

# Attitudes, perception and knowledge: Understanding the human-cougar nexus on the West Coast Trail



**By:**

**Geoff Carrow**

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Royal Roads University

## 1.0 Introduction

### 1.1 Study Overview

Large carnivores such as the cougar (*Felis concolor*) are a fundamental ecological component of the greater Pacific Rim ecosystem. As top predators, cougars have profound ecological value because their predation activities create impacts that ripple downward through the trophic levels of an ecosystem (Miller *et al* 2001). Pacific Rim National Park Reserve (PRNPR) has identified human use and land alteration as the top two stressors affecting carnivores in the park ecosystem. Wildlife observational data over the past 30 years indicate that large carnivore populations are at risk from the cumulative effects of these stressors. One of the park's main challenges is to protect regional biodiversity by conserving top predators at the landscape level while addressing public values, attitudes and perceptions. (Hansen 2004)

Faced with management decisions to minimize risks associated with wildlife-human interactions while conserving species, carnivore conservation at PRNPR is a complex of social and biological issues. Current literature suggests that the success of carnivore conservation strategies lies in integrating the human dimension through social sciences with ecosystem science concerns (Decker and Chase, 1997; Jacobsen and McDuff, 1998; Kellert, 1995; Innes, 2002; Mascia, 2003; Robertson and Hull, 2001; Treves and Karanth, 2003; Watson et al., 2004). In Parks Canada, the Panel on the Ecological Integrity of Canada's National Parks (Parks Canada Agency 2000a), The Review of Priorities for Social Science Within Parks Canada (Praxis Inc. 2000), the Parks Canada Action Plan (Parks Canada Agency 2000b) and First Priority Report (Parks Canada Agency 2001) all support a long-term investment in social science. In addition, a Parks Canada Science Strategy (Parks Canada 2001) outlines the integration of social sciences and ecosystem sciences.

In Yoho National Park of Canada, for example, a social scientist has been added to the staff and works out of the resource conservation office. With support from the Friends of

Yoho and the Lake O'Hara Trails Club, a survey entitled "Bears and People: Understanding Risk, Communication and Values" was conducted in 2002 (Parks Canada 2004). Back-country and front-country visitors were surveyed about their perceptions of risk from bear encounters, actions they take to avoid negative encounters, where they learned about bear issues, and their values toward bears.

Decker and Chase (1997) describe human dimensions of wildlife management as identifying peoples actions and thoughts regarding wildlife, understanding the reasons behind them, and integrating this knowledge into practices, policy and legislation. In this paper, the human dimension includes the attitudes, perception and knowledge characteristics of stakeholders with respect to cougar conservation issues. This study examines the human dimension of cougar ecology and management of visitors to the West Coast Trail (WCT) and recommends action for integrating the results into management strategies.

This attempt to understand the human dimension was catalyzed by events on the WCT in 2003 involving a marked increase in cougar-human interaction. In response, PRNPR managers initiated a carnivore conservation program later that same year. The "WildCoast" initiative was designed as a long-term program of partnerships and cooperation between wildlife agencies, First Nations, stakeholders and park visitors to preserve large carnivores throughout the park and adjacent regions. Paramount to the success of "WildCoast" is the development of baseline human dimension data. Therefore, the purpose of this study is to develop an understanding of peoples thoughts and opinions regarding cougars and their management, suggest directions for future research and to identify management implications.

Attitudes, perceptions and knowledge pertaining to cougars and their management at PRNPR were undocumented before this study.

## 1.2 Background

Visitation to PRNPR has been steadily increasing since the park's inception. The Long Beach Unit visitation for 2003 set a new record with over 1 million visitors. The Broken Group Islands and West Coast Trail Units have the highest levels of visitation for backcountry areas in Canada's National Parks system; approximately 25,000 and 30,000 user nights per year respectively (Hansen 2004). Carnivores increasingly encounter human activity or impacted landscapes and appear to be adapting their behaviour - traveling, hunting, denning, etc. - in areas of relatively high human use. Wildlife managers now face many situations where there is a growing demand to reduce conflicts between people and species of wildlife that were rare just a few decades ago (Treves & Karanth 2003). For wildlife managers, this means they must work within an increasingly complex nexus of biological and sociological forces (Decker & Chase 1997).

In PRNPR, the number of carnivore-human encounters has increased markedly throughout over the past six years (See Figure 1.1). This is likely due to a variety of factors; increased visitation to the park, loss of habitat in regions adjacent to the park, and fluctuations in prey numbers.

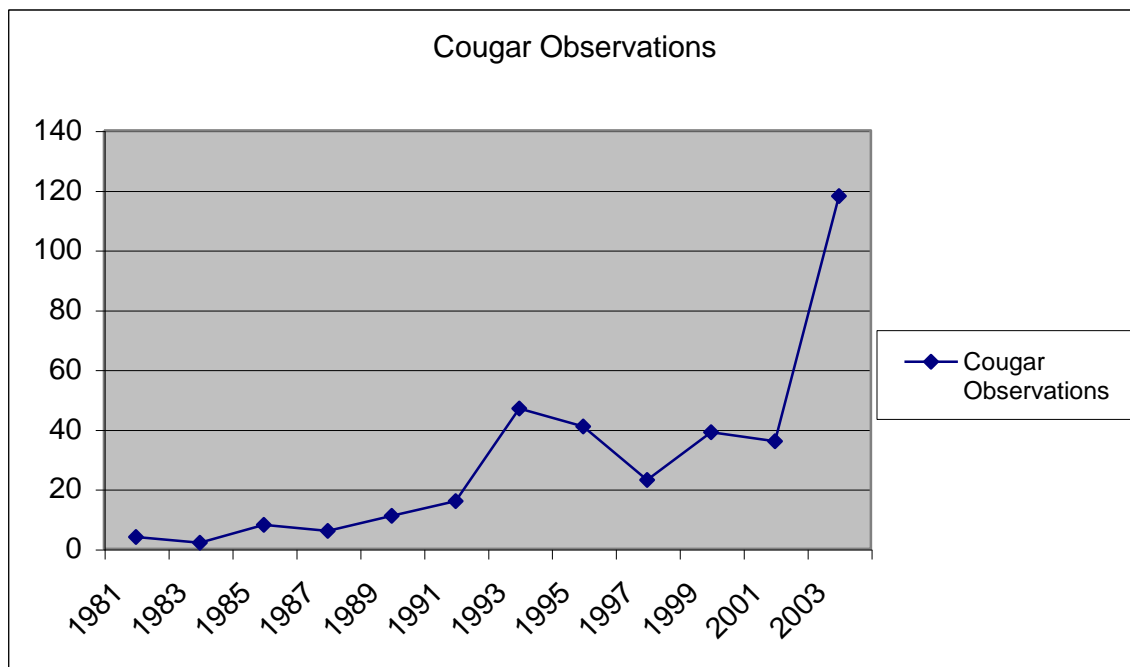


Figure 1.1 Cougar Observations from 1980 to 2003 at PRNPR. Adapted from Source.

During 2003, two cougars on the West Coast Trail were reported as moderately to highly aggressive. Later that season, one was found dead on a beach on the West Coast Trail. The necropsy revealed starvation to be the cause of death. Also in 2003, a cougar had to be destroyed near the Warden Station in Port Renfrew after two weeks of preying on local domestic animals. These events combined with observed trends suggest that the long-term viability of cougars in the greater park ecosystem is at risk. With minimal scientific information to work with, resource conservation actions at PRNPR are primarily reactive. Currently the park depends upon anecdotal observational data and information from other areas and agencies in North America to manage these risks (Hansen 2004). Therefore, before appropriate management strategies can be developed and put in place, it is necessary to understand the sociological and biophysical dynamics driving the trends.

Other wildlife agencies have faced similar issues and are in the process of developing strategies to address emerging conflicts. In central African forest reserves, researchers are studying social challenges to conservation programmes that include community development, immigration, diversification of economic and subsistence strategies, ethnic diversity and the lack of a conservation ethic (Noss 1997). In California, recent increases in cougar-human interactions have led researchers to conduct a mail survey. The survey was designed to determine public opinion about issues affecting cougar conservation (Vickers *et al* 2004).

In the case of carnivore conservation, wildlife managers report that the human dimension aspect is the most difficult to mitigate (Jacobsen & McDuff 1998; Treves & Karanth 2003). In general, human-dimension conflict can be expressed as tension between human communities and those humans seeking to preserve or restore wildlife populations (human-human conflict) and tension between humans and wildlife (human-wildlife conflict). An example of both conflicts emerging in a single issue occurred in Colorado. An increase in human-cougar interaction over several years was the result of a variety of factors. Human population expansion into cougar habitat and habitat alteration brought humans in closer contact with cougars. At the same time, the frequency of conflict was

compounded by recent cougar conservation efforts that saw the recovery of cougar populations from historic lows. With cougars feeding on expanding populations of mule deer (*Odocoileus hemionus*) in and near residential development the growing frequency of interaction had attracted public and media attention. In 1991 a fatal cougar attack on a human brought media attention and public scrutiny of management actions to a peak. Wildlife managers involved in this case realized that while they were expected to provide high levels of protection to the public from wildlife-related attacks, their methods of hazing and aversive conditioning were seen as inadequate by the public. The result was a loss of public support for agency actions (Manfredo *et al* 1998).

Typically, the standard tools and management strategies used by government agencies to manage carnivores have been eradication, regulated harvest and preservation either on their own or in combination. Treves and Karanth (2003) define them as “population management goals”. Eradication is designed to reduce the negative economic or ecological impacts of carnivores, as in the elimination of exotic species that harm native fauna or flora. Regulated harvest involves controlling the timing, number, location and species of carnivores killed by hunters or wildlife managers. Preservation aims to protect carnivores by more careful monitoring of their numbers and instituting methods to protect them from poaching and unintentional killing (such as highway mortality) and is generally used in protected areas or for carnivore populations that are at risk, endangered or threatened.

Eradication has several costs. The first is socio-political: conservation and animal welfare groups oppose any harm to animals. Economically, eradication costs can burden the taxpayer when aerial hunting or bounties are employed (Treves and Karanth 2003). Hidden ecological costs include the detrimental effects of removing species from the environment and thus altering ecosystem function. Eradication of the Elk Island National Park of Canada bison herd was proposed in 1990 to fight disease. The proposal was abandoned, but would have cost taxpayers \$20 million and had the potential to be the demise of local wolves who depended on the herd for prey (Struzik 1995).

