best represents your opinion)

	Way too low	Somewhat low	About, right	Somewhat high	Way too high	No Opinion
Access trails.	-2	-1	0	1	2	X
Boat launches.	-2	-1	0	1	2	X
Enforcement of sport fishing regulations.	-2	-1	0	1	2	X
Enforcement of commercial fishing regulations.	-2	-1	0	1	2	X
Enforcement of subsistence fishing regulations.	-2	-1	0	1	2	X
Toilet facilities.	-2	-1	0	1	2	X
Public use Forest Service cabins	-2	-1	0	1	2	X
Agency patrols.	-2	-1	0	1	2	X
Campsites.	-2	-1	0	1	2	X
Consultation with local residents about management actions.	-2	-1	0	1	2	X
Education of users about appropriate behavior	-2	-1	0	1	2	X

Q6. How much of the following activities would you **prefer** on the Situk River compared to current use?
(Circle one scale number for each)

	None	Less than now	Current level	More than now	Unlimited Use	No Opinion
Commercial fishing	-2	-1	0	1	2	X
Subsistence fishing	-2	-1	0	1	2	X
Guided sport fishing	-2	-1	0	1	2	X
Outfitted sport fishing	-2	-1	0	1	2	X
Private sport fishing	-2	-1	0	1	2	X
Motorized boats below the weir	-2	-1	0	1	2	X
Motorized boats above the weir	-2	-1	0	1	2	X

Q7. How much do you **agree** or disagree with each of the following statements? (Circle one response for each statement that best represents your level of agreement)

	Strongly Disagree	Disagree	Agree	Strongly Agree	No Opinion
I find that a lot of my life is organized around the Situk River	SD	D	A	SA	X
Non-local sport fishing on the Situk benefits Yakutat economically.	SD	D	A	SA	X
I personally benefit financially from non-local sport fishing on the Situk River.	SD	D	A	SA	X
No other place can compare to the Situk River.	SD	D	A	SA	X
I would rather live in Yakutat than anywhere else.	SD	D	A	SA	X
If I had to move away from Yakutat, I would be very sorry to leave.	SD	D	A	SA	X
Increased sport fishing on the Situk River would help Yakutat grow in the "right direction."	SD	D	A	SA	X
The overall benefits to Yakutat from non-local sport fishing on the Situk outweigh the costs.	SD	D	A	SA	X
The Situk River is becoming overcrowded because of more non-local sport fishing.	SD	D	A	SA	X
I am very attached to the Situk River	SD	D	A	SA	X
I seldom take time to visit the Situk River	SD	D	A	SA	X
If things change, I could go to another place nearby to do the type of things I do on the Situk River.	SD	D	A	SA	X

Q8. How well do the primary managing agencies represent your interests in decisions about the Situk River Watershed? (Rate the five agencies by circling one scale number for each that best represents your evaluation).

	<u>Doesn't reflect my values</u>		<u>Not Sure</u>	<u>Reflects my values</u>	
City and Borough of Yakutat	-2	-1	0	1	2
Yakutat Tlingit Tribe	-2	-1	0	1	2
Alaska Department of Fish and Game	-2	-1	0	1	2
Alaska Department of Natural Resources	-2	-1	0	1	2
US Forest Service	-2	-1	0	1	2

	<u>Doesn't consider my views</u>		<u>Not Sure</u>	<u>Considers my views</u>	
City and Borough of Yakutat	-2	-1	0	1	2
Yakutat Tlingit Tribe	-2	-1	0	1	2
Alaska Department of Fish and Game	-2	-1	0	1	2
Alaska Department of Natural Resources	-2	-1	0	1	2
US Forest Service	-2	-1	0	1	2

	<u>I do not trust...at all</u>		<u>Not Sure</u>	<u>I trust... completely</u>	
City and Borough of Yakutat	-2	-1	0	1	2
Yakutat Tlingit Tribe	-2	-1	0	1	2
Alaska Department of Fish and Game	-2	-1	0	1	2
Alaska Department of Natural Resources	-2	-1	0	1	2
US Forest Service	-2	-1	0	1	2

Q9. What level of government would you prefer to have final authority over management decisions for the Situk River? *(Circle one number to indicate your preferred choice)*

1. City and Borough
2. Tribal
3. State
4. Federal
5. Collaborative partnership

Q10. Do you feel that a limit is needed on amount of use of the Situk River to reduce or control impacts, recognizing that if a limit is set your own opportunity to use this area may be reduced in the future? *(Circle one number. If you choose 3 please explain.)*

1. Yes, a limit is needed now to **lower** the current level of use.
2. Yes, a limit is needed now to **hold use** at about the current level.
3. No limit is needed now, but should be **imposed if overuse** occurs.

→What do you feel would make it seem overused? _____

-
4. No, there should **never** be a limit on amount of use in the area.

Q11. What changes in regulations or management would improve the condition of the Situk River? *(Explain briefly and give your reason, continue on back of questionnaire if needed)*

Q12. What is special to you about living in Yakutat? What changes to this place would make you unhappy? What changes would you like to see? *(Continue on back of questionnaire if needed)*

Q13. Tell us how you feel about the following possible management options for the Situk River. Refer to the map inside the front cover for place locations. (Circle one response for each statement that best represents your level of support or opposition)

	Strongly oppose	Oppose	Neutral or no opinion	Support	Strongly support
Designate campsites and implement a reservation system for camping.	-2	-1	0	1	2
Encourage sport anglers to practice more “catch-and-release” fishing.	-2	-1	0	1	2
Prohibit motors of more than ten horsepower above the weir	-2	-1	0	1	2
Stage boat launches from Nine Mile Bridge at different times of day.	-2	-1	0	1	2
Prohibit jetboats above the weir.	-2	-1	0	1	2
Set a daily limit on the number of boats allowed on the river above the weir.	-2	-1	0	1	2
Set a daily limit on guided recreation use on the river.	-2	-1	0	1	2
Set a daily limit on nonguided recreation use on the river.	-2	-1	0	1	2
Prohibit motorized boating in an upstream direction above the weir during peak sport fishing periods.	-2	-1	0	1	2
Prohibit all motorized boats above the weir.	-2	-1	0	1	2
Prohibit sport fishing below the lower landing.	-2	-1	0	1	2
Decrease sport fishing bag limits.	-2	-1	0	1	2
Decrease allowable subsistence harvests of fish.	-2	-1	0	1	2
Decrease allowable commercial harvests of fish.	-2	-1	0	1	2

Your personal characteristics:

Q14. What was your age on your last birthday? _____ *Years*

Q15. Are you: (*Circle one*)

1. Female 2. Male

Q16. Do you identify yourself as Tlingit?

1. Yes 2. No

Q17. How much of the year do you usually live in Yakutat? _____ *Months per Year*

Q18. How many years have you lived in Yakutat?

Year-around: _____ *Years*

Seasonally: _____ *Years*

THANK YOU VERY MUCH FOR PARTICIPATING!

Please use the remaining space here and on the back cover for additional comments.

Public reporting burden for this collection of information is estimated to average 20 minutes per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Agriculture, Clearance Officer, OIRM, Room 404-W, Washington, DC 20250; and to the Office of Management and Budget, Paperwork Reduction Project (OMB #0596-0108), Washington, DC 20503.

Appendix C
Darby Case Study Quantitative Questionnaire

Recreation in the Bitterroot National Forest

A Survey of
Darby and Conner Residents

2006

Sponsored by:

College of Forestry and Conservation
Montana Forest and Conservation Experiment Station
The University of Montana

Thank you for taking the time to complete this survey. Please answer every question to ensure the accuracy and value of the study results. Participation in this study is voluntary and your answers will remain confidential. It is important that the answers to these questions be given by the person to whom this survey was addressed.

Q1. Which of the following recreation activities have **you and other members of your household** done in the Bitterroot National Forest? *(Check all that apply)*

	Have you personally participated:		Other household member(s) did this activity in the past year
	In the past year	In your lifetime <i>OR</i>	
Walking or hiking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Overnight backpacking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fishing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Horseback riding	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Bicycling or mountain biking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ATV or other motorized trail use	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Snowmobiling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gathering plants, berries, mushrooms	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Non-motorized boating, floating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Motorized boating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Camping in developed sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Camping in undeveloped sites	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Picnicking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cross-country skiing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hunting	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Gathering firewood	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other (specify):	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Q2. How **important** to you are each of the following values that may be associated with the Bitterroot National Forest? (*Circle one response for each type of value that best represents the importance you place on it*)

	Not at all Important	Slightly Important	Moderately Important	Very Important
Watershed protection	NI	SI	MI	VI
Economic value of timber resources	NI	SI	MI	VI
Economic value of recreation visitor spending in the area	NI	SI	MI	VI
Wildlife and fish habitat protection	NI	SI	MI	VI
Recreation opportunity	NI	SI	MI	VI
Spiritual or emotional value	NI	SI	MI	VI
Cultural and historical value	NI	SI	MI	VI
Opportunity to hunt, fish, gather food	NI	SI	MI	VI
Opportunity to spend time with family and friends	NI	SI	MI	VI
Personal – defining who you are	NI	SI	MI	VI
Social – defining your community	NI	SI	MI	VI

Q3. How much do you **agree or disagree** with each of the following statements? (Circle one response for each statement that best represents your level of agreement)

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
The Bitterroot National Forest means a lot to me.	SD	D	N	A	SA
I identify strongly with the Bitterroot National Forest	SD	D	N	A	SA
I would enjoy doing the things I do in the Bitterroot National Forest just as much at a similar place.	SD	D	N	A	SA
I benefit more from visiting or viewing places in the Selway-Bitterroot Wilderness than other places in the Bitterroot National Forest.	SD	D	N	A	SA
I would rather live in the community I live in now than anywhere else.	SD	D	N	A	SA
Visiting the Bitterroot National Forest says a lot about who I am.	SD	D	N	A	SA
No other place can compare to the Bitterroot National Forest.	SD	D	N	A	SA
I am very attached to a few specific places in the Bitterroot National Forest	SD	D	N	A	SA
I wouldn't substitute any other area for doing the types of things I do in the Bitterroot National Forest.	SD	D	N	A	SA
I have strong ties to the community that I live in now.	SD	D	N	A	SA
I feel like the Selway-Bitterroot Wilderness is a part of me.	SD	D	N	A	SA