Regulated harvests are used in many areas to manage carnivore populations. Simple and inexpensive monitoring techniques (such as collecting data from hunters) are used to determine sustainable harvest levels. Regulated harvests have had little effect on reducing crop and livestock losses as wildlife agencies often do not target the specific problem animal (Treves and Karanth 2003). Similar to eradication, regulated harvests face mounting political opposition from rural, urban and suburban residents (Treves and Karanth 2003). Wood Buffalo National Park of Canada continues to allow native subsistence users to live, hunt, trap and fish within the park's boundaries. Hunting in areas surrounding national parks has been identified as a top stressor to park ecological integrity (Parks Canada Agency 2000a)

Preservation has become the focus for many wildlife managers as carnivore populations have declined dramatically. Preservation has resulted not only in protecting remaining stock of carnivores, but has assisted in the recovery of several populations on the brink of extinction (Treves and Karanth 2003). Preserved spaces also provide researchers with long-term study areas that can be used as a platform for biophysical and social science. However, preservation requires the greatest investment of human and economic capital and resources (Linnel *et al* 1997).

These strategies form the basis for the major options available to wildlife managers. They are strategies with history and polarized support and people's attitudes towards them can be entrenched in myth and misconception. Learning from the experiences of other wildlife agencies and current published literature as well as baseline human-dimensions data from its own research, PRNPR has an opportunity to work with the public towards a carnivore conservation objective and integrate the human dimension into a successful conservation strategy. Although biological science and conservation philosophy have often ignored the human participation in nature, conservation authorities are increasingly recognizing the critical role of human activity in ecological process (Robertson & Hull 2001). Faced with invasive species, fragmented landscapes and global climate change, protected area conservation managers must learn to balance human dimensions research with ecosystems science.

### 1.2.1 Definitions

This study examines attitudes, perceptions and knowledge, with words such as ‘values’ and ‘opinion’ used as social descriptors. This section defines each term and attempts to describe the relationship between them and relevance to this study.

The Princeton University Cognitive Sciences Laboratory web-based dictionary “WordNet” was used to define the terms in this study. WordNet defines attitudes as a complex mental state involving beliefs, feelings, values and dispositions to act in certain ways. Perceptions are defined as the representation of what is perceived (what has been made aware of through the senses), and knowledge as the psychological result of perception, learning and reasoning.

According to the Princeton Cognitive Sciences Lab, values are an ideal accepted by some individual or group and opinions are sentiment, persuasion, view or thought (a personal belief or judgment that is not founded on proof or certainty). The following diagram was developed to illustrate the relationship between these terms:

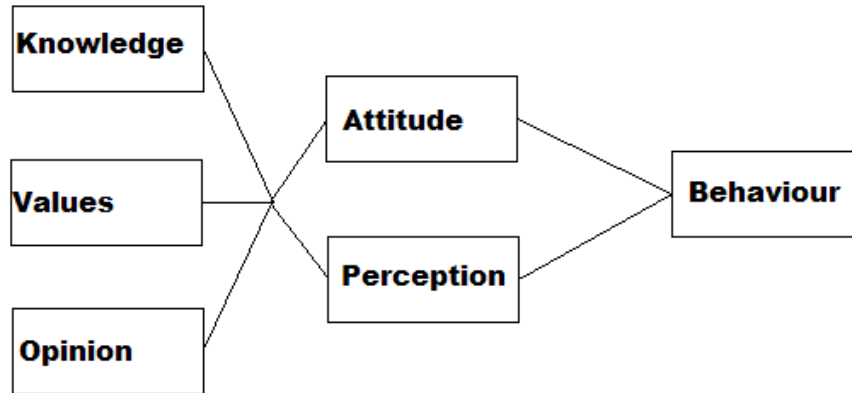


Figure 1.2 Diagram of relationship between cognitive terms.

While this diagram illustrates a flow from left to right in the development of behaviour, the model is dynamic with each term influenced by the expression of every other. This diagram is simple in its interpretation and is designed only to provide clarity to readers of the complex relationship between cognitive terms. Understanding and predicting human behaviour remains a major challenge to policy-makers.

### 1.3 Nature of the Study

### 1.3.1 Purpose

The purpose of this study is to develop an understanding of the attitudes, perspectives and knowledge of hikers visiting the West Coast Trail of Pacific Rim National Park Reserve of Canada with respect to cougars. The goal is to contribute to the body of knowledge of protected area management to assist wildlife managers in developing carnivore conservation strategies.

Human behaviour specialists believe that while biophysical research remains essential, managing people and managing the decision making process itself are equally important for dealing with people-wildlife interactions in the modern context (Decker & Chase 1997). Understanding the human dimension is paramount especially to Parks Canada because people impact public lands not only by direct use but also through their influence on public land management policies (Marynowski & Jacobsen 1999).

With increased recognition of the role of social science in facilitating the success of conservation programs, baseline sociopolitical data has become an important tool for wildlife managers.

### 1.3.2 Research Objectives

Specific research objectives are:

1. To determine hikers attitudes towards cougars by examining their interest, intrinsic values and concept of the cougar's role in protected areas and ecological process.
2. To determine hiker's perception of a spectrum of carnivore management options, including: eradication, regulated harvest and preservation.
3. To examine the level of knowledge of hikers with regards to general cougar ecology and traveling in cougar country, and the relationship of this knowledge to selected independent variables.

### 1.3.3 Rationale

From financial and public safety perspectives, the economic cost and frequency of interactions between humans and carnivores appear to be on the rise, not only at Pacific Rim, but internationally (Treves & Karanth 2003). Ecologically, carnivores often regulate or limit the numbers of their prey, thereby altering the structure and function of entire ecosystems. The Canada National Park Act (CNPA) states:

“The National Parks of Canada are hereby dedicated to the people of Canada for their benefit, education, and enjoyment, subject to this Act and the regulations, and National Parks shall be maintained and made use of so as to leave them unimpaired for future generations.”

National Parks Act, 1930

Providing a legal basis for mitigating public safety and ecological issues, the CNPA was amended in 2000 to include consideration of ecological integrity in all management activities:

“Maintenance or restoration of ecological integrity, through the protection of natural resources and processes, shall be the first priority of the Minister when considering all aspects of the management of parks.”

Canada National Parks Act, 2000

In the National Parks Policy, Guiding Principles and Operational Policies (1994) it states:

Protecting ecological and commemorative integrity takes precedence in acquiring, managing, and administering heritage places and programs.

Carnivore conservation is of central concern to PRNPR wildlife managers. Preventing and mitigating human-carnivore conflict has to be based on an improved understanding of carnivore ecology and the related human component. Only then can we expect to successfully manage the financial, public safety and ecological implications of increased carnivore-human interaction.

#### 1.4 Study Area

Pacific Rim National Park protects a narrow strip of marine and terrestrial resources along the west coast of Vancouver Island. The greater park ecosystem area is considered

to include all of the watersheds that run through the park (See Figure 1.3).

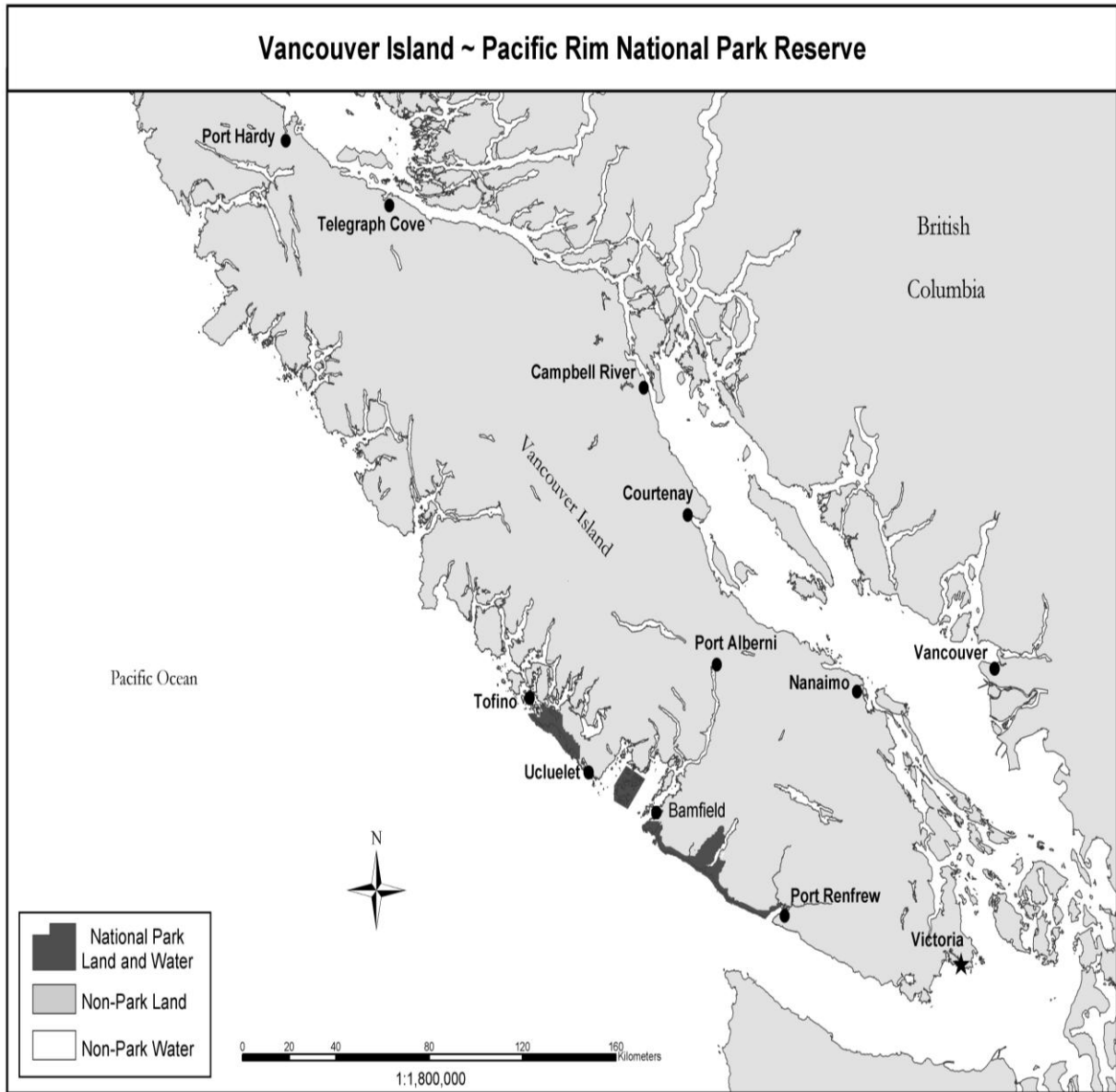


Figure 1.3 The Greater PRNPR ecosystem showing the three park units shaded dark. Adapted from Source.

#### 1.4.1 The Setting

The study area is the West Coast Trail, an historic 75 kilometer backcountry hiking trail on the west coast of Vancouver Island, British Columbia. The WCT is the southern-most unit of three distinct management units of Pacific Rim National Park Reserve of Canada (See Figure 1.4).

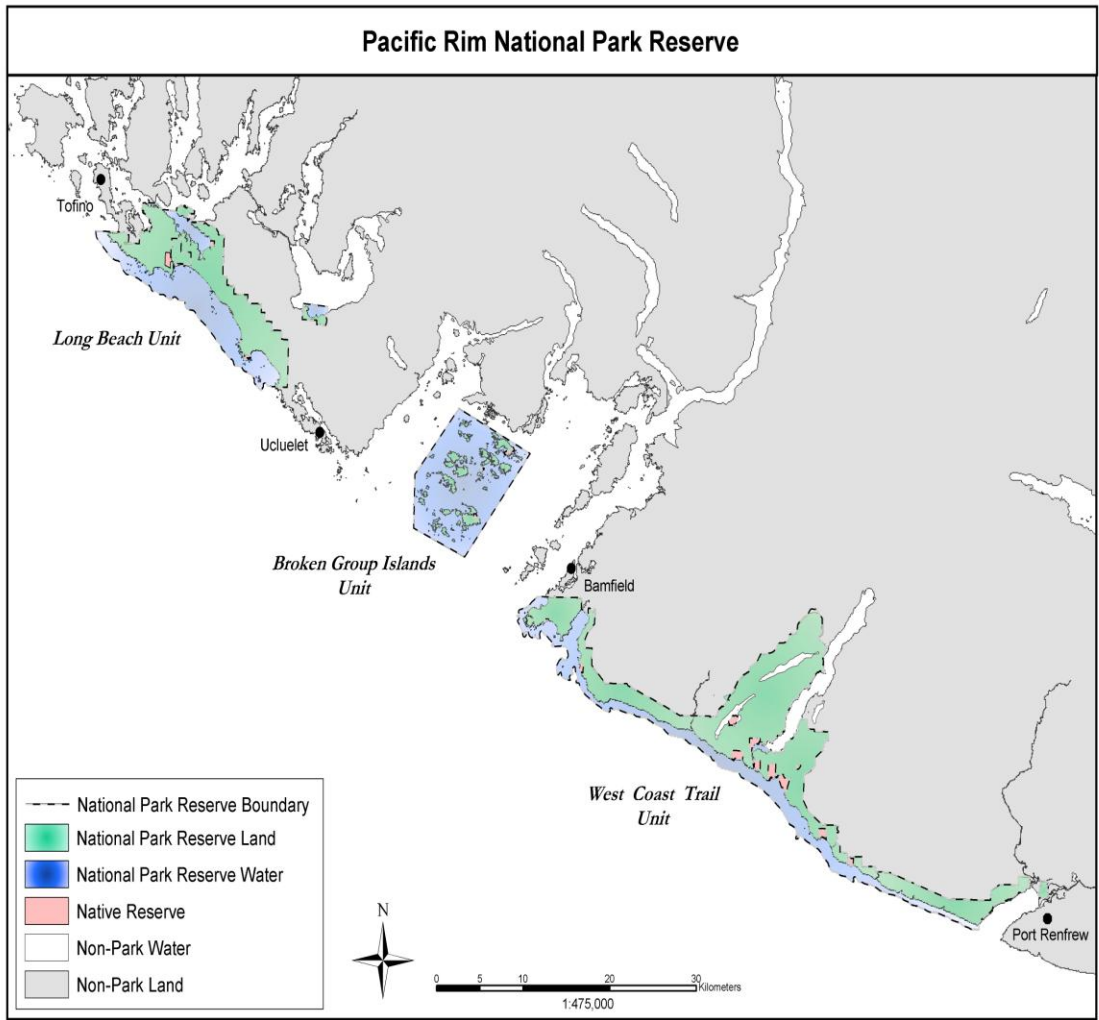


Figure 1.4 Map showing the three units of PRNPR and adjacent marine component. Parks Canada 2005.

Most of the greater ecosystem is provincial crown land that has been allocated for tree farm licenses and foreshore leases, recreation areas and provincial parks. The landscape surrounding the park has been greatly modified. There has been extensive and intensive logging over past decades in almost all watersheds that run through PRNPR. Many past and current cut blocks are located right along the park boundary and the logging road network is extensive (Personal Observation) (See Figure 1.5).

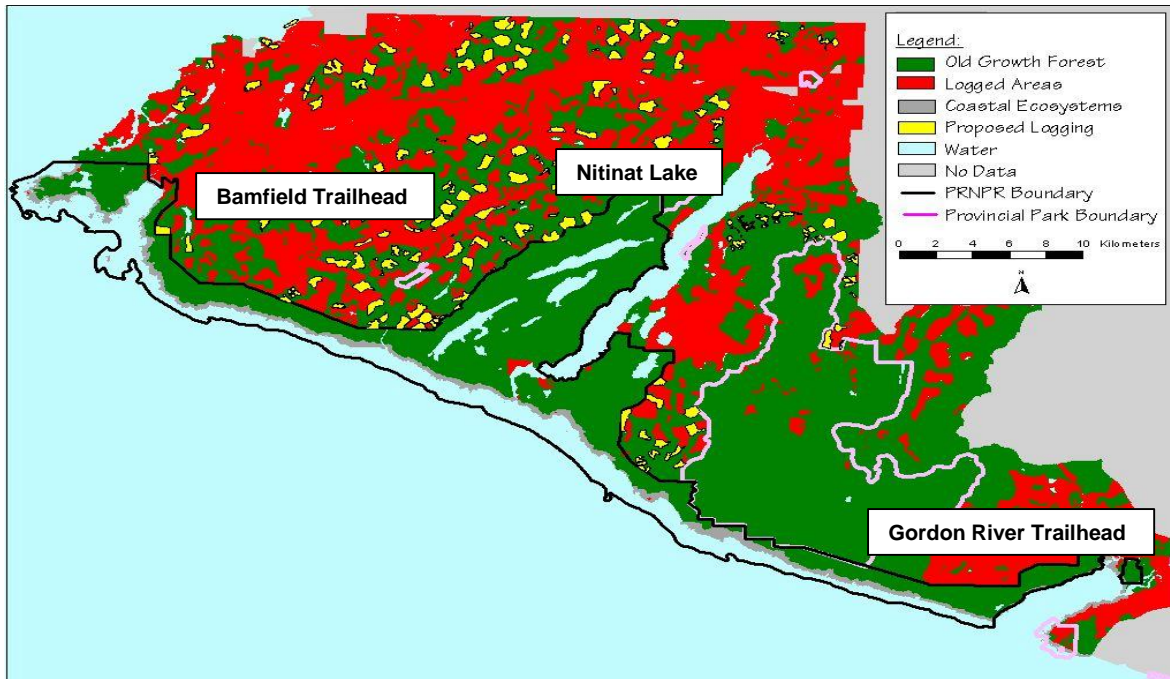


Figure 1.5 The West Coast Trail outlined in black with yellow and red colors defining past and proposed logging cut-block locations. Parks Canada, 2004.

The WCT Unit encompasses the interface between remote marine, terrestrial and cultural environments. In the heart of the Central Pacific Coastal Forests (CPFC) ecoregion, the WCT follows an historic mariner life-saving trail through coastal old and second growth forests. The WCT is unique in that it stretches across a long but narrow strip of coastline, transiting numerous watersheds and First Nation reserve lands.

Recreation opportunities are primarily multi-day backcountry excursions on the trail between Port Renfrew and Bamfield. Limited backcountry use occurs on the Nitinat Triangle portage circuit on the north side of Nitinat Lake. Day-use is permitted from both the Port Renfrew and Bamfield trailheads.

The typical hike on the WCT takes five nights and six full days. Along the trail are designated campsites where wildlife-proof food lockers and composting toilets are located, although hikers are allowed to camp anywhere along the trail. The WCT is open from May 1<sup>st</sup> to October 31<sup>st</sup>, with a quota in place which allows 10,000 hikers per season. Hikers are currently required to reserve one of 60 starts each day on the trail (30 from each trailhead) between June 15<sup>th</sup> and September 15<sup>th</sup>, with unlimited numbers

starting the trail in the shoulder seasons. Visitors are mostly from Canada, but this study documented visitation from a total of 18 countries.

## 1.5 Thesis Structure

This thesis examines three dependent variables of importance to understanding the human dimension landscape of the West Coast Trail (WCT) of PRNPR. Chapter 1 provides an overview of the nature and purpose of the study, the setting, conceptual framework and methodology. Each variable has been organized within its own chapter. This facilitates a comprehensive review of each dependent variable in relation to each of three independent variables examined in this study: urban versus rural residence, perceptions of park wildlife management techniques and knowledge of park messages and cougar ecology. Thus, this thesis is divided into five chapters. Chapter 2 examines the relationship between hiker attitudes and the independent variables. Chapter 3 examines the relationship between selected independent variables and hiker perceptions of park wildlife management options. Chapter 4 examines the relationship of knowledge of both cougar ecology and protocols for traveling in cougar country to selected independent variables. Finally, Chapter 5 summarizes the findings of this thesis and identifies park management implications and future research needs.

## 1.6 Conceptual Framework

### 1.6.1 Dependent Variables

The conceptual framework of this study is structured by three dependent variables: hiker's attitudes towards cougars, hiker's perception of park management of cougars, and knowledge of general ecology of cougars and park messages.

#### 1.6.1.1 Hiker's Attitudes Towards Cougars

Conservation problems are people problems. Jacobsen and McDuff (1998) state that people are at the beginning, middle and end of all management issues, therefore, conservation is primarily a human endeavor driven by people's values and attitudes toward the management of wildlife. Failure to accurately assess and target attitudes can

result in opposition to conservation initiatives and costly political battles (Jacobsen & McDuff 1998).

In 2002 and 2003 there were 89 human-cougar interactions in PRNPR with four presenting criteria for high risk to both the hiker and the cougar (Parks Canada, 2004). As this issue increasingly presents itself, creating a baseline of human attitudes towards cougars becomes critical for long-term management of this top predator.

#### 1.6.1.2 Hiker's Perception of Park Management of Cougars

Preliminary findings in one predator conservation study showed that, besides knowledge about predators, people's perception of nature was a key factor governing the attitudes towards predators (Hunziker et al. 1998). In the example of the re-introduction of wolves to Yellowstone National Park, biologists working with the recovery plan realized that “many recovery issues are perceptual, having more to do with deeply held personal values about government, outside influences, people's relationship to nature, and the political role of special interest groups than to the wolves themselves” (Fritts et al. 1995).