Q4a. Do you feel Bitterroot National Forest lands have been negatively impacted by inappropriate behaviors of other people? *(Circle one)*

1. Yes 2. No *(go to Q5.)*

Q4b. **If yes**, what are the behaviors and the types of impacts that most concern you? *(Continue on the back cover if you need more room to explain)*

Q5a. Has any person, group of people, or organization ever interfered with your relationship with Bitterroot National Forest lands *(Check all that apply)*

- Hunters
- Anglers
- Visitors from out of the local area
- Nonmotorized recreationists
- Motorized recreationists
- Professional guides/outfitters
- Environmental organizations
- Commercial operators such as loggers or miners
- Managers, law enforcement officers, ranger patrols
- Residents living near the national forest boundary
- Other (specify) _____

Q5b. Please describe the problems or types of interference. *(If there were none, go to Q6. Write on the back cover if you need more room to explain)*

Q6. Evaluate the current **amount** of management, services and facilities in the Bitterroot National Forest, compared to what you would prefer. *(Circle one response for each)*

The current amount is:

	Way too low	Somewhat too low	About, right	Somewhat too high	Way too high	Don't Know
Recreation facility maintenance	WL	L	R	H	WH	X
Road and trail maintenance	WL	L	R	H	WH	X
Recreation travel information and regulation signs	WL	L	R	H	WH	X
Toilet facilities.	WL	L	R	H	WH	X
Primitive campsites	WL	L	R	H	WH	X
Developed campsites	WL	L	R	H	WH	X
Parking for recreation access	WL	L	R	H	WH	X
Law enforcement	WL	L	R	H	WH	X
Education about appropriate behavior and stewardship	WL	L	R	H	WH	X
Consideration of local concerns in management decisions	WL	L	R	H	WH	X

Q7. Evaluate the current **opportunities** in the Bitterroot National Forest for each of the following types of recreation activities, compared to what you would prefer. *(Circle one response for each type of recreation opportunity)*

The current opportunity for this activity is:

	Way too low	Somewhat too low	About, right	Somewhat too high	Way too high	Don't Know
Hiking, backpacking	WL	L	R	H	WH	X
Horseback riding	WL	L	R	H	WH	X
Bicycling or mountain biking	WL	L	R	H	WH	X
ATV, motorized recreation	WL	L	R	H	WH	X
Fishing	WL	L	R	H	WH	X
Hunting	WL	L	R	H	WH	X
Snowmobiling	WL	L	R	H	WH	X

Q8. Tell us whether you **oppose or support** the following recreation and travel management options for the Bitterroot National Forest. (Circle one response for each statement that best represents your level of support or opposition)

	Strongly oppose	Oppose	Not Sure	Support	Strongly support
Provide more opportunities for trail riding open to ATV's and motorcycles, but closed to larger motor vehicles.	SO	O	N	S	SS
Provide more opportunities for using full-size four-wheel-drive vehicles on primitive, non-maintained roads.	SO	O	N	S	SS
Provide more opportunities for hiking and equestrian use on trails closed to motorized use.	SO	O	N	S	SS
Open more currently gated roads to year-around motorized access.	SO	O	N	S	SS
Open more currently gated roads to motorized access during the summer months.	SO	O	N	S	SS
Close some roads or trails that are currently open to motorized use to provide more nonmotorized recreation opportunities.	SO	O	N	S	SS
Close some roads or trails currently open to motorized use if it improves wildlife habitat or water quality.	SO	O	N	S	SS
Locate motorized recreation uses at least a half mile away from national forest boundaries to reduce impacts on nearby residents.	SO	O	N	S	SS
Develop new connecting routes to provide loop trail opportunities for motorized recreation use.	SO	O	N	S	SS
Re-route, rather than remove, legal motorized use trails that are currently in undesirable locations.	SO	O	N	S	SS
Remove and rehabilitate all illegal user-created motorized travel routes.	SO	O	N	S	SS

Q9. How does the Bitterroot National Forest management consider your interests in their decisions?
(Circle one scale number for each item that best represents your evaluation).

Bitterroot National Forest Management:

<u>Does not listen to me</u>		<u>Not Sure</u>		<u>Listens to me</u>
-2	-1	0	1	2
<u>Does not reflect my values</u>		<u>Not Sure</u>		<u>Reflect my values</u>
-2	-1	0	1	2
<u>I do not trust...at all</u>		<u>Not Sure</u>		<u>I trust... completely</u>
-2	-1	0	1	2
<u>Opposes my views</u>		<u>Not Sure</u>		<u>Supports my views</u>
-2	-1	0	1	2

Q10. How do the following organized groups represent your interests in management decisions about the Bitterroot National Forest?
(Circle one scale number for each organization that best represents your evaluation).

	<u>Opposes my views</u>		<u>Not Sure</u>		<u>Supports my views</u>
Friends of the Bitter Root	-2	-1	0	1	2
Ravalli County Off Road User Association	-2	-1	0	1	2
Burnt Ridge Neighborhood Assoc.	-2	-1	0	1	2
Montana Wilderness Association	-2	-1	0	1	2
Montana Snowmobile Association	-2	-1	0	1	2
Back Country Horsemen of Montana	-2	-1	0	1	2
WildWest Institute	-2	-1	0	1	2

Write your answers to the following questions. Use the back cover for more space.

Q11a. What is special to you about living in the Darby or Conner Area?

Q11b. What changes to this area would make you unhappy?

Q11c. What changes to this area would you like to see?

Q12. What are the most important things that need to be done to improve the Bitterroot National Forest?

Your personal characteristics:

Q13. What is your age? _____ *Years*

Q14. Are you: (*Circle one*)

1. Female 2. Male

Q15. How many **people besides yourself** live in your current home? (*enter 0 if there are none*)

_____ *Adults* _____ *Children*

Q16. Is your current home in town or in a rural area? (*Circle one*)

1. In Town 2. Rural Area

Q17. How much of the year do you usually live in the Darby or Conner Area?

_____ *Months per Year*

Q18. How many years have you lived in the Darby or Conner Area?

Year-around: _____ *Years*

Seasonally: _____ *Years*

Q19. How many years have you lived in Montana?

_____ *Years*

THANK YOU VERY MUCH FOR PARTICIPATING!

Please use the remaining space here and on the back cover for additional comments.

Appendix D

Yakutat Case Study Tabulated Quantitative Results

The following tables show the results from the Yakutat Resident quantitative survey. The results are tabulated using the SAS statistical software package frequency distribution analysis procedure. The results are listed in the order that they were measured in the questionnaire (Appendix B). Subcomponents of major survey question numbers are assigned small letters for referencing (for example Q3a, Q3b, etc.). Written responses received on the 'open-ended' portions of survey questions are not included here. A complete record or written comments is available in the report to managers (Christensen and Watson 2006).

Q1: Activity participation

The FREQ Procedure

Walking or hiking

q1a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	144	64.00	144	64.00
Have done, but not in past year	70	31.11	214	95.11
Never done	11	4.89	225	100.00

Subsistence fishing

q1b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	115	51.11	115	51.11
Have done, but not in past year	72	32.00	187	83.11
Never done	38	16.89	225	100.00

Recreation or personal fishing

q1c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	117	52.00	117	52.00
Have done, but not in past year	72	32.00	189	84.00
Never done	36	16.00	225	100.00

Commercial fishing

q1d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	46	20.44	46	20.44
Have done, but not in past year	71	31.56	117	52.00
Never done	108	48.00	225	100.00

Guiding or outfitting

q1e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	9	4.00	9	4.00
Have done, but not in past year	10	4.44	19	8.44
Never done	206	91.56	225	100.00

The FREQ Procedure

ATV riding

q1f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	60	26.67	60	26.67
Have done, but not in past year	72	32.00	132	58.67
Never done	93	41.33	225	100.00

Harvesting eggs

q1g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	25	11.11	25	11.11
Have done, but not in past year	43	19.11	68	30.22
Never done	157	69.78	225	100.00

Gathering plants, berries, mushrooms

q1h	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	119	52.89	119	52.89
Have done, but not in past year	56	24.89	175	77.78
Never done	50	22.22	225	100.00

Non-motorized floating, boating

q1i	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	69	30.67	69	30.67
Have done, but not in past year	78	34.67	147	65.33
Never done	78	34.67	225	100.00

Motorized boating

q1j	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	75	33.33	75	33.33
Have done, but not in past year	79	35.11	154	68.44
Never done	71	31.56	225	100.00

The FREQ Procedure

Camping

	q1k	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year		77	34.22	77	34.22
Have done, but not in past year		81	36.00	158	70.22
Never done		67	29.78	225	100.00

Picnicking

	q1l	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year		99	44.00	99	44.00
Have done, but not in past year		59	26.22	158	70.22
Never done		67	29.78	225	100.00

Photography

	q1m	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year		80	35.56	80	35.56
Have done, but not in past year		65	28.89	145	64.44
Never done		80	35.56	225	100.00

Hunting

	q1n	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year		72	32.00	72	32.00
Have done, but not in past year		58	25.78	130	57.78
Never done		95	42.22	225	100.00

Other

	q1o	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year		7	3.11	7	3.11
Have done, but not in past year		3	1.33	10	4.44
Never done		215	95.56	225	100.00

Q2: Situk impacted?

The FREQ Procedure

Situk Impacted?				
q2a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
missing response	34	.	.	.
Yes	129	67.54	129	67.54
No	62	32.46	191	100.00

Frequency Missing = 34

Q3: Others' interfere?