As managers face increasingly complicated and frequent decisions regarding the carnivore-human interface, understanding human perceptions will be a necessary component in a successful conservation strategy.

#### 1.6.1.3 Knowledge of General Ecology of Cougars and Park Messages

Although the effects of knowledge on attitudes are not conclusively known, some studies suggest a link exists between knowledge and attitudes toward natural resource management (Watson et al. 2004). In one study, researchers found that exposure to information affected the strength of attitudes toward old growth forests (Bright & Manfredo 1997). Another study found that interpretive messages about forest management had a positive effect on visitor attitudes towards forest management in Canada (Cable et al. 1987).

## 1.6.2 Independent Variables

Three independent variables were identified and explored in this study: the effect of urban or rural residency, the effect of previous experience with cougars and the effect of knowledge of cougar ecology and traveling in cougar country.

### 1.6.2.1 Effect of Urban or Rural Residency

Urban or rural residency was selected as an independent variable (Q29). Inglehart (1997) states that some research indicates a relationship between attitude-formation and rural versus urban residence, and further that traditional values shift as the population increasingly becomes urban. A similar study in Colorado found that urban residency affected attitude orientation throughout the general population (Manfredo & Zinn, 1996).

### 1.6.2.2 Experiential Effects

The effects of experience were evaluated by examining responses to questions about previous history hiking the WCT (Q1), whether the hiker's permanent residence was in cougar country (Q8) and whether the hiker had previously encountered a cougar (Q9). According to Morford *et al* (2003) attitudes are learned through experience and they predispose a person to act in a certain way. Furthermore, people's attitudes toward something can change as they receive new information or through new experiences. Both physical and human-modified landscapes are viewed or experienced through a filter of cultural values which form value-systems that people use to construct attitudes (Aitken *et al* 1989; Feldman 1999). This independent variable was selected to facilitate an understanding of what or how experience affected visitor's values.

### 1.6.2.3 Effect of Knowledge

The effect of knowledge was examined by exploring three independent variables: whether people were aware of cougars on the WCT (Q2); how informed hiker's thought they were (Q7), and; how well they felt Parks Canada had prepared them for traveling in cougar country (Q6). Research shows that knowledge can be linked to public values, attitudes and perceptions (Tarrant *et al* 1997). A study by Pierce *et al* (1989) found that people with higher levels of factual knowledge about the environment also had attitudes toward environmental policies that were more consistent with their fundamental values

(Tarrant *et al* 1997). This independent variable was selected to provide a baseline of data regarding visitor knowledge levels.

## 1.7 Methodology

### 1.7.1 Preliminary Work

Preliminary work involved reviewing PRNPR ecosystem management guidelines and procedure manuals related to wildlife-human interaction. To clarify specific points and determine priorities for PRNPR wildlife managers, interviews were conducted with PRNPR staff and the “WildCoast” working group was consulted. As well, a pilot study was conducted by information centre staff in Port Renfrew to determine if presentation of the survey and the timeline were accessible and reasonable. The pilot study, conducted August 10<sup>th</sup> and 11<sup>th</sup>, 2004, revealed that the original two-page leaflet style format was considered tedious by hikers, therefore, the double-sided legal size format was adopted.

### 1.7.2 Research Method

This study uses a single method approach designed to be accessible to the greatest number of visitors to the West Coast Trail. Employing a point-intercept questionnaire style survey, the research consists of two samples of visitors to the West Coast Trail, distributed by visitor services staff at both trailheads (Gordon River and Bamfield).

#### 1.7.2.1 Rationale

Self administered questionnaires allow for a much larger sample size and range of questions to be addressed than personal interviews and focus groups, and are appropriate when working with complex issues (Mitra and Lankford, 1999). The point-intercept structured questionnaire method was chosen as the primary data collection instrument to assemble attitude, perception and knowledge related information from hikers on the West Coast Trail. Distributed by park information center staff, this method was effective in being offered to every hiker that accessed the WCT during the sampling periods and generated a high response rate.

#### 1.7.2.2 Questionnaire Design

A structured questionnaire (See Appendix 1) was developed to include the study objectives and information needs. Variables were developed from a review of relevant literature in several areas including carnivore conservation, human dimensions of carnivore conservation, carnivore ecology, attitude and behaviour theory, and survey design. The single page, two-sided questionnaire style was developed based on the Dillman Total Design Method, proven to optimize response rates and quality (Salant and Dillman, 1994).

The questionnaire was designed to provide information on hiker experience on the WCT and with cougars, hiker preparation and knowledge, attitudes to cougars and opinion of park management of cougars. The questionnaire was distributed pre-trip at the conclusion of a mandatory information briefing from Parks Canada staff. It was designed to be completed in less than ten minutes so that hikers would have time to complete the survey before catching a scheduled ferry ride to the trailhead. To achieve this, the questionnaire contained 29 questions in four sections employing closed-ended questions using the Likert scale and semantic differential measures, as well as open-ended and true/false questions to test knowledge.

The questionnaire layout was as follows:

- Section 1 of the questionnaire was used to compile information on previous hiker experience on the WCT or with cougars, how prepared and knowledgeable the hiker was about traveling in cougar country, how well the park informed them about traveling in cougar country and where they had accessed cougar information prior to the trip.
- Section 2 was designed to evaluate hiker attitudes to cougars and national parks by asking questions using a five point Likert scale ranging from “1 = strongly disagree” to “5 = strongly agree”. The questions elicited attitudinal responses to the ecological role of cougars, the purpose of national parks, and the intrinsic value of cougars in the wild.

- Section 3 was developed to gather baseline information on hikers perception of risk and perception of wildlife management actions in reference to cougars. Using the five point Likert scale, responses were gathered on subjects including: support for hunting; lethal control of cougars for threat to humans, pets and livestock and; support for non-lethal control measures or no management at all.
- Section 4 was designed in two parts; to assess hiker knowledge of general cougar ecology and to test the hiker's knowledge of how to avoid an encounter with a cougar. The first part of Section 4 was developed as six true or false questions related to general cougar ecology detailed in Parks Canada literature. The second part of Section 4 was an open-ended question asking the hiker to list all the actions they could take to reduce the chance of being attacked by a cougar. This question was designed to test the level of knowledge possessed by hikers after their mandatory park safety briefing by the Parks Canada Visitor Services staff (an important evaluation in the efficacy of the briefings).

Once the survey was completed, it was submitted for review and comment by Parks Canada wildlife management and social science staff for review and comment.

#### 1.7.2.3 Sampling Design

To achieve the objectives of this study, two sampling efforts were made in the hiking season of 2004. The first, in August, was designed to capture a snapshot of the West Coast Trail's peak user period. Throughout July and August the WCT experiences its highest visitor use and its greatest diversity of users in age and origin (Parks Canada, 2004b). The first sample consisted of 509 surveys completed from August 12<sup>th</sup> to August 28<sup>th</sup>, 2004. The second sampling effort was conducted in mid to late September to capture any differences from the shoulder season visitor. This sampling effort resulted in 171 completed surveys from September 8<sup>th</sup> until the trail closed for the season on September 31<sup>st</sup>, 2004.

To achieve the highest number of responses throughout the total five weeks of sampling, the Parks Canada information centre staff at both the Bamfield and Port Renfrew trailheads were given a set of protocols to introduce the survey. The first protocol consisted of inserting a slide into their Microsoft PowerPoint presentation that every trail user must watch before starting on the trail (see Appendix 2). This slide was introduced during a section of the presentation that detailed the various procedures for traveling in cougar, wolf and bear country while on the WCT.

The second protocol required the distribution of the questionnaire with a clipboard and pen along with the hiker registration information card that each hiker was required to fill out at the end of the presentation. During both the introduction of the survey by Microsoft PowerPoint and the distribution at the end of the presentation the hikers were instructed by Parks Canada information centre staff that the survey was not mandatory, that it was an option for any hikers that wished to participate.

Overall, the sampling effort resulted in 684 surveys completed from 13 days in August and 24 days in September, 2004. Of those, 680 were considered valid. Based on statistics from Parks Canada Visitor Services staff, 839 hikers received an information briefing during the days that the questionnaire was distributed, generating an overall response rate of 81.0%, with a response rate of 78.1% for the August sample and 91.1% for the September sample.

### 1.7.3 Statistical Analysis

Data from the 680 valid surveys were first entered onto Microsoft Excel for Windows 2000 and later transferred into the Statistical Package for the Social Sciences (SPSS) 12.0 for Windows platform. SPSS allowed the researcher to conduct frequency analysis and prepare descriptive statistics. Chi-squared tests were performed on non-parametric data and Pearson's t-test was performed on parametric data. Chi-squared tests were used to compare categorical variables and determine whether significant differences existed between identifiable groups. Independent sample t-tests were used to compare the mean scores of two groups to highlight significant group differences.

### 1.6.3.1 Margin of Error

The margin of error was calculated with adjustment for an finite population size using the following formula:

$$1.96 \sqrt{\frac{\hat{p}(1-\hat{p})(1-\frac{n}{N})}{n}}$$

In the 2004 hiking season, 5565 visitors traveled through the WCT (Parks Canada 2005). For any response from the sample of 680 valid surveys, the results are likely to be within 3.5% of the true response 95% of the time. This means, for example, that if 87.2% of respondents indicated that the presence of cougars on the WCT had ‘No Effect’ on their decision to visit the area (as in Table 2.1, Question 3), this response would be accurate within 83.7% to 90.7% of respondents 95% of the time.

### 1.7.4 Limitations

The human dimension in the context of this research includes the attitudes, perception and knowledge characteristics of stakeholders with respect to cougar conservation issues. The knowledge gaps that exist in this field, in particular with respect to PRNPR and the WCT, are extensive. This study attempted to address some of them. However, the following are several factors for consideration which may increase the value of future research:

1. Handing out surveys eliminates important feedback that can be gained from personal interviews;
2. Specific groups such as First Nations, commercial guides and hunters, as well as age and gender were not identified;
3. There were no choice-experiment questions that would allow further assessment of how willing visitors would be to accept change to the management of cougars in PRNPR;
4. The survey questions were broad in content and may have resulted in revealing only general environmental attitudes. More explicit questions may be needed to generate significant results; and,

5. This sample only captures hikers, a unique segment of the public that may possess different bias.

### 1.7.5 Ethical Considerations

The ethical arena of human research subjects was addressed in three ways. First, the study was designed to be conducted by a third party (the Parks Canada Visitor Services staff) with no direct contact between the researcher and the research subjects. Second, no identifiable personal data was collected on the survey. Lastly, the questionnaire was submitted to both Parks Canada and Royal Roads University ethical review processes. In addition, the survey itself included a paragraph of preamble that detailed the relationship between the researcher and the survey participant to further dispel any ethical concerns (See Appendix 1).

### 1.8 Chapter Summary

Carnivore-human interactions are on the increase due to decades of conservation efforts and further human encroachment into carnivore territory. Such encounters can pose a danger to humans, cost millions of dollars in management response and livestock losses. In the coming decades wildlife managers will be increasingly tasked with mitigating conservation needs with human-livestock protection.

Many creative strategies for conflict mitigation are being devised and tested around the world, and lessons learned often have practical applicability to other regions and other carnivore species. A questionnaire regarding the attitudes, perceptions, and knowledge of hikers was successfully implemented at the West Coast Trail in August and September of 2004 and achieved a high response rate. Understanding the human-cougar nexus will be explored in the following chapters.

## 2.0 Hiker's Attitudes Towards Cougars

### 2.1 Introduction

The word "value" is commonly used in conservation and biological diversity literature. According to Gollege and Stimson (1997), values can be defined as "enduring beliefs" that guide certain behaviour or decisions. Schwartz (1992) claims that these beliefs are about people, their actions, or events; he states that values are not qualities inherent in objects. Rather, values are used to evaluate the worthiness of phenomena. In British Columbia, the term "value" is often used to describe forest attributes such as "wildlife values" or "watershed values" rather than to associate values with people (Morford et al. 2003). In this paper the term "values" is used to refer to core beliefs that form the basis of the individuals attitudes and behaviours.

Most human-carnivore disputes involve a complex variety of basic values, whether it be an emphasis on wildlife functions or intrinsic wildlife values or a view of wildlife as a harvestable resource (Kellert 1995). Resolving these disputes requires recognition that conflict often emerges less because of ignorance, but from a complexity of basic values. Both physical and human-modified landscapes are viewed or experienced through a filter of values (Aitken *et al* 1989) which form the foundation of people's attitudes (Feldman 1999). In decision-making or dispute-resolution, people usually have to apply their values to the facts before they can make their appropriate response (Feldman 1999). By examining the debate concerning the wolf, for example, we note fundamental differences in attitudes toward wildlife, animal damage control philosophy, views of endangered species management, concern for game versus predator species, consumptive versus nonconsumptive uses of animal, and the right of states versus federal governments to manage wildlife (Kellert 1995).

In addition to managing the human component of conservation, managing for biological diversity also means broadening spatial and temporal horizons. From a spatial perspective, this means a far greater emphasis on species that are especially significant contributors to ecosystem structure, function, and process (Kellert 1995). Managing for biodiversity requires establishment and protection of enduring linkages, corridors, and

connections among habitats and ecosystems to guard against fragmentation and isolation (Kellert 1995).

The purpose of this chapter is to examine baseline human attitudes of hikers on the West Coast Trail with respect to cougars. Specifically, this paper explores human values of cougars in the wild and attitudes towards cougars in the protected area of PRNPR.

## 2.2 Results

In order to illustrate the relationship between the independent and dependent variables, the following table provides a listing of the survey questions which apply to each of the variables, along with a reference to the Tables which summarize the questionnaire results:

### Dependent Variables

<i><b>Independent Variables</b></i>	Hiker's Attitudes towards Cougars
Urban vs. rural residence	Q. 3, 12, 13, 14 Table 2.1
Previous experience hiking WCT	Q. 3, 12, 13, 14 Table 2.2
Hiker resident in cougar country	Q. 3, 12, 13, 14 Table 2.3
Previous encounter with cougar	Q. 3, 12, 13, 14 Table 2.4
Hiker aware of cougars on WCT	Q 3, 12, 13, 14 Table 2.5
Preparation for travel in cougar country by Parks Canada	Q 3, 12, 13, 14 Table 2.6

## 2.2.1 Hiker Response based on Urban versus Rural Residence

Table 2.1 Hiker Attitudes to Cougar (Q3, Q12, Q13, and Q14) by Urban or Rural Residence (Q29)

Attitude Issue	Response	Residence (%)			Chi Square	Sig.
		Urban	Rural	Total		
		87.2	12.8	n=485		
Q3 How did the presence of cougars affect your interest to hike the WCT?	Increased	8.9	11.9	.3	2.895	.235
	Decreased	4.1	0.0	3.5		
	No Effect	87.1	88.1	87.2		
Q12 Cougars, in their natural habitat, are necessary for a healthy ecosystem	Disagree	0.0	4.5	0.4	0.728	.695
	Not Sure	0.5	6.5	4.8		
	Agree	95.0	93.5	94.8		
Q13 National parks are first for animals, such as cougars, then for people	Disagree	5.2	6.5	5.4	4.476	.107
	Not Sure	10.5	19.4	11.6		
	Agree	84.3	74.2	83.0		
Q14 Knowing there is a healthy population of cougars in PRNPR is important to me	Disagree	4.0	4.8	4.2	0.924	.630
	Not Sure	12.1	16.1	12.6		
	Agree	83.8	79.0	83.2		

This table illustrates the relationship between urban and rural residency and response to attitude related statements. The results indicate that hikers attitudes to cougars were unaffected by their type of residence – rural or urban. Although the differences were not statistically significant, the data shows that 94.8% of hikers feel strongly that cougars are necessary for a healthy ecosystem. There is also 83.0% and 83.2% support for national parks being first for animals and home to healthy populations of cougars, respectively. Of those surveyed, 87.2% were from an urban center while 12.8% were from an urban community.

## 2.2.2 Hiker Response based on Previous Experience Hiking the WCT

Table 2.2 Hiker Attitudes to Cougar (Q3 and Q12 to Q14) based on Previous Experience Hiking the WCT (Q1)

Attitude Issue	Response	Previously Hiked (%)			Chi Square	Sig.
		Yes	No	Total		
		15.5	84.5	n=676		
Q3 How did the presence of cougars affect your interest to hike the WCT?	Increased	12.6	11.4	11.7	2.910	.233
	Decreased	1.0	4.5	3.8		
	No effect	86.4	84.1	84.5		
Q12 Cougars, in their natural habitat, are necessary for a healthy ecosystem	Disagree	1.0	1.2	0.3	2.031	.362
	Not Sure	3.9	4.1	4.9		
	Agree	95.1	94.7	94.8		
Q13 National parks are first for animals, such as cougars, then for people	Disagree	5.9	4.6	4.8	0.356	.837
	Not Sure	9.9	10.0	10.0		
	Agree	84.2	85.4	85.2		
Q14 Knowing there is a healthy population of cougars in PRNPR is important to me	Disagree	2.9	3.3	3.1	2.910	.233
	Not Sure	18.6	11.1	12.5		
	Agree	78.4	85.7	84.4		

This table details the results of examining the effect of whether hiker's have previous experience on the WCT or not on attitude statements. The result show no statistically significant differences between samples, indicating that previous experience hiking the WCT had no effect on hiker attitudes. Of the respondents, 15.5% had previously hiked the WCT while 84.5% had not. There is some variation in the responses in this table compared to Table 2.1. This is likely due to cross-tabulation differences resulting from varying sample sizes.

### 2.2.3 Hiker Response based on Hiker Residence in Cougar Country

Table 2.3 Hiker Attitudes to Cougar (Q3 and Q12 to Q14) based on Hiker Residence in Cougar Country (Q8)

Attitude Issue	Response	Residence in Cougar Country (%)			Chi Square	Sig.
		Yes	No	Total		
		44.9	52.1	n=675		
Q3 How did the presence of cougars affect your decision to hike the WCT?	Increased	9.3	14.0	11.6	8.752	.068
	Decreased	2.2	5.4	3.9		
	No effect	88.5	80.6	84.5		
Q12 Cougars, in their natural habitat, are necessary for a healthy ecosystem	Disagree	0.0	0.6	0.3	2.586	.629
	Not Sure	4.1	5.6	4.9		
	Agree	95.9	93.8	94.8		
Q13 National parks are first for animals, such as cougars, then for people	Disagree	4.5	4.7	4.8	2.732	.604
	Not Sure	11.0	8.9	10.0		
	Agree	84.5	86.4	85.2		
Q14 Knowing there is a healthy population of cougars in PRNPR is important to me	Disagree	3.1	3.5	3.2	2.409	.661
	Not Sure	11.0	12.9	12.3		
	Agree	86.0	83.6	84.5		

This table examines the effects of whether the respondent lives in cougar country or not on hiker's attitudes to cougars. The results of this examination revealed no statistically significant differences and indicate that the attitudes of hikers towards cougars were unaffected by whether the hikers resided in cougar country or not. Responses indicated that 44.9% live in cougar country while 52.1% do not. The remaining 3.0% that answered "Don't Know" are not represented in this table.

## 2.2.4 Hiker Response based on Hiker Previously Encountering a Cougar

Table 2.4 Hiker Attitudes to Cougar (Q3 and Q12 to Q14) Based on Having Previously Encountered a Cougar (Q9)

		<u>Previous Encounter (%)</u>			Chi Square	Sig.
		Yes	No	Total		
Attitude Issue	Response	28.3	71.7	n=675		
<b>Q3 How did the presence of cougars affect your decision to hike the WCT?</b>	<b>Increased</b>	<b>17.5</b>	<b>9.1</b>	<b>11.6</b>	<b>11.662</b>	<b>0.003</b>
	<b>Decreased</b>	<b>1.6</b>	<b>4.9</b>	<b>3.9</b>		
	<b>No effect</b>	<b>80.9</b>	<b>86.0</b>	<b>84.5</b>		
<b>Q12 Cougars, in their natural habitat, are necessary for a healthy ecosystem</b>	<b>Disagree</b>	<b>0.0</b>	<b>0.4</b>	<b>0.3</b>	<b>8.938</b>	<b>0.011</b>
	<b>Not Sure</b>	<b>1.1</b>	<b>6.4</b>	<b>4.9</b>		
	<b>Agree</b>	<b>98.9</b>	<b>93.2</b>	<b>94.8</b>		
Q13 National parks are first for animals, such as cougars, then for people	Disagree	2.7	5.6	4.8	2.677	0.262
	Not Sure	9.2	10.3	10.0		
	Agree	88.0	84.1	85.2		
<b>Q14 Knowing there is a healthy population of cougars in PRNPR is important to me</b>	<b>Disagree</b>	<b>1.1</b>	<b>4.1</b>	<b>3.2</b>	<b>7.398</b>	<b>0.025</b>
	<b>Not Sure</b>	<b>8.6</b>	<b>13.7</b>	<b>12.3</b>		
	<b>Agree</b>	<b>90.3</b>	<b>82.3</b>	<b>84.5</b>		

The analysis presented in this table showed significant differences in three hiker variables: interest in hiking the WCT (Q3), knowledge that cougars are necessary for a healthy ecosystem (Q12) and that cougars are necessary components of healthy ecosystems (Q14). The data indicate that the experience of having previously encountered a cougar resulted in a significantly greater interest in hiking the WCT. As well, this previous experience led to a greater recognition of the necessity of cougars in the ecosystem. Previous experience with a cougar also resulted in a stronger sense of intrinsic value for having cougars in PRNPR. Analysis shows that 28.3% of hikers had previously encountered a cougar while 71.7% had not.