The FREQ Procedure

Commercial fishers interfere

q3aa	Frequency	Percent
No	216	96.00
Yes	9	4.00

Subsistence fishers interfere

q3ab	Frequency	Percent
No	221	98.22
Yes	4	1.78

Motorized boaters interfere

q3ac	Frequency	Percent
No	198	88.00
Yes	27	12.00

Management interfere

q3ad	Frequency	Percent
No	187	83.11
Yes	38	16.89

Sport anglers interfere

q3ae	Frequency	Percent
No	130	57.78
Yes	95	42.22

Local recreationists interfere

q3af	Frequency	Percent
No	221	98.22
Yes	4	1.78

The FREQ Procedure

Guides interfere

q3ag	Frequency	Percent
No	204	90.67
Yes	21	9.33

Other interfere

q3ah	Frequency	Percent
No	209	92.89
Yes	16	7.11

The FREQ Procedure

Other interfere specific

q3ahspec	Frequency	Percent
USFS	3	18.75
Native allotment folks	2	12.50
Bears that break up camp	1	6.25
Fish and Game	1	6.25
Germans	1	6.25
Hunters	1	6.25
Just too much! (Rules and People)	1	6.25
Land owners	1	6.25
Locals	1	6.25
Lodges and B&B's	1	6.25
Meat fishermen	1	6.25
Non-local hunters	1	6.25
Only on the roadways to and from	1	6.25

Frequency Missing = 209

Q4: Importance of Situk values

The FREQ Procedure

Recreation, leisure, relax

q4a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	3	1.34	3	1.34
Slightly Important	13	5.80	16	7.14
Moderately Important	56	25.00	72	32.14
Very Important	152	67.86	224	100.00

Frequency Missing = 1

Economic, commercial benefits

q4b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	20	8.93	20	8.93
Slightly Important	22	9.82	42	18.75
Moderately Important	36	16.07	78	34.82
Very Important	146	65.18	224	100.00

Frequency Missing = 1

Protection of the Environment

q4c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	6	2.68	6	2.68
Slightly Important	11	4.91	17	7.59
Moderately Important	42	18.75	59	26.34
Very Important	165	73.66	224	100.00

Frequency Missing = 1

The FREQ Procedure

Spiritual values

q4d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	34	15.18	34	15.18
Slightly Important	27	12.05	61	27.23
Moderately Important	48	21.43	109	48.66
Very Important	115	51.34	224	100.00

Frequency Missing = 1

Opportunities to be alone

q4e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	25	11.16	25	11.16
Slightly Important	44	19.64	69	30.80
Moderately Important	56	25.00	125	55.80
Very Important	99	44.20	224	100.00

Frequency Missing = 1

Subsistence activities

q4f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	13	5.80	13	5.80
Slightly Important	17	7.59	30	13.39
Moderately Important	34	15.18	64	28.57
Very Important	160	71.43	224	100.00

Frequency Missing = 1

The FREQ Procedure

Traditional cultural activities

q4g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	36	16.07	36	16.07
Slightly Important	27	12.05	63	28.13
Moderately Important	39	17.41	102	45.54
Very Important	122	54.46	224	100.00

Frequency Missing = 1

Defining who you are

q4h	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	56	25.00	56	25.00
Slightly Important	31	13.84	87	38.84
Moderately Important	52	23.21	139	62.05
Very Important	85	37.95	224	100.00

Frequency Missing = 1

Appreciating family history

q4i	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	58	25.89	58	25.89
Slightly Important	20	8.93	78	34.82
Moderately Important	33	14.73	111	49.55
Very Important	113	50.45	224	100.00

Frequency Missing = 1

Q5: Amount of current facilities and management

The FREQ Procedure

Access tails

q5a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	23	10.41	23	10.41
Somewhat low	50	22.62	73	33.03
About right	111	50.23	184	83.26
Somewhat high	21	9.50	205	92.76
Way too high	16	7.24	221	100.00

Frequency Missing = 4

Boat launches

q5b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	28	12.67	28	12.67
Somewhat low	48	21.72	76	34.39
About right	122	55.20	198	89.59
Somewhat high	14	6.33	212	95.93
Way too high	9	4.07	221	100.00

Frequency Missing = 4

Enforcement of sport fishing regs

q5c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	106	47.96	106	47.96
Somewhat low	41	18.55	147	66.52
About right	58	26.24	205	92.76
Somewhat high	7	3.17	212	95.93
Way too high	9	4.07	221	100.00

Frequency Missing = 4

The FREQ Procedure

Enforcement of comm fishing regs

q5d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	13	5.88	13	5.88
Somewhat low	24	10.86	37	16.74
About right	123	55.66	160	72.40
Somewhat high	36	16.29	196	88.69
Way too high	25	11.31	221	100.00

Frequency Missing = 4

Enforce subsistence fishing regs

q5e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	11	4.98	11	4.98
Somewhat low	29	13.12	40	18.10
About right	136	61.54	176	79.64
Somewhat high	23	10.41	199	90.05
Way too high	22	9.95	221	100.00

Frequency Missing = 4

Toilet facilities

q5f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	41	18.55	41	18.55
Somewhat low	69	31.22	110	49.77
About right	103	46.61	213	96.38
Somewhat high	4	1.81	217	98.19
Way too high	4	1.81	221	100.00

Frequency Missing = 4

The FREQ Procedure

Public use FS cabins

	q5g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low		13	5.88	13	5.88
Somewhat low		55	24.89	68	30.77
About right		120	54.30	188	85.07
Somewhat high		21	9.50	209	94.57
Way too high		12	5.43	221	100.00

Frequency Missing = 4

Agency patrols

	q5h	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low		30	13.57	30	13.57
Somewhat low		51	23.08	81	36.65
About right		102	46.15	183	82.81
Somewhat high		21	9.50	204	92.31
Way too high		17	7.69	221	100.00

Frequency Missing = 4

Campsites

	q5i	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low		29	13.12	29	13.12
Somewhat low		56	25.34	85	38.46
About right		113	51.13	198	89.59
Somewhat high		12	5.43	210	95.02
Way too high		11	4.98	221	100.00

Frequency Missing = 4

The FREQ Procedure

Consulting locals about mngt

q5j	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	58	26.24	58	26.24
Somewhat low	79	35.75	137	61.99
About right	69	31.22	206	93.21
Somewhat high	12	5.43	218	98.64
Way too high	3	1.36	221	100.00

Frequency Missing = 4

Education about approp behavior

q5k	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	72	32.58	72	32.58
Somewhat low	82	37.10	154	69.68
About right	57	25.79	211	95.48
Somewhat high	7	3.17	218	98.64
Way too high	3	1.36	221	100.00

Frequency Missing = 4

Q6: Preference for activity amounts

The FREQ Procedure

Commercial fishing

q6a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Less than now	17	7.69	17	7.69
Current level	141	63.80	158	71.49
More than now	34	15.38	192	86.88
Unlimited use	29	13.12	221	100.00

Frequency Missing = 4

Subsistence fishing

q6b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Less than now	5	2.26	5	2.26
Current level	131	59.28	136	61.54
More than now	41	18.55	177	80.09
Unlimited use	44	19.91	221	100.00

Frequency Missing = 4

Guided sport fishing

q6c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
None	15	6.79	15	6.79
Less than now	80	36.20	95	42.99
Current level	99	44.80	194	87.78
More than now	21	9.50	215	97.29
Unlimited use	6	2.71	221	100.00

Frequency Missing = 4

The FREQ Procedure

Outfitted sport fishing

q6d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
None	24	10.86	24	10.86
Less than now	89	40.27	113	51.13
Current level	88	39.82	201	90.95
More than now	14	6.33	215	97.29
Unlimited use	6	2.71	221	100.00

Frequency Missing = 4

Private sport fishing

Cumulative Cumulative

	q6e	Frequency	Percent	Frequency	Percent
None		18	8.14	18	8.14
Less than now		46	20.81	64	28.96
Current level		118	53.39	182	82.35
More than now		26	11.76	208	94.12
Unlimited use		13	5.88	221	100.00

Frequency Missing = 4

Motorized boats below weir

	q6f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
None		27	12.22	27	12.22
Less than now		54	24.43	81	36.65
Current level		113	51.13	194	87.78
More than now		13	5.88	207	93.67
Unlimited use		14	6.33	221	100.00

Frequency Missing = 4

The FREQ Procedure

Motorized boats above weir

	q6g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
None		72	32.58	72	32.58
Less than now		58	26.24	130	58.82
Current level		64	28.96	194	87.78
More than now		17	7.69	211	95.48
Unlimited use		10	4.52	221	100.00

Frequency Missing = 4

Q7: Attachments to place

The FREQ Procedure

My Life is organized around Situk

q7a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	10	4.59	10	4.59
Disagree	52	23.85	62	28.44
Agree	97	44.50	159	72.94
Strongly Agree	59	27.06	218	100.00

Frequency Missing = 7

Sport fishing benefits Yakutat economically

q7b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	15	6.85	15	6.85
Disagree	35	15.98	50	22.83
Agree	121	55.25	171	78.08
Strongly Agree	48	21.92	219	100.00

Frequency Missing = 6

I benefit financially from Situk sport fishing

q7c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	70	32.41	70	32.41
Disagree	76	35.19	146	67.59
Agree	44	20.37	190	87.96
Strongly Agree	26	12.04	216	100.00

Frequency Missing = 9

The FREQ Procedure

No other place can compare to the Situk

q7d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	5	2.34	5	2.34
Disagree	31	14.49	36	16.82
Agree	87	40.65	123	57.48
Strongly Agree	91	42.52	214	100.00

Frequency Missing = 11

I would rather live in Yakutat than anywhere else

q7e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	4	1.87	4	1.87
Disagree	21	9.81	25	11.68
Agree	76	35.51	101	47.20
Strongly Agree	113	52.80	214	100.00

Frequency Missing = 11

If I had to move away I would be sorry to leave

q7f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	3	1.38	3	1.38
Disagree	11	5.07	14	6.45
Agree	85	39.17	99	45.62
Strongly Agree	118	54.38	217	100.00

Frequency Missing = 8

The FREQ Procedure

Sport fishing would help Yakutat in the right direction

q7g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	87	40.47	87	40.47
Disagree	89	41.40	176	81.86
Agree	31	14.42	207	96.28
Strongly Agree	8	3.72	215	100.00

Frequency Missing = 10

Overall benefits outweigh costs of sport fishing

q7h	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	46	21.40	46	21.40
Disagree	83	38.60	129	60.00
Agree	69	32.09	198	92.09
Strongly Agree	17	7.91	215	100.00