## 2.2.5 Hiker Response based on Whether Hiker was Aware that Cougars Travel in the Area of the WCT

Table 2.5 Hiker Attitude towards cougars (Q3 and Q12 to Q14) Based on Hiker Aware that Cougars Travel Through the WCT (Q2)

		<u>Aware of Cougars (%)</u>			Chi Square	Sig.
Attitude Issue	Response	Yes	No	Total		
		90.4	9.6	n=676		
Q3 How did the presence of cougars affect your decision to hike the WCT?	Increased	11.3	27.3	11.6	3.003	.223
	Decreased	4.0	0.0	3.9		
	No Effect	84.7	72.7	84.5		
Q12 Cougars, in their natural habitat, are necessary for a healthy ecosystem	Disagree	0.3	0.0	0.3	3.248	.197
	Not Sure	4.4	9.4	4.9		
	Agree	95.2	90.6	94.8		
Q13 National parks are first for animals, such as cougars, then for people	Disagree	4.8	4.7	4.8	2.258	.323
	Not Sure	10.6	4.7	10.0		
	Agree	84.6	90.6	85.2		
Q14 Knowing there is a healthy Population of cougars in PRNPR is Important to me	Disagree	3.4	1.6	3.2	0.832	.660
	Not Sure	11.9	14.1	12.1		
	Agree	84.7	84.4	84.7		

This table examines the difference in response from hikers being aware that cougars travel in the area against those that are not aware. The results revealed no significant differences between samples on attitudes to cougars. This indicates that hiker response was likely unaffected by their awareness of cougars on the WCT. The analysis shows that 90.4% of hikers were previously aware that cougars travel in the area of the WCT compared to 9.6% who were not aware.

## 2.2.6 Hiker Response based on How Well Parks Canada Prepared the Hiker for Traveling in Cougar Country

Table 2.6 Hiker Attitude towards cougars (Q3 and Q12 to Q14) Based on How Well Parks Canada Prepared Hiker for Traveling in Cougar Country (Q6)

		<u>Informed by Parks Canada (%)</u>				Chi-square	Sig.
Attitude Issue	Response	Not at All	Slightly	Well	Total		
		4.5	25.5	70.0	n=647		
Q12 Cougars, in their natural habitat, are necessary for a healthy ecosystem	Disagree	0.0	0.0	0.5	0.3	1.426	.840
	Not Sure	3.6	6.7	4.8	5.1		
	Agree	96.4	93.9	94.7	94.6		
<b>Q13 National parks are first for animals, such as cougars, then for people</b>	<b>Disagree</b>	<b>0.0</b>	<b>5.6</b>	<b>5.1</b>	<b>5.0</b>	<b>11.970</b>	<b>.018</b>
	<b>Not Sure</b>	<b>14.3</b>	<b>16.0</b>	<b>7.4</b>	<b>10.0</b>		
	<b>Agree</b>	<b>85.7</b>	<b>78.4</b>	<b>87.5</b>	<b>85.0</b>		
Q14 Knowing there is a healthy Population of cougars in PRNPR is Important to me	Disagree	7.4	4.3	2.8	3.4	3.692	.449
	Not Sure	11.1	15.3	12.0	12.8		
	Agree	81.5	80.4	85.3	83.8		

The results described in this table show an examination between different responses to how well Parks Canada informed hikers about traveling in cougar country. The effect of the difference revealed significant results for response to national parks being first for animals, such as cougars (Q13), suggesting that there is a positive correlation between park messaging and attitudes towards parks as a place for wildlife before people. The results also show that 4.5% of hikers replied that Parks Canada did not inform them about traveling in cougar country, compared to 25.5% and 70.0% that replied that they had been well to very well informed, respectively.

## 2.3 Discussion

While research suggests that urban or rural residency has a relationship with value-formation (Inglehart 1997; Manfredi & Zinn 1996), this study revealed an absence of statistically significant results in relation to attitude (Table 2.1). Unfortunately, the range

of specific independent variables for an area of concern such as cougar management is extensive, therefore, the basic challenge is to measure attitudes toward a range of variables which are specific enough to ensure predictive validity but are also generic enough to be applied across a wide variety of situations (Manfredo *et al* 1998). In this case, other independent variables (such as life experience or cultural beliefs) could possibly have greater influence on a hiker's attitude towards specific questions and statements in the survey. As well, it may be that the survey was too generic to be able to discern between urban and rural residence.

Results of experiential related independent variables (Table 2.2, 2.3 and 2.4) demonstrated no significant results with the exception of comparisons between hikers who had previously encountered a cougar and those who had not (Q9). The experience of meeting any large carnivore in the wild is never forgotten. It is such a powerful tool that some conservation organizations promote preservation by using "ambassador" animals, such as the Colorado based "Mission: Wolf" that tours internationally with live wolves. If attitudes are indeed learned and can change as new information is processed (Morford *et al* 2003; Aitken *et al* 1989) these results indicate that dynamic experiences as opposed to the more benign experience of living in cougar country or previously hiking in cougar country may be the catalyst for such change.

The results for the knowledge related independent variables (Table 2.5 and 2.6) revealed no significant results with the exception of the effect of how well Parks Canada informed hikers about traveling in cougar country (Table 2.6) and response to national parks being first for animals, such as cougars, then for people (Q13). Although research has demonstrated a link between knowledge and attitudes, including that higher levels of factual knowledge can align attitudes with beliefs (Tarrant *et al* 1997; Pierce *et al* 1989), levels of awareness and information showed little correlation to attitudes towards cougars in this study. In the instance where a significant result was found, it is difficult to explain the significance from the results. It may be due to the relatively small sample size of the segment of hiker's that responded "Not at All" informed in Question 6 (4.3% of all hikers). It may also be due to the type of information that is provided to WCT visitors. The majority of the information is related to traveling safely in cougar country in contrast

to more factual information related to the role of cougars in the environment and the significance of their conservation.

## 2.4 Management Implications

These results suggest that visitors to the WCT are supportive of cougars and the role of parks and protected areas in prioritizing them in wildlife management concerns. The presence of cougars has little effect on hiker's interest in the area although the existence of them in the park is highly important. Cougar encounters proved to be the most significant variable influencing attitude and highlighting the interface between people and cougars through interpretation could be a strong management tool for influencing public opinion.

## 3.0 Hiker's Perception of Cougar Management

### 3.1 Introduction

Increasingly, public preference plays a significant role in determining the tools and techniques available for dealing with human-wildlife interaction. In the United States, public opinion forced the end to cougar hunting in California; eliminated the spring black bear (*Ursus americanus*) hunt in several western states, and restricted trapping in Arizona, Colorado, and Massachusetts (Manfredo *et al* 1998). Furthermore, negative public reaction to media coverage of carnivore management actions (such as hazing and relocating techniques) has resulted in pressure on wildlife agencies to alter or abandon proven techniques and tools. It can also lead to policy change, loss of agency reputation and public support (Manfredo *et al* 1998; Treves & Karanth 2003).

Human-wildlife interaction at PRNPR is classified in three groups. This has been described by Decker and Chase (1997) and is as follows: when the behaviour of humans negatively impact wildlife and their habitat; when the behaviour of wildlife creates real or perceived impact on humans, and; when wildlife focused behaviour of some humans creates a negative interaction with other people/agencies, often when values clash. The human-wildlife nexus therefore exists as human-wildlife, wildlife-human and human-human problems. The purpose of this chapter is to examine human perceptions of the

second form of interaction - when the behaviour of wildlife creates real or perceived impact on humans.

### 3.2 Results

In order to illustrate the relationship between the independent and dependent variables, the following table provides a listing of the survey questions which apply to each of the variables, along with a reference to the Tables which summarize the questionnaire results:

#### **Dependent Variables**

<b><i>Independent Variables</i></b>	<b>Hiker's Perception of Cougar Management</b>
Urban vs. rural residence	Q15 to Q21 Table 3.1
Previous experience hiking WCT	Q15 to Q21 Table 3.2
Previous encounter with cougar	Q15 to Q21 Table 3.4
Hiker resident in cougar country	Q15 to Q21 Table 3.3
Hiker aware of cougars on WCT	Q15 to Q21 Table 3.5
Preparation for travel in cougar country	Q15 to Q21 Table 3.6

### 3.4.1 Hiker Response based on Urban or Rural Residence

Table 3.1 Hiker Perception of Cougar Management (Q15 to Q21) by Urban or Rural Residence (Q28)

Perception Issue	Response	Residence (%)			Chi Square	Sig.
		Urban	Rural	Total		
Q15 Outside national parks I support cougar hunting	Disagree	74.2	73.8	74.1	0.391	0.822
	Not Sure	19.1	21.3	19.4		
	Agree	6.7	4.9	6.5		
Q16 Outside national parks, I want to hunt cougar	Disagree	90.7	85.5	90.0	2.931	0.231
	Not Sure	4.5	9.7	5.2		
	Agree	4.8	4.8	4.8		
Q17 Cougars should be destroyed if they are a threat to public safety	Disagree	32.1	32.3	32.2	0.625	0.732
	Not Sure	29.5	33.9	30.1		
	Agree	38.3	33.9	37.8		
Q18 Cougars should be destroyed if they are a threat to pets	Disagree	71.5	79.0	72.5	1.541	0.463
	Not Sure	19.5	14.5	18.8		
	Agree	9.0	6.5	8.7		
Q19 Cougars should be destroyed if they are a threat to livestock	Disagree	54.5	48.4	53.7	1.274	0.529
	Not Sure	28.6	35.5	29.5		
	Agree	16.9	16.1	16.8		
Q20 Wildlife managers should consider non-lethal management options	Disagree	2.6	5.0	2.9	1.238	0.539
	Not Sure	5.5	6.7	5.6		
	Agree	91.9	88.3	91.5		
Q21 Wildlife managers should take a 'hands-off' approach – no management.	Disagree	67.5	63.9	67.1	1.181	0.554
	Not Sure	23.6	29.5	24.4		
	Agree	8.8	6.6	8.5		

N=485

This table illustrates the differences in results between urban and rural responses to perception of park management options. The effects of urban or rural residence had no significant effect on responses to park management options regarding cougars. However, the data illustrates strong support for no cougar hunting outside parks and destruction of cougars inside parks is supported most if they are a threat to people, less so for livestock and least for pets. As well, there was strong support for non-lethal wildlife management options and some form of management in general as opposed to none at all.

### 3.4.2 Hiker Response based on Previous Experience Hiking the WCT

Table 3.2 Hiker Perception of Cougar Management (Q15 to Q21) by Previous Experience Hiking the WCT (Q1)

Perception Issue	Response	Previous Experience (%)			Chi Square	Sig.
		Yes	No	Total		
Q15 Outside national parks I support cougar hunting	Disagree	82.2	75.2	76.3	3.532	0.171
	Not Sure	14.9	17.1	16.7		
	Agree	3.0	7.7	7.0		
Q16 Outside national parks, I want to hunt cougar	Disagree	92.1	90.9	91.1	0.428	0.807
	Not Sure	5.0	4.7	4.8		
	Agree	3.0	4.4	4.2		
Q17 Cougars should be destroyed if they are a threat to public safety	Disagree	30.7	36.8	35.8	1.385	0.500
	Not Sure	31.7	29.1	29.5		
	Agree	37.6	34.1	34.6		
Q18 Cougars should be destroyed if they are a threat to pets	Disagree	78.2	74.0	74.6	1.258	0.533
	Not Sure	16.8	18.2	18.0		
	Agree	5.0	7.8	7.4		
Q19 Cougars should be destroyed if they are a threat to livestock	Disagree	61.4	55.0	56.0	2.073	0.355
	Not Sure	23.8	30.8	29.7		
	Agree	14.9	14.1	14.2		
Q20 Wildlife managers should consider non-lethal management options	Disagree	6.0	3.1	3.6	3.863	0.145
	Not Sure	4.0	8.1	7.5		
	Agree	90.0	88.8	89.0		
Q21 Wildlife managers should take a 'hands-off' approach – no management.	Disagree	63.6	63.2	63.3	0.020	0.990
	Not Sure	28.3	28.3	28.3		
	Agree	8.1	8.5	8.4		

N=676

The results in this table illustrate the differences in response between hikers who had previously hiked the WCT and those who had not. An examination of the results of revealed no significant differences between samples and indicates that there is no effect on hikers perception of management options as a result of previous experience on the WCT.

### 3.4.3 Hiker Response based on Hiker Residence in Cougar Country

Table 3.3 Hiker Perception of Cougar Management (Q15 to Q21) by Hiker Residing in Cougar Country (Q8)

Perception Issue	Response	Cougar Country (%)			Chi Square	Sig.
		Yes	No	Total		
Q15 Outside national parks I support cougar hunting	Disagree	77.7	75.8	76.3	3.183	0.528
	Not Sure	15.1	17.3	16.7		
	Agree	7.2	6.9	7.0		
Q16 Outside national parks, I want to hunt cougar	Disagree	90.7	91.7	91.1	7.878	0.098
	Not Sure	3.8	5.0	4.8		
	Agree	5.5	3.3	4.2		
Q17 Cougars should be destroyed if they are a threat to public safety	Disagree	36.4	36.0	36.0	3.636	0.457
	Not Sure	26.8	32.2	29.5		
	Agree	36.8	31.9	34.5		
Q18 Cougars should be destroyed if they are a threat to pets	Disagree	74.3	75.7	74.8	2.225	0.694
	Not Sure	18.2	17.2	18.0		
	Agree	7.5	7.1	7.2		
Q19 Cougars should be destroyed if they are a threat to livestock	Disagree	57.5	55.1	56.2	0.855	0.931
	Not Sure	28.4	30.5	29.7		
	Agree	14.0	14.4	14.1		
<b>Q20 Wildlife managers should consider non-lethal management options</b>	<b>Disagree</b>	<b>2.4</b>	<b>4.8</b>	<b>3.6</b>	<b>10.924</b>	<b>0.027</b>
	<b>Not Sure</b>	<b>4.5</b>	<b>10.0</b>	<b>7.5</b>		
	<b>Agree</b>	<b>93.2</b>	<b>85.2</b>	<b>89.0</b>		
Q21 Wildlife managers should take a 'hands-off' approach – no management.	Disagree	62.2	63.8	63.1	1.978	0.740
	Not Sure	28.9	28.6	28.4		
	Agree	8.9	7.6	8.4		

N=675

The table illustrates the effect of residence in cougar country on perceptions to cougar management options. The results revealed statistically significant findings suggesting that residency in cougar country results in greater support for wildlife managers to consider non-lethal management options.

### 3.4.4 Hiker Response based on Hiker Previously Encountering a Cougar

Table 3.4 Hiker Perception of Cougar Management (Q15 to Q21) by Hiker Previously Encountering a Cougar (Q9)

Perception Issue	Response	Previous Encounter (%)			Chi Square	Sig.
		Yes	No	Total		
<b>Q15 Outside national parks I support cougar hunting</b>	<b>Disagree</b>	<b>79.7</b>	<b>75.0</b>	<b>76.3</b>	<b>9.459</b>	<b>0.009</b>
	<b>Not Sure</b>	<b>10.4</b>	<b>19.2</b>	<b>16.7</b>		
	<b>Agree</b>	<b>9.9</b>	<b>5.8</b>	<b>7.0</b>		
Q16 Outside national parks, I want to hunt cougar	Disagree	89.2	91.8	91.1	1.149	0.563
	Not Sure	5.9	4.3	4.8		
	Agree	4.9	3.9	4.2		
Q17 Cougars should be destroyed if they are a threat to public safety	Disagree	38.6	34.8	35.8	0.838	0.658
	Not Sure	28.3	30.0	29.5		
	Agree	33.2	35.2	34.6		
Q18 Cougars should be destroyed if they are a threat to pets	Disagree	76.2	74.0	74.6	1.048	0.592
	Not Sure	15.7	18.9	18.0		
	Agree	8.1	7.1	7.4		
Q19 Cougars should be destroyed if they are a threat to livestock	Disagree	61.6	53.8	56.0	3.282	0.194
	Not Sure	25.9	31.2	29.7		
	Agree	12.4	15.0	14.2		
Q20 Wildlife managers should consider non-lethal management options	Disagree	3.3	3.7	3.6	5.157	0.076
	Not Sure	3.8	8.9	7.5		
	Agree	92.9	87.4	89.0		
Q21 Wildlife managers should take a 'hands-off' approach – no management.	Disagree	60.1	64.3	63.1	5.664	0.059
	Not Sure	27.3	28.9	28.4		
	Agree	12.6	6.8	8.4		

N=675

An examination of the difference between samples of hikers who had previously encountering a cougar and those who had not is illustrated in this table. The results show statistically significant differences indicating a relationship exists between previously encountering a cougar and support for hunting outside national parks.

### 3.4.5 Hiker Response based on Whether the Hiker was Aware that the WCT is in Cougar Country

Table 3.5 Hiker Perception of Cougar Management (Q15 to Q21) by Hiker Aware that the WCT is in Cougar Country (Q2)

Perception Issue	Response	Aware of Cougars (%)			Chi Square	Sig.
		Yes	No	Total		
Q15 Outside national parks I support cougar hunting	Disagree	75.8	81.0	76.3	5.139	0.077
	Not Sure	17.7	7.9	16.7		
	Agree	6.5	11.1	7.0		
Q16 Outside national parks, I want to hunt cougar	Disagree	91.3	88.9	91.1	1.658	0.437
	Not Sure	4.4	7.9	4.8		
	Agree	4.3	3.2	4.2		
Q17 Cougars should be destroyed if they are a threat to public safety	Disagree	35.4	39.7	35.8	0.693	0.707
	Not Sure	30.0	25.4	29.5		
	Agree	34.6	34.9	34.6		
Q18 Cougars should be destroyed if they are a threat to pets	Disagree	75.1	69.8	74.6	1.567	0.457
	Not Sure	17.9	19.0	18.0		
	Agree	7.0	11.1	7.4		
Q19 Cougars should be destroyed if they are a threat to livestock	Disagree	55.8	60.0	56.2	2.344	0.310
	Not Sure	30.4	21.7	29.6		
	Agree	13.8	18.3	14.2		
Q20 Wildlife managers should consider non-lethal management options	Disagree	3.1	8.1	3.6	4.659	0.097
	Not Sure	7.2	9.7	7.5		
	Agree	89.7	82.3	89.0		
Q21 Wildlife managers should take a 'hands-off' approach – no management.	Disagree	62.8	67.7	63.3	0.685	0.710
	Not Sure	28.5	25.8	28.3		
	Agree	8.7	6.5	8.4		

N=676

This table examines any relationship between whether or not the hiker resided in cougar country and perceptions to cougar management options. The results show that residence in cougar country has no statistically significant effect on perceptions of management options.

### 3.4.6 Hiker Response based on Whether the Hiker Prepared for Traveling in Cougar Country

Table 3.6 Hiker Perception of Cougar Management (Q15 to Q21) by Whether the Hiker Prepared for Traveling in Cougar Country (Q4)

Perception Issue	Response	Prepared (%)			Chi Square	Sig.
		Yes (58.3)	No (41.7)	Total		
Q15 Outside national parks I support cougar hunting	Disagree	76.8	73.8	75.5	0.719	0.698
	Not Sure	16.8	19.3	17.8		
	Agree	6.5	7.0	6.7		
Q16 Outside national parks, I want to hunt cougar	Disagree	91.5	90.7	91.1	0.389	0.823
	Not Sure	4.7	4.5	4.6		
	Agree	3.8	4.9	4.3		
Q17 Cougars should be destroyed if they are a threat to public safety	Disagree	37.5	33.2	35.7	2.549	0.280
	Not Sure	27.3	33.2	29.8		
	Agree	35.2	33.6	34.5		
Q18 Cougars should be destroyed if they are a threat to pets	Disagree	76.4	73.9	75.3	5.380	0.069
	Not Sure	18.7	16.3	17.7		
	Agree	5.0	9.8	7.0		
Q19 Cougars should be destroyed if they are a threat to livestock	Disagree	55.8	54.7	55.4	1.717	0.424
	Not Sure	28.9	33.1	30.7		
	Agree	15.2	12.2	14.0		
Q20 Wildlife managers should consider non-lethal management options	Disagree	3.3	3.3	3.3	0.002	0.999
	Not Sure	7.7	7.8	7.7		
	Agree	89.1	88.9	89.0		
Q21 Wildlife managers should take a 'hands-off' approach – no management.	Disagree	63.6	61.0	62.5	1.166	0.558
	Not Sure	27.2	31.1	28.8		
	Agree	9.2	7.9	8.6		

N=647

This examination of the relationship between hikers preparing for traveling in cougar country on perceptions to cougar management revealed no significant findings. This indicates that prior preparation, including knowledge, was not a factor in hiker's perceptions of cougar management. The results show that 58.3% of respondents had prepared for traveling in cougar country while 41.7% had not.