Frequency Missing = 10

The Situk is becoming overcrowded from sport fishing

q7i	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	8	3.69	8	3.69
Disagree	32	14.75	40	18.43
Agree	101	46.54	141	64.98
Strongly Agree	76	35.02	217	100.00

Frequency Missing = 8

The FREQ Procedure

I am very attached to the Situk River

q7j	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	4	1.89	4	1.89
Disagree	24	11.32	28	13.21
Agree	82	38.68	110	51.89
Strongly Agree	102	48.11	212	100.00

Frequency Missing = 13

I seldom take time to visit the Situk River

q7k	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	80	36.87	80	36.87
Disagree	97	44.70	177	81.57
Agree	29	13.36	206	94.93
Strongly Agree	11	5.07	217	100.00

Frequency Missing = 8

I could go to another river instead of the Situk

q7l	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	89	41.20	89	41.20
Disagree	74	34.26	163	75.46
Agree	47	21.76	210	97.22
Strongly Agree	6	2.78	216	100.00

Frequency Missing = 9

Q8: Trust in management agencies

The FREQ Procedure

CBY and my values

q8aa	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt reflect my values	46	21.00	46	21.00
Sorta doesnt reflect my values	18	8.22	64	29.22
Not Sure	109	49.77	173	79.00
Sorta reflects my values	33	15.07	206	94.06
Reflects my values	13	5.94	219	100.00

Frequency Missing = 6

YTT and my values

q8ab	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt reflect my values	30	13.70	30	13.70
Sorta doesnt reflect my values	16	7.31	46	21.00
Not Sure	88	40.18	134	61.19
Sorta reflects my values	44	20.09	178	81.28
Reflects my values	41	18.72	219	100.00

Frequency Missing = 6

ADFG and my values

q8ac	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt reflect my values	35	15.98	35	15.98
Sorta doesnt reflect my values	36	16.44	71	32.42
Not Sure	79	36.07	150	68.49
Sorta reflects my values	52	23.74	202	92.24
Reflects my values	17	7.76	219	100.00

Frequency Missing = 6

ADNR and my values

q8ad	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt reflect my values	32	14.61	32	14.61
Sorta doesnt reflect my values	24	10.96	56	25.57
Not Sure	119	54.34	175	79.91
Sorta reflects my values	35	15.98	210	95.89
Reflects my values	9	4.11	219	100.00

Frequency Missing = 6

USFS and my values

q8ae	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt reflect my values	66	30.14	66	30.14
Sorta doesnt reflect my values	35	15.98	101	46.12
Not Sure	70	31.96	171	78.08
Sorta reflects my values	40	18.26	211	96.35
Reflects my values	8	3.65	219	100.00

Frequency Missing = 6

CBY and my views

q8ba	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt consider my views	38	17.35	38	17.35
Sorta doesnt consider my views	34	15.53	72	32.88
Not sure	93	42.47	165	75.34
Sorta considers my views	37	16.89	202	92.24
Considers my views	17	7.76	219	100.00

Frequency Missing = 6

YTT and my views

q8bb	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt consider my views	38	17.35	38	17.35
Sorta doesnt consider my views	22	10.05	60	27.40
Not sure	78	35.62	138	63.01
Sorta considers my views	38	17.35	176	80.37
Considers my views	43	19.63	219	100.00

Frequency Missing = 6

ADFG and my views

q8bc	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt consider my views	35	15.98	35	15.98
Sorta doesnt consider my views	27	12.33	62	28.31
Not sure	99	45.21	161	73.52
Sorta considers my views	50	22.83	211	96.35
Considers my views	8	3.65	219	100.00

Frequency Missing = 6

The FREQ Procedure

ADNR and my views

q8bd	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt consider my views	37	16.89	37	16.89
Sorta doesnt consider my views	24	10.96	61	27.85
Not sure	132	60.27	193	88.13
Sorta considers my views	24	10.96	217	99.09
Considers my views	2	0.91	219	100.00

Frequency Missing = 6

USFS and my views

q8be	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt consider my views	61	27.85	61	27.85
Sorta doesnt consider my views	36	16.44	97	44.29
Not sure	77	35.16	174	79.45
Sorta considers my views	37	16.89	211	96.35
Considers my views	8	3.65	219	100.00

Frequency Missing = 6

The FREQ Procedure

CBY and my trust

q8ca	Frequency	Percent	Cumulative Frequency	Cumulative Percent
I do not trust...at all	46	21.00	46	21.00
I kinda do not trust...	37	16.89	83	37.90
Not sure	71	32.42	154	70.32
I kinda trust...	51	23.29	205	93.61
I trust...completely	14	6.39	219	100.00

Frequency Missing = 6

YTT and my trust

q8cb	Frequency	Percent	Cumulative Frequency	Cumulative Percent
I do not trust...at all	29	13.24	29	13.24
I kinda do not trust...	20	9.13	49	22.37
Not sure	75	34.25	124	56.62
I kinda trust...	57	26.03	181	82.65
I trust...completely	38	17.35	219	100.00

Frequency Missing = 6

ADFG and my trust

q8cc	Frequency	Percent	Cumulative Frequency	Cumulative Percent
I do not trust...at all	38	17.35	38	17.35
I kinda do not trust...	34	15.53	72	32.88
Not sure	70	31.96	142	64.84
I kinda trust...	66	30.14	208	94.98
I trust...completely	11	5.02	219	100.00

Frequency Missing = 6

The FREQ Procedure

ADNR and my trust

q8cd	Frequency	Percent	Cumulative Frequency	Cumulative Percent
I do not trust...at all	40	18.26	40	18.26
I kinda do not trust...	26	11.87	66	30.14
Not sure	114	52.05	180	82.19
I kinda trust...	34	15.53	214	97.72
I trust...completely	5	2.28	219	100.00

Frequency Missing = 6

USFS and my trust

q8ce	Frequency	Percent	Cumulative Frequency	Cumulative Percent
I do not trust...at all	75	34.25	75	34.25
I kinda do not trust...	31	14.16	106	48.40
Not sure	64	29.22	170	77.63
I kinda trust...	44	20.09	214	97.72
I trust...completely	5	2.28	219	100.00

Frequency Missing = 6

Q9: Preferred level of government authority

The FREQ Procedure

Preferred level of management

	q9	Frequency	Percent
City and Borough		15	6.94
Tribal		55	25.46
State		34	15.74
Federal		5	2.31
Collaborative partnership		99	45.83
Limited collaborative		8	3.70

Frequency Missing = 9

Q10: View on limiting use in general

The FREQ Procedure

Limit use of the Situk

q10	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Yes limit now to lower use	39	18.75	39	18.75
Yes hold use at current level	86	41.35	125	60.10
No limit now, but maybe later	73	35.10	198	95.19
No there should never be a limit	10	4.81	208	100.00

Frequency Missing = 17

Q13: Preference for management approaches

The FREQ Procedure

Designate campsites and implement reservations

q13a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	30	13.70	30	13.70
Oppose	31	14.16	61	27.85
Neutral or no opinion	68	31.05	129	58.90
Support	67	30.59	196	89.50
Strongly support	23	10.50	219	100.00

Frequency Missing = 6

Encourage catch-and-release fishing

q13b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	10	4.57	10	4.57
Oppose	8	3.65	18	8.22
Neutral or no opinion	39	17.81	57	26.03
Support	71	32.42	128	58.45
Strongly support	91	41.55	219	100.00

Frequency Missing = 6

Prohibit motors > 10hp above weir

q13c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	23	10.50	23	10.50
Oppose	17	7.76	40	18.26
Neutral or no opinion	48	21.92	88	40.18
Support	58	26.48	146	66.67
Strongly support	73	33.33	219	100.00

Frequency Missing = 6

Stage boat launches at Nine Mile

q13d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	26	11.87	26	11.87
Oppose	25	11.42	51	23.29
Neutral or no opinion	101	46.12	152	69.41
Support	40	18.26	192	87.67
Strongly support	27	12.33	219	100.00

Frequency Missing = 6

Prohibit jetboats above weir

q13e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
------	-----------	---------	----------------------	--------------------

Strongly oppose	24	10.96	24	10.96
Oppose	19	8.68	43	19.63
Neutral or no opinion	65	29.68	108	49.32
Support	37	16.89	145	66.21
Strongly support	74	33.79	219	100.00

Frequency Missing = 6

Daily boat limit above weir

q13f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	20	9.13	20	9.13
Oppose	20	9.13	40	18.26
Neutral or no opinion	56	25.57	96	43.84
Support	62	28.31	158	72.15
Strongly support	61	27.85	219	100.00

Frequency Missing = 6

Daily limit on guided use

q13g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	14	6.39	14	6.39
Oppose	29	13.24	43	19.63
Neutral or no opinion	47	21.46	90	41.10
Support	72	32.88	162	73.97
Strongly support	57	26.03	219	100.00

Frequency Missing = 6

Daily limit on nonguided rec use

q13h	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	29	13.24	29	13.24
Oppose	41	18.72	70	31.96
Neutral or no opinion	63	28.77	133	60.73
Support	55	25.11	188	85.84
Strongly support	31	14.16	219	100.00

Frequency Missing = 6

Prohibit upstream motoring above weir during peak

q13i	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	25	11.42	25	11.42
Oppose	15	6.85	40	18.26
Neutral or no opinion	60	27.40	100	45.66

Support	57	26.03	157	71.69
Strongly support	62	28.31	219	100.00

Frequency Missing = 6

Prohibit all motorized boating above weir

q13j	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	33	15.07	33	15.07
Oppose	32	14.61	65	29.68
Neutral or no opinion	57	26.03	122	55.71
Support	38	17.35	160	73.06
Strongly support	59	26.94	219	100.00

Frequency Missing = 6

Prohibit sport fishing below lower landing

q13k	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	21	9.59	21	9.59
Oppose	32	14.61	53	24.20
Neutral or no opinion	67	30.59	120	54.79
Support	49	22.37	169	77.17
Strongly support	50	22.83	219	100.00

Frequency Missing = 6

Decrease sport fishing bag limits

q13l	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	14	6.39	14	6.39
Oppose	23	10.50	37	16.89
Neutral or no opinion	52	23.74	89	40.64
Support	57	26.03	146	66.67
Strongly support	73	33.33	219	100.00

Frequency Missing = 6

The FREQ Procedure

Decrease allowable subsistence harvests of fish

q13m	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	106	48.40	106	48.40
Oppose	59	26.94	165	75.34
Neutral or no opinion	48	21.92	213	97.26
Support	3	1.37	216	98.63
Strongly support	3	1.37	219	100.00

Frequency Missing = 6

Decrease allowable commercial harvests of fish

q13n	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	103	47.03	103	47.03
Oppose	52	23.74	155	70.78
Neutral or no opinion	51	23.29	206	94.06
Support	10	4.57	216	98.63
Strongly support	3	1.37	219	100.00

Frequency Missing = 6

Q14: Respondent's age

The FREQ Procedure

Age				
q14	Frequency	Percent	Cumulative Frequency	Cumulative Percent
19	2	0.93	2	0.93
20	1	0.47	3	1.40
21	2	0.93	5	2.34
22	2	0.93	7	3.27
23	1	0.47	8	3.74
24	4	1.87	12	5.61
25	6	2.80	18	8.41
26	3	1.40	21	9.81
27	6	2.80	27	12.62
28	7	3.27	34	15.89
29	3	1.40	37	17.29
30	5	2.34	42	19.63
31	3	1.40	45	21.03
32	7	3.27	52	24.30
33	1	0.47	53	24.77
34	6	2.80	59	27.57
35	8	3.74	67	31.31
36	5	2.34	72	33.64
37	6	2.80	78	36.45
38	3	1.40	81	37.85
39	6	2.80	87	40.65
40	6	2.80	93	43.46
41	2	0.93	95	44.39
42	3	1.40	98	45.79
43	6	2.80	104	48.60
44	8	3.74	112	52.34
45	6	2.80	118	55.14
46	7	3.27	125	58.41
47	2	0.93	127	59.35
48	7	3.27	134	62.62
49	5	2.34	139	64.95
50	14	6.54	153	71.50
51	3	1.40	156	72.90
52	9	4.21	165	77.10
53	7	3.27	172	80.37
54	6	2.80	178	83.18
55	3	1.40	181	84.58
56	3	1.40	184	85.98
57	1	0.47	185	86.45
58	2	0.93	187	87.38
59	6	2.80	193	90.19
60	2	0.93	195	91.12
61	3	1.40	198	92.52
62	4	1.87	202	94.39
63	1	0.47	203	94.86
64	1	0.47	204	95.33

The FREQ Procedure

Age

q14	Frequency	Percent	Cumulative Frequency	Cumulative Percent
65	1	0.47	205	95.79
66	1	0.47	206	96.26
67	1	0.47	207	96.73
68	1	0.47	208	97.20
69	1	0.47	209	97.66
73	1	0.47	210	98.13
74	1	0.47	211	98.60
76	1	0.47	212	99.07
77	1	0.47	213	99.53
78	1	0.47	214	100.00

Frequency Missing = 11

Q15: Respondent's sex The FREQ Procedure

Sex		
q15	Frequency	Percent
Female	94	42.53
Male	127	57.47

Frequency Missing = 4

Q16: Respondent's Tlingit identity The FREQ Procedure

Do you identify yourself as Tlingit

	q16	Frequency	Percent
Yes		95	43.78
No		122	56.22

Frequency Missing = 8

Q17: Months per year currently living in Yakutat

The FREQ Procedure

Months per year in Yakutat

q17	Frequency	Percent	Cumulative Frequency	Cumulative Percent
4	1	0.46	1	0.46
5	1	0.46	2	0.93
8	1	0.46	3	1.39
9	1	0.46	4	1.85
10	3	1.39	7	3.24
11	3	1.39	10	4.63
12	206	95.37	216	100.00

Frequency Missing = 9

Q18: History in Yakutat

The FREQ Procedure

Year-around years in Yakutat

q18a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	4	1.83	4	1.83
1	8	3.67	12	5.50
2	1	0.46	13	5.96
3	5	2.29	18	8.26
4	12	5.50	30	13.76
5	2	0.92	32	14.68
6	3	1.38	35	16.06
7	6	2.75	41	18.81
8	5	2.29	46	21.10
10	15	6.88	61	27.98
11	7	3.21	68	31.19
12	3	1.38	71	32.57
13	6	2.75	77	35.32
14	2	0.92	79	36.24
15	7	3.21	86	39.45
16	3	1.38	89	40.83
17	3	1.38	92	42.20
18	5	2.29	97	44.50
19	3	1.38	100	45.87
20	6	2.75	106	48.62
21	4	1.83	110	50.46
22	2	0.92	112	51.38
23	3	1.38	115	52.75
24	2	0.92	117	53.67
25	7	3.21	124	56.88
26	1	0.46	125	57.34
27	4	1.83	129	59.17
28	3	1.38	132	60.55
29	3	1.38	135	61.93
30	9	4.13	144	66.06
31	2	0.92	146	66.97
32	4	1.83	150	68.81
33	3	1.38	153	70.18
34	5	2.29	158	72.48
35	7	3.21	165	75.69
37	1	0.46	166	76.15
38	2	0.92	168	77.06
39	3	1.38	171	78.44
40	3	1.38	174	79.82
42	3	1.38	177	81.19
44	3	1.38	180	82.57
45	3	1.38	183	83.94
46	2	0.92	185	84.86
47	1	0.46	186	85.32
48	3	1.38	189	86.70
49	1	0.46	190	87.16

The FREQ Procedure

Year-around years in Yakutat

q18a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
50	8	3.67	198	90.83
51	1	0.46	199	91.28
52	3	1.38	202	92.66
53	2	0.92	204	93.58
54	1	0.46	205	94.04
55	1	0.46	206	94.50
56	3	1.38	209	95.87
58	1	0.46	210	96.33
60	2	0.92	212	97.25
61	1	0.46	213	97.71
66	2	0.92	215	98.62
74	1	0.46	216	99.08
76	1	0.46	217	99.54
77	1	0.46	218	100.00

Frequency Missing = 7

Seasonal years in Yakutat

q18b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	188	85.07	188	85.07
1	2	0.90	190	85.97
2	5	2.26	195	88.24
3	4	1.81	199	90.05
4	3	1.36	202	91.40
5	4	1.81	206	93.21
6	2	0.90	208	94.12
7	1	0.45	209	94.57
8	3	1.36	212	95.93
9	1	0.45	213	96.38
12	1	0.45	214	96.83
13	1	0.45	215	97.29
15	1	0.45	216	97.74
19	1	0.45	217	98.19
20	1	0.45	218	98.64
21	1	0.45	219	99.10
27	1	0.45	220	99.55
39	1	0.45	221	100.00

Frequency Missing = 4

The FREQ Procedure

Percentage of life as a full-time resident

q18c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	4	1.90	4	1.90
2	2	0.95	6	2.84
3	5	2.37	11	5.21
4	1	0.47	12	5.69
6	1	0.47	13	6.16
7	3	1.42	16	7.58
8	6	2.84	22	10.43
9	5	2.37	27	12.80
10	1	0.47	28	13.27
11	2	0.95	30	14.22
12	1	0.47	31	14.69
13	1	0.47	32	15.17
14	2	0.95	34	16.11
15	5	2.37	39	18.48
16	3	1.42	42	19.91
17	4	1.90	46	21.80
18	1	0.47	47	22.27
19	1	0.47	48	22.75
20	2	0.95	50	23.70
21	1	0.47	51	24.17
22	1	0.47	52	24.64
23	3	1.42	55	26.07
24	2	0.95	57	27.01
25	2	0.95	59	27.96
26	3	1.42	62	29.38
27	1	0.47	63	29.86
29	4	1.90	67	31.75
30	2	0.95	69	32.70
31	3	1.42	72	34.12
32	2	0.95	74	35.07
33	3	1.42	77	36.49
38	2	0.95	79	37.44
39	1	0.47	80	37.91
40	2	0.95	82	38.86
41	5	2.37	87	41.23
42	1	0.47	88	41.71
43	3	1.42	91	43.13
45	3	1.42	94	44.55
46	2	0.95	96	45.50
47	2	0.95	98	46.45
49	1	0.47	99	46.92
50	1	0.47	100	47.39
51	3	1.42	103	48.82
54	4	1.90	107	50.71
55	1	0.47	108	51.18
56	1	0.47	109	51.66

The FREQ Procedure

Percentage of life as a full-time resident

q18c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
57	2	0.95	111	52.61
59	1	0.47	112	53.08
60	2	0.95	114	54.03
63	1	0.47	115	54.50
65	2	0.95	117	55.45
66	1	0.47	118	55.92
67	1	0.47	119	56.40
68	1	0.47	120	56.87
69	1	0.47	121	57.35
72	2	0.95	123	58.29
74	1	0.47	124	58.77
75	1	0.47	125	59.24
76	1	0.47	126	59.72
77	1	0.47	127	60.19
79	3	1.42	130	61.61
80	3	1.42	133	63.03
82	2	0.95	135	63.98
83	2	0.95	137	64.93
84	3	1.42	140	66.35
85	3	1.42	143	67.77
86	3	1.42	146	69.19
88	4	1.90	150	71.09
89	1	0.47	151	71.56
90	2	0.95	153	72.51
91	1	0.47	154	72.99
92	1	0.47	155	73.46
94	1	0.47	156	73.93
95	1	0.47	157	74.41
96	1	0.47	158	74.88
97	2	0.95	160	75.83
100	51	24.17	211	100.00

Frequency Missing = 14

The FREQ Procedure

Percentage of life as a resident (full + part time)

q18d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
2	2	0.95	2	0.95
3	3	1.43	5	2.38
4	1	0.48	6	2.86
6	1	0.48	7	3.33
7	3	1.43	10	4.76
8	5	2.38	15	7.14
9	4	1.90	19	9.05
10	1	0.48	20	9.52
11	1	0.48	21	10.00
12	1	0.48	22	10.48
14	2	0.95	24	11.43
15	5	2.38	29	13.81
16	3	1.43	32	15.24
17	1	0.48	33	15.71
18	1	0.48	34	16.19
19	2	0.95	36	17.14
20	1	0.48	37	17.62
21	2	0.95	39	18.57
22	1	0.48	40	19.05
24	2	0.95	42	20.00
25	2	0.95	44	20.95
26	1	0.48	45	21.43
27	1	0.48	46	21.90
28	2	0.95	48	22.86
29	5	2.38	53	25.24
30	2	0.95	55	26.19
31	5	2.38	60	28.57
32	3	1.43	63	30.00
33	3	1.43	66	31.43
35	1	0.48	67	31.90
37	1	0.48	68	32.38
38	3	1.43	71	33.81
39	1	0.48	72	34.29
40	2	0.95	74	35.24
41	4	1.90	78	37.14
42	1	0.48	79	37.62
43	3	1.43	82	39.05
44	2	0.95	84	40.00
45	2	0.95	86	40.95
46	2	0.95	88	41.90
47	2	0.95	90	42.86
49	1	0.48	91	43.33
50	1	0.48	92	43.81
51	2	0.95	94	44.76
54	4	1.90	98	46.67
55	2	0.95	100	47.62

The FREQ Procedure

Percentage of life as a resident (full + part time)

q18d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
56	2	0.95	102	48.57
57	3	1.43	105	50.00
59	1	0.48	106	50.48
60	3	1.43	109	51.90
63	1	0.48	110	52.38
65	2	0.95	112	53.33
66	2	0.95	114	54.29
67	1	0.48	115	54.76
68	1	0.48	116	55.24
69	1	0.48	117	55.71
72	1	0.48	118	56.19
74	1	0.48	119	56.67
75	2	0.95	121	57.62
77	1	0.48	122	58.10
79	3	1.43	125	59.52
80	3	1.43	128	60.95
82	2	0.95	130	61.90
83	2	0.95	132	62.86
84	2	0.95	134	63.81
85	3	1.43	137	65.24
86	2	0.95	139	66.19
88	3	1.43	142	67.62
89	2	0.95	144	68.57
90	2	0.95	146	69.52
91	2	0.95	148	70.48
94	1	0.48	149	70.95
95	1	0.48	150	71.43
96	1	0.48	151	71.90
97	2	0.95	153	72.86
100	57	27.14	210	100.00

Frequency Missing = 15

Appendix E

Darby Case Study Tabulated Quantitative Results

Q1: Activity Participation

Walking or hiking activity by you

q1ayou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	201	82.04	201	82.04
Have done, but not in past year	25	10.20	226	92.24
Never done	19	7.76	245	100.00

Overnight backpacking activity by you

q1byou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	46	18.78	46	18.78
Have done, but not in past year	71	28.98	117	47.76
Never done	128	52.24	245	100.00

fishing activity by you

q1cyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	139	56.73	139	56.73
Have done, but not in past year	58	23.67	197	80.41
Never done	48	19.59	245	100.00

Horseback riding activity by you

q1dyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	57	23.27	57	23.27
Have done, but not in past year	72	29.39	129	52.65
Never done	116	47.35	245	100.00

Bicycling or mountain biking activity by you

q1eyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	70	28.57	70	28.57
Have done, but not in past year	28	11.43	98	40.00
Never done	147	60.00	245	100.00

ATV or other motorized trail use activity by you

q1fyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	88	35.92	88	35.92
Have done, but not in past year	24	9.80	112	45.71
Never done	133	54.29	245	100.00

Snowmobiling activity by you

q1gyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	42	17.14	42	17.14
Have done, but not in past year	54	22.04	96	39.18
Never done	149	60.82	245	100.00

Gathering plants, berries, mushrooms activity by you

q1hyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	122	49.80	122	49.80
Have done, but not in past year	49	20.00	171	69.80
Never done	74	30.20	245	100.00

Non-motorized boating, floating activity by you

q1iyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	89	36.33	89	36.33
Have done, but not in past year	52	21.22	141	57.55
Never done	104	42.45	245	100.00

Motorized boating activity by you

q1jyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	43	17.55	43	17.55
Have done, but not in past year	54	22.04	97	39.59
Never done	148	60.41	245	100.00

Camping in developed sites activity by you

q1kyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	93	37.96	93	37.96
Have done, but not in past year	67	27.35	160	65.31
Never done	85	34.69	245	100.00

Camping in undeveloped sites activity by you

q1lyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	91	37.14	91	37.14
Have done, but not in past year	65	26.53	156	63.67
Never done	89	36.33	245	100.00

picnicking activity by you

q1myou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	149	60.82	149	60.82
Have done, but not in past year	48	19.59	197	80.41
Never done	48	19.59	245	100.00

Cross-country skiing activity by you

q1nyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	47	19.18	47	19.18
Have done, but not in past year	40	16.33	87	35.51
Never done	158	64.49	245	100.00

hunting activity by you

q1oyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	116	47.35	116	47.35
Have done, but not in past year	48	19.59	164	66.94
Never done	81	33.06	245	100.00

Gathering firewood activity by you

q1pyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	112	45.71	112	45.71
Have done, but not in past year	52	21.22	164	66.94
Never done	81	33.06	245	100.00

other activity by you

q1qyou	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Have done in past year	22	8.98	22	8.98
Have done, but not in past year	4	1.63	26	10.61
Never done	219	89.39	245	100.00

Walking or hiking by other household member

q1ahhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	83	33.88	83	33.88
Yes (in past year)	162	66.12	245	100.00

Overnight backpacking by other household member

q1bhbm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	184	75.10	184	75.10
Yes (in past year)	61	24.90	245	100.00

fishing by other household member

q1chhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	127	51.84	127	51.84
Yes (in past year)	118	48.16	245	100.00

Horseback riding by other household member

q1dhhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	174	71.02	174	71.02
Yes (in past year)	71	28.98	245	100.00

Bicycling or mountain biking by other household member

q1ehhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	174	71.02	174	71.02
Yes (in past year)	71	28.98	245	100.00

ATV or other motorized trail use by other household member

q1fhhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	173	70.61	173	70.61
Yes (in past year)	72	29.39	245	100.00

Snowmobiling by other household member

q1ghhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	200	81.63	200	81.63
Yes (in past year)	45	18.37	245	100.00

Gathering plants, berries, mushrooms by other household member

q1hhhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	136	55.51	136	55.51
Yes (in past year)	109	44.49	245	100.00

Non-motorized boating, floating by other household member

q1ihhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	160	65.31	160	65.31
Yes (in past year)	85	34.69	245	100.00

Motorized boating by other household member

q1jhhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	199	81.22	199	81.22
Yes (in past year)	46	18.78	245	100.00

Camping in developed sites by other household member

q1khhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	154	62.86	154	62.86
Yes (in past year)	91	37.14	245	100.00

Camping in undeveloped sites by other household member

q1lhhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	160	65.31	160	65.31
Yes (in past year)	85	34.69	245	100.00

picnicking activity by other household member

q1mhhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	119	48.57	119	48.57
Yes (in past year)	126	51.43	245	100.00

Cross-country skiing by other household member

q1nhhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	201	82.04	201	82.04
Yes (in past year)	44	17.96	245	100.00

hunting by other household member

q1ohhm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	147	60.00	147	60.00
Yes (in past year)	98	40.00	245	100.00

Gathering firewood by other household member

q1pghm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	150	61.22	150	61.22
Yes (in past year)	95	38.78	245	100.00

other activity by other household member

q1qghm	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No (in the past year)	229	93.47	229	93.47
Yes (in past year)	16	6.53	245	100.00

Q2: Importance of Bitterroot National Forest Values

watershed value

q2a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	2	0.85	2	0.85
Slightly Important	19	8.12	21	8.97
Moderately Important	51	21.79	72	30.77
Very Important	162	69.23	234	100.00

Frequency Missing = 11

timber value

q2b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	10	4.22	10	4.22
Slightly Important	22	9.28	32	13.50
Moderately Important	65	27.43	97	40.93
Very Important	140	59.07	237	100.00

Frequency Missing = 8

recreation econ value

q2c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	26	11.06	26	11.06
Slightly Important	49	20.85	75	31.91
Moderately Important	84	35.74	159	67.66
Very Important	76	32.34	235	100.00

Frequency Missing = 10

wildlife value

q2d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	1	0.42	1	0.42
Slightly Important	12	5.06	13	5.49
Moderately Important	54	22.78	67	28.27
Very Important	170	71.73	237	100.00

Frequency Missing = 8

recreation op value

q2e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	1	0.42	1	0.42
Slightly Important	9	3.81	10	4.24
Moderately Important	67	28.39	77	32.63
Very Important	159	67.37	236	100.00

Frequency Missing = 9

spiritual value

q2f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	30	12.77	30	12.77
Slightly Important	35	14.89	65	27.66
Moderately Important	54	22.98	119	50.64
Very Important	116	49.36	235	100.00

Frequency Missing = 10

cultural value

q2g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	15	6.33	15	6.33
Slightly Important	33	13.92	48	20.25
Moderately Important	89	37.55	137	57.81
Very Important	100	42.19	237	100.00

Frequency Missing = 8

subsistence value

q2h	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	5	2.10	5	2.10
Slightly Important	12	5.04	17	7.14
Moderately Important	39	16.39	56	23.53
Very Important	182	76.47	238	100.00

Frequency Missing = 7

family value

q2i	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	3	1.27	3	1.27
Slightly Important	15	6.33	18	7.59
Moderately Important	39	16.46	57	24.05
Very Important	180	75.95	237	100.00

Frequency Missing = 8

personal value

q2j	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	21	9.09	21	9.09
Slightly Important	42	18.18	63	27.27
Moderately Important	61	26.41	124	53.68
Very Important	107	46.32	231	100.00

Frequency Missing = 14

social value

q2k	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Not at all Important	18	7.79	18	7.79
Slightly Important	42	18.18	60	25.97
Moderately Important	77	33.33	137	59.31
Very Important	94	40.69	231	100.00

Frequency Missing = 14

Q3: Attachment to Place on the Bitterroot National Forest

means a lot Bitterroot National Forest

q3a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	1	0.42	1	0.42
Neutral	14	5.88	15	6.30
Agree	55	23.11	70	29.41
Strongly Agree	168	70.59	238	100.00

Frequency Missing = 7

identify Bitterroot National Forest

q3b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	4	1.69	4	1.69
Disagree	5	2.12	9	3.81
Neutral	35	14.83	44	18.64
Agree	69	29.24	113	47.88
Strongly Agree	123	52.12	236	100.00

Frequency Missing = 9

similar Bitterroot National Forest

q3c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	18	7.63	18	7.63
Disagree	48	20.34	66	27.97
Neutral	40	16.95	106	44.92
Agree	86	36.44	192	81.36
Strongly Agree	44	18.64	236	100.00

Frequency Missing = 9

bene more SBW

q3d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	14	5.88	14	5.88
Disagree	53	22.27	67	28.15
Neutral	94	39.50	161	67.65
Agree	48	20.17	209	87.82
Strongly Agree	29	12.18	238	100.00

Frequency Missing = 7

rather live COMM

q3e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	4	1.68	4	1.68
Disagree	12	5.04	16	6.72
Neutral	27	11.34	43	18.07
Agree	78	32.77	121	50.84
Strongly Agree	117	49.16	238	100.00

Frequency Missing = 7

who I am Bitterroot National Forest

q3f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	5	2.12	5	2.12
Disagree	10	4.24	15	6.36
Neutral	75	31.78	90	38.14
Agree	72	30.51	162	68.64
Strongly Agree	74	31.36	236	100.00

Frequency Missing = 9

no other place Bitterroot National Forest

q3g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	18	7.59	18	7.59
Disagree	43	18.14	61	25.74
Neutral	80	33.76	141	59.49
Agree	53	22.36	194	81.86
Strongly Agree	43	18.14	237	100.00

Frequency Missing = 8

specific places Bitterroot National Forest

q3h	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	4	1.68	4	1.68
Disagree	13	5.46	17	7.14
Neutral	67	28.15	84	35.29
Agree	94	39.50	178	74.79
Strongly Agree	60	25.21	238	100.00

Frequency Missing = 7

would not substitute Bitterroot National Forest

q3i	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	13	5.49	13	5.49
Disagree	42	17.72	55	23.21
Neutral	93	39.24	148	62.45
Agree	49	20.68	197	83.12
Strongly Agree	40	16.88	237	100.00

Frequency Missing = 8

strong ties COMM

q3j	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	7	2.94	7	2.94
Disagree	11	4.62	18	7.56
Neutral	56	23.53	74	31.09
Agree	91	38.24	165	69.33
Strongly Agree	73	30.67	238	100.00

Frequency Missing = 7

part of me SBW

q3k	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly Disagree	14	5.91	14	5.91
Disagree	20	8.44	34	14.35
Neutral	93	39.24	127	53.59
Agree	66	27.85	193	81.43
Strongly Agree	44	18.57	237	100.00

Frequency Missing = 8

Q4a: Bitterroot National Forest Negatively Impacted

Bitterroot National Forest lands negatively impacted

q4a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	62	25.31	62	25.31
Yes	183	74.69	245	100.00

Q5a: Sources of Interference with human / place bonds on the Bitterroot National Forest

hunter interfere

q5aa	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	214	87.35	214	87.35
Yes	31	12.65	245	100.00

angler interfere

q5ab	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	236	96.33	236	96.33
Yes	9	3.67	245	100.00

visitor interfere

q5ac	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	205	83.67	205	83.67
Yes	40	16.33	245	100.00

nonmotor rec interfere

q5ad	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	234	95.51	234	95.51
Yes	11	4.49	245	100.00

motor rec interfere

q5ae	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	173	70.61	173	70.61
Yes	72	29.39	245	100.00

guide interfere

q5af	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	208	84.90	208	84.90
Yes	37	15.10	245	100.00

enviro interfere

q5ag	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	145	59.18	145	59.18
Yes	100	40.82	245	100.00

commercial op interfere

q5ah	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	224	91.43	224	91.43
Yes	21	8.57	245	100.00

manager interfere

q5ai	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	218	88.98	218	88.98
Yes	27	11.02	245	100.00

resident interfere

q5aj	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	205	83.67	205	83.67
Yes	40	16.33	245	100.00

other interfere

q5ak	Frequency	Percent	Cumulative Frequency	Cumulative Percent
No	241	98.37	241	98.37
Yes	4	1.63	245	100.00

Q6: Evaluation of Current Levels of Management, Services, and Facilities

facility amount

q6a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	4	1.68	4	1.68
Somewhat too low	49	20.59	53	22.27
About right	155	65.13	208	87.39
Somewhat too high	8	3.36	216	90.76
Way too high	5	2.10	221	92.86
do not know	17	7.14	238	100.00

Frequency Missing = 7

road maintenance amount

q6b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	38	15.97	38	15.97
Somewhat too low	72	30.25	110	46.22
About right	117	49.16	227	95.38
Somewhat too high	2	0.84	229	96.22
Way too high	4	1.68	233	97.90
do not know	5	2.10	238	100.00

Frequency Missing = 7

rec sign amount

q6c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	7	2.93	7	2.93
Somewhat too low	39	16.32	46	19.25
About right	171	71.55	217	90.79
Somewhat too high	10	4.18	227	94.98
Way too high	6	2.51	233	97.49
do not know	6	2.51	239	100.00

Frequency Missing = 6

toilet amount

q6d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	7	2.94	7	2.94
Somewhat too low	32	13.45	39	16.39
About right	180	75.63	219	92.02
Somewhat too high	3	1.26	222	93.28
Way too high	3	1.26	225	94.54
do not know	13	5.46	238	100.00

Frequency Missing = 7

campsite primitive mount

q6e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	14	5.98	14	5.98
Somewhat too low	25	10.68	39	16.67
About right	157	67.09	196	83.76
Somewhat too high	6	2.56	202	86.32
Way too high	3	1.28	205	87.61
do not know	29	12.39	234	100.00

Frequency Missing = 11

campsite developed amount

q6f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	3	1.24	3	1.24
Somewhat too low	18	7.47	21	8.71
About right	188	78.01	209	86.72
Somewhat too high	9	3.73	218	90.46
Way too high	8	3.32	226	93.78
do not know	15	6.22	241	100.00

Frequency Missing = 4

rec parking amount

q6g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	6	2.50	6	2.50
Somewhat too low	36	15.00	42	17.50
About right	178	74.17	220	91.67
Somewhat too high	8	3.33	228	95.00
Way too high	4	1.67	232	96.67
do not know	8	3.33	240	100.00

Frequency Missing = 5

law enforcement amount

q6h	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	28	11.67	28	11.67
Somewhat too low	46	19.17	74	30.83
About right	101	42.08	175	72.92
Somewhat too high	21	8.75	196	81.67
Way too high	27	11.25	223	92.92
do not know	17	7.08	240	100.00

Frequency Missing = 5

stewardship education amount

q6i	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	35	14.52	35	14.52
Somewhat too low	85	35.27	120	49.79
About right	96	39.83	216	89.63
Somewhat too high	8	3.32	224	92.95
Way too high	2	0.83	226	93.78
do not know	15	6.22	241	100.00

Frequency Missing = 4

consideration of local concerns amount

q6j	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	58	24.27	58	24.27
Somewhat too low	75	31.38	133	55.65
About right	81	33.89	214	89.54
Somewhat too high	5	2.09	219	91.63
Way too high	1	0.42	220	92.05
do not know	19	7.95	239	100.00

Frequency Missing = 6

Q7: Evaluation of Current Recreation Opportunities on the Bitterroot National Forest

hiking opportunity

q7a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	4	1.67	4	1.67
Somewhat too low	8	3.35	12	5.02
About right	204	85.36	216	90.38
Somewhat too high	9	3.77	225	94.14
Way too high	3	1.26	228	95.40
do not know	11	4.60	239	100.00

Frequency Missing = 6

horse opportunity

q7b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	5	2.14	5	2.14
Somewhat too low	18	7.69	23	9.83
About right	168	71.79	191	81.62
Somewhat too high	5	2.14	196	83.76
Way too high	5	2.14	201	85.90
do not know	33	14.10	234	100.00

Frequency Missing = 11

bike opportunity

q7c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	6	2.55	6	2.55
Somewhat too low	25	10.64	31	13.19
About right	144	61.28	175	74.47
Somewhat too high	13	5.53	188	80.00
Way too high	4	1.70	192	81.70
do not know	43	18.30	235	100.00

Frequency Missing = 10

atv opportunity

q7d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	26	11.11	26	11.11
Somewhat too low	42	17.95	68	29.06
About right	70	29.91	138	58.97
Somewhat too high	31	13.25	169	72.22
Way too high	36	15.38	205	87.61
do not know	29	12.39	234	100.00

Frequency Missing = 11

fishing opportunity

q7e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	8	3.33	8	3.33
Somewhat too low	19	7.92	27	11.25
About right	195	81.25	222	92.50
Somewhat too high	7	2.92	229	95.42
Way too high	1	0.42	230	95.83
do not know	10	4.17	240	100.00

Frequency Missing = 5

hunting opportunity

q7f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	12	5.00	12	5.00
Somewhat too low	27	11.25	39	16.25
About right	172	71.67	211	87.92
Somewhat too high	7	2.92	218	90.83
Way too high	6	2.50	224	93.33
do not know	16	6.67	240	100.00

Frequency Missing = 5

snowmobiling opportunity

q7g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Way too low	12	5.17	12	5.17
Somewhat too low	22	9.48	34	14.66
About right	119	51.29	153	65.95
Somewhat too high	21	9.05	174	75.00
Way too high	17	7.33	191	82.33
do not know	41	17.67	232	100.00

Frequency Missing = 13

Q8: Level of Support for Travel Management Options on the Bitterroot National Forest

atv mngt

q8a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	60	24.49	60	24.49
Oppose	65	26.53	125	51.02
Not sure	25	10.20	150	61.22
Support	62	25.31	212	86.53
Strongly support	33	13.47	245	100.00

4wd mngt

q8b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	74	30.33	74	30.33
Oppose	62	25.41	136	55.74
Not sure	35	14.34	171	70.08
Support	52	21.31	223	91.39
Strongly support	21	8.61	244	100.00

Frequency Missing = 1

hiking horse mngt

q8c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	8	3.28	8	3.28
Oppose	21	8.61	29	11.89
Not sure	41	16.80	70	28.69
Support	130	53.28	200	81.97
Strongly support	44	18.03	244	100.00

Frequency Missing = 1

open gated road mngt

q8d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	39	15.98	39	15.98
Oppose	53	21.72	92	37.70
Not sure	29	11.89	121	49.59
Support	70	28.69	191	78.28
Strongly support	53	21.72	244	100.00

Frequency Missing = 1

open gated road summer mngt

q8e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	33	13.52	33	13.52
Oppose	29	11.89	62	25.41
Not sure	27	11.07	89	36.48
Support	93	38.11	182	74.59
Strongly support	62	25.41	244	100.00

Frequency Missing = 1

close roads for nomotorized rec mngt

q8f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	50	20.58	50	20.58
Oppose	63	25.93	113	46.50
Not sure	69	28.40	182	74.90
Support	42	17.28	224	92.18
Strongly support	19	7.82	243	100.00

Frequency Missing = 2

close roads for wildlife mngt

q8g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	33	13.47	33	13.47
Oppose	40	16.33	73	29.80
Not sure	37	15.10	110	44.90
Support	85	34.69	195	79.59
Strongly support	50	20.41	245	100.00

motorized away from resident mngt

q8h	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	21	8.64	21	8.64
Oppose	33	13.58	54	22.22
Not sure	68	27.98	122	50.21
Support	80	32.92	202	83.13
Strongly support	41	16.87	243	100.00

Frequency Missing = 2

motorized connecting routes mngt

q8i	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	39	15.98	39	15.98
Oppose	28	11.48	67	27.46
Not sure	47	19.26	114	46.72
Support	95	38.93	209	85.66
Strongly support	35	14.34	244	100.00

Frequency Missing = 1

reroute legal motorized mngt

q8j	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	20	8.23	20	8.23
Oppose	19	7.82	39	16.05
Not sure	63	25.93	102	41.98
Support	107	44.03	209	86.01
Strongly support	34	13.99	243	100.00

Frequency Missing = 2

remove illegal motorized mngt

q8k	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Strongly oppose	21	8.61	21	8.61
Oppose	27	11.07	48	19.67
Not sure	40	16.39	88	36.07
Support	71	29.10	159	65.16
Strongly support	85	34.84	244	100.00

Frequency Missing = 1

Q9: Level of Trust in Bitterroot National Forest Management

Bitterroot National Forest listen to me

q9a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt listen to me	63	26.36	63	26.36
Sorta doesnt listen to me	42	17.57	105	43.93
Not Sure	80	33.47	185	77.41
Sorta listens to me	35	14.64	220	92.05
Listens to me	19	7.95	239	100.00

Frequency Missing = 6

Bitterroot National Forest reflects my values

q9b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Doesnt reflect my values	55	23.40	55	23.40
Sorta doesnt reflect my values	43	18.30	98	41.70
Not Sure	78	33.19	176	74.89
Sorta reflects my values	45	19.15	221	94.04
Reflects my values	14	5.96	235	100.00

Frequency Missing = 10

Bitterroot National Forest I trust

q9c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
I do not trust...at all	51	21.79	51	21.79
I kinda do not trust...	41	17.52	92	39.32
Not sure	83	35.47	175	74.79
I kinda trust...	51	21.79	226	96.58
I trust...completely	8	3.42	234	100.00

Frequency Missing = 11

Bitterroot National Forest supports my views

q9d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Opposes my views	44	18.80	44	18.80
Sorta opposes my views	41	17.52	85	36.32
Not sure	94	40.17	179	76.50
Sorta supports my views	48	20.51	227	97.01
Supports my views	7	2.99	234	100.00

Frequency Missing = 11

Q10: Representation by Stakeholder Groups in Bitterroot National Forest Management Decisions

Friends BR supports my views

q10a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Opposes my views	118	48.56	118	48.56
Sorta opposes my views	22	9.05	140	57.61
Not sure	60	24.69	200	82.30
Sorta supports my views	27	11.11	227	93.42
Supports my views	16	6.58	243	100.00

Frequency Missing = 2

Ravalli OR User A supports my views

q10b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Opposes my views	52	21.58	52	21.58
Sorta opposes my views	15	6.22	67	27.80
Not sure	115	47.72	182	75.52
Sorta supports my views	34	14.11	216	89.63
Supports my views	25	10.37	241	100.00

Frequency Missing = 4

Burnt Ridge NA supports my views

q10c	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Opposes my views	15	6.25	15	6.25
Sorta opposes my views	5	2.08	20	8.33
Not sure	191	79.58	211	87.92
Sorta supports my views	6	2.50	217	90.42
Supports my views	23	9.58	240	100.00

Frequency Missing = 5

MT Wilderness A supports my views

q10d	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Opposes my views	47	19.42	47	19.42
Sorta opposes my views	14	5.79	61	25.21
Not sure	126	52.07	187	77.27
Sorta supports my views	41	16.94	228	94.21
Supports my views	14	5.79	242	100.00

Frequency Missing = 3

MT Snowmobile A supports my views

q10e	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Opposes my views	26	10.70	26	10.70
Sorta opposes my views	28	11.52	54	22.22
Not sure	122	50.21	176	72.43
Sorta supports my views	37	15.23	213	87.65
Supports my views	30	12.35	243	100.00

Frequency Missing = 2

Backcountry Horsemen supports my views

q10f	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Opposes my views	8	3.29	8	3.29
Sorta opposes my views	8	3.29	16	6.58
Not sure	111	45.68	127	52.26
Sorta supports my views	60	24.69	187	76.95
Supports my views	56	23.05	243	100.00

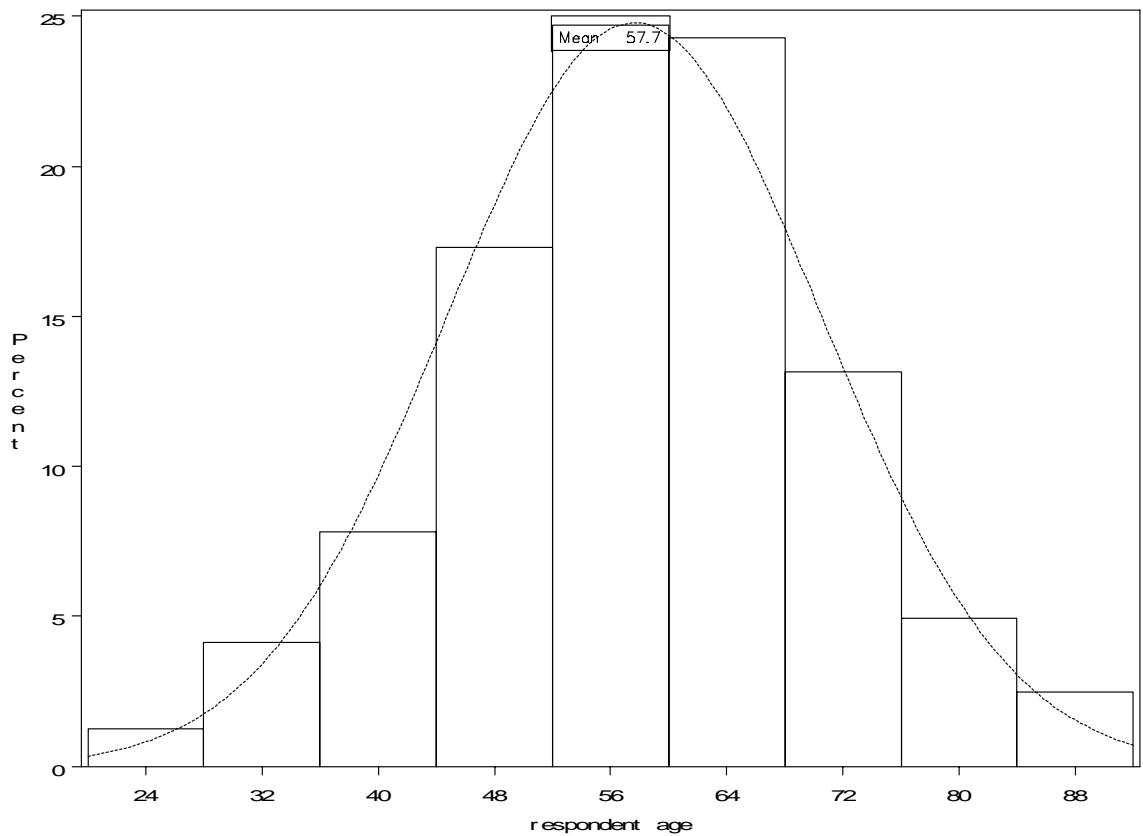
Frequency Missing = 2

WildWest Institute supports my views

q10g	Frequency	Percent	Cumulative Frequency	Cumulative Percent
Opposes my views	38	15.97	38	15.97
Sorta opposes my views	8	3.36	46	19.33
Not sure	171	71.85	217	91.18
Sorta supports my views	13	5.46	230	96.64
Supports my views	8	3.36	238	100.00

Frequency Missing = 7

Q13 – Q19: Respondent Characteristics



sex

q14	Frequency	Percent	Cumulative Frequency	Cumulative Percent
-----	-----------	---------	----------------------	--------------------

Female	97	39.92	97	39.92
Male	146	60.08	243	100.00

Frequency Missing = 2

other household adults

q15a	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	27	11.11	27	11.11
1	159	65.43	186	76.54
2	50	20.58	236	97.12
3	6	2.47	242	99.59
5	1	0.41	243	100.00

Frequency Missing = 2

household children

q15b	Frequency	Percent	Cumulative Frequency	Cumulative Percent
0	184	75.72	184	75.72
1	23	9.47	207	85.19
2	20	8.23	227	93.42
3	11	4.53	238	97.94
4	4	1.65	242	99.59
5	1	0.41	243	100.00

Frequency Missing = 2

type of community

q16	Frequency	Percent	Cumulative Frequency	Cumulative Percent
In Town	42	17.28	42	17.28
Rural Area	201	82.72	243	100.00

Frequency Missing = 2