### 3.3 Discussion

Carnivore management has been recognized as a political challenge as well a scientific one (Treves & Karanth 2003). Public support for management actions regarding carnivores is a necessary component of a successful conservation strategy. Public opposition to carnivore management tactics can lead to policy and procedure change regardless of the success of the techniques. Successful carnivore conservation strategies depend on tolerant sociopolitical landscapes and favorable ecological conditions because humans have caused most of the carnivore mortality worldwide and most of the recent extirpations of carnivores (Treves & Karanth 2003). Understanding the human dimension is paramount, especially to Parks Canada, because people impact public lands not only by direct use but also through their influence on public land management policies (Marynowski & Jacobsen 1999).

Hiker residence in cougar country (Table 3.3) and previous encounters with cougar (Table 3.4) proved to be significant variables. Hiker residence illustrated a increase in support for wildlife managers choosing non-lethal carnivore control options(Q20). The relationship between samples in support for hunting outside national parks (Q15) based on previous encounters is difficult to describe by the data. It may be due to relatively small sample sizes within each group, resulting in erroneous cross-tabulation results.

Support for hunting cougar outside of national parks proved to be statistically significant when examining the relationship was low – only 6.9%. The proportion of hikers surveyed who wished to hunt cougars outside national parks was also low - only 4.1%. While the percentage is small, because hunters range into carnivore habitat with intent to kill cougars, their impact on conservation efforts exceeds their numerical representation (Treves and Karanth 2003). Of the three statements regarding destruction of cougars if there is a threat to humans (Q17), threat to pets (Q18) or threat to livestock (Q19), hikers surveyed responded up to 30% unsure of how management should proceed. Human-cougar conflict responses illustrated a divided response between the three options, suggesting a need for education and communication to inform hikers. Support for destruction as a management tool was strongest for human-cougar conflict, then for livestock-cougar conflict and last for pet-cougar conflict. Considering that higher levels

of factual knowledge can align attitudes with beliefs (Tarrant et al 1997; Pierce et al 1989), this data suggests that respondents are lacking information regarding both the ecological status of cougars and the management techniques that are employed when cougars threaten humans.

While the destruction of cougars as a threat to pets garnered little support, the threat to livestock evoked a higher response in favor of destruction. Oгода *et al* (2003) observed that conflicts with local people, particularly over depredation on livestock, is a major cause of general carnivore population decline, affecting both nominally protected populations and those outside protected areas. As well, Treves and Karanth (2003) noted that because ranchers are permitted to kill carnivores on their land, their impact on conservation strategies exceeds their numerical representation. For this reason, techniques that can resolve conflicts between large carnivores and livestock farmers may make important contributions to conservation.

Response to wildlife managers considering non-lethal management options (Q20) was strong. These results are indicative of the public reaction to media coverage of carnivore management actions as described by Manfredo *et al* (1998) including voter initiatives to end cougar hunting and restrict bear hunting. However, response to whether wildlife managers at PRNPR should take a “hands-off” approach to managing cougars, in fact not managing them at all, generated little support. This correlates with literature that suggests that the public expects government agencies to actively manage wildlife (Marynowski & Jacobsen 1999), although there still remains a large undecided segment of visitors to the WCT.

### 3.4 Management Implications

These results suggest that visitors to the WCT are not supportive of cougar hunting in regions outside the park and provide a clear mandate for pursuing strategies in cooperation with other wildlife agencies that do not include cougar culls or regulated hunting. Respondents were evenly divided with regards to destroying cougars for public safety purposes. This suggests that to garner public support for management actions, a

greater level of information about the implications of managing carnivore-human interaction is needed.

There is a lack of public support for destroying cougars if they threaten pets. PRNPR wildlife managers should consider the effect of wildlife management actions on public support for current agency policy that, in some cases, includes destruction of problem carnivores if they threaten pets. While livestock is not a concern in the park, with 57.7% of farm land on Vancouver Island dedicated to livestock production (B.C. Ministry of Agriculture, Food and Fisheries 2001) and considering rancher's and farmer's impact on cougar conservation, cooperation and partnerships with this group is important.

Because of the strong visitor support for wildlife manager's use of non-lethal options, park managers should first consider information campaigns to inform park visitors about the integrity of the policies and procedures already in place. An alternative is to adopt management strategies that are in-line with visitor perception, or a mix of both. If policy development is to be influenced by public opinion, then the public must be well informed. An ill-informed public leads to 'opinion, unbiased by the facts', and ultimately to poor policy. In either case, support for the involvement of management in resolving human-wildlife conflict is impressive.

## 4.0 Hiker's Knowledge of Cougar Ecology and Park Messages

### 4.1 Introduction

The purpose of this chapter is to examine hiker knowledge of both cougar ecology and techniques for traveling in cougar country along the West Coast Trail. While it is not within the scope of this paper to fully explore the relationship between knowledge and both attitudes and perceptions, this research does intend to develop baseline information of hiker knowledge that will contribute to further understanding the link between knowledge and attitudes.

Theoretically, knowledge can be linked to public values, attitudes and perceptions (Tarrant *et al* 1997; Pierce *et al* 1989). While the effects of knowledge on attitudes are

not conclusively known, several studies have examined links between knowledge and attitudes, specifically toward natural resource management. For example, Bright and Manfreda (1997) found that exposure to information affected the strength of attitudes toward old growth forests; (Cable *et al.* 1987) found that interpretive messages about forest management had a positive effect on visitor attitudes about forest management in Canada. The following are results of hiker knowledge scores examined against several independent variables.

#### 4.2 Results

In order to illustrate the relationship between the independent and dependent variables, the following table provides a listing of the survey questions which apply to each of the variables, along with a reference to the Tables which summarize the questionnaire results:

#### **Dependent Variables**

<b><i>Independent Variables</i></b>	Knowledge of Cougar Ecology and Traveling Protocol
Urban vs. rural residence	Q22 to Q27 Table 4.1
Hiker resident in cougar country	Q22 to Q27 Table 4.2
Previous encounter with cougar	Q22 to Q27 Table 4.3
Hiker aware of cougars on WCT	Q22 to Q27 Table 4.4
Preparation for travel in cougar country	Q22 to Q27 Table 4.5

#### 4.2.1 Hiker Response based on Urban versus Rural Residence

Table 4.1 Knowledge of Cougar Ecology (Q22 to Q27) and Traveling in Cougar Country Procedures (Q28) by Urban or Rural Residence

Knowledge Issue	Variable	Mean Score	Mean Difference	T-Test (t)	Sig.
<b>Q22 to Q27 Knowledge of Cougar Ecology</b>	<b>Urban</b>	<b>3.15</b>	<b>0.351</b>	<b>-2.149</b>	<b>0.032</b>
	<b>Rural</b>	<b>3.50</b>			
Q28 Knowledge of Procedures for Traveling in Cougar Country	Urban	2.36	0.208	-1.261	0.208
	Rural	2.57			

N=485

This table shows the effect of urban or rural residence on knowledge of cougar ecology and knowledge of traveling protocol while in cougar country. The difference between samples revealed statistically significant results for knowledge of cougar ecology scores suggesting that rural residents are more informed.

#### 4.2.2 Hiker Response based on Hiker Residence in Cougar Country

Table 4.2 Knowledge of Cougar Ecology (Q22 to Q27) and Traveling in Cougar Country Procedures (Q28) by Hiker Residence in Cougar Country (Q8)

Knowledge Issue	Variable	Mean Score	Mean Difference	T-Test (t)	Sig.
<b>Q22 to Q27 Knowledge of Cougar Ecology</b>	<b>In Cougar Country</b>	<b>3.32</b>	<b>0.235</b>	<b>2.485</b>	<b>0.013</b>
	<b>Not in Cougar Country</b>	<b>3.09</b>			
Q28 Knowledge of Procedures for Traveling in Cougar Country	In Cougar Country	2.40	0.031	0.316	0.752
	Not in Cougar Country	2.37			

N=675

Statistically significant results were found when the relationship between residence and non-residence in cougar country was examined. The results illustrated in this table show that hikers who reside in cougar country were more knowledgeable about cougar ecology than those who resided in non-cougar regions.

#### 4.2.3 Hiker Response based on Hiker Previously Encountering a Cougar

Table 4.3 Knowledge of Cougar Ecology (Q22 to Q27) and Traveling in Cougar Country Procedures (Q28) by Hiker Previously Encountering a Cougar (Q9)

Knowledge Issue	Variable	Mean Score	Mean Difference	T-Test (t)	Sig.
<b>Q22 to Q27 Knowledge of Cougar Ecology</b>	<b>Previous Encounter</b>	<b>3.48</b>	<b>0.407</b>	<b>3.995</b>	<b>0.000</b>
	<b>No Previous Encounter</b>	<b>3.07</b>			
<b>Q28 Knowledge of Procedures for Traveling in Cougar Country</b>	<b>Previous Encounter</b>	<b>2.60</b>	<b>0.309</b>	<b>2.961</b>	<b>0.003</b>
	<b>No Previous Encounter</b>	<b>2.29</b>			

N=675

This table illustrates the examination of differences between knowledge scores for hikers who had previously encountered a cougar and those who had not. The results were statistically significant for both knowledge of cougar ecology and knowledge of traveling protocol while in cougar country. This indicates that previous encounters with cougars are a significant factor in the development and retention of cougar related knowledge, leading to higher levels of knowledge than hikers who had not encountered a cougar.

#### 4.2.4 Hiker Response based on Whether Hiker was Aware that Cougars Travel in the WCT Area

Table 4.4 Knowledge of Cougar Ecology (Q22 to Q27) and Traveling in Cougar Country Procedures (Q28) by Previously Aware that the WCT is in Cougar Country (Q2)

Knowledge Issue	Variable	Mean Score	Mean Difference	T-Test (t)	Sig.
Q22 to Q27 Knowledge of Cougar Ecology	Aware	3.20	0.047	0.298	0.766
	Unaware	3.15			
Q28 Knowledge of Procedures for Traveling in Cougar Country	Aware	2.39	0.070	0.435	0.664
	Unaware	2.32			

N=676

The results in this table examine the relationship between hikers who were previously aware that the WCT is in cougar country and those who weren't. The results revealed no statistically significant differences, demonstrating that awareness of cougars in the area had little effect on the results of knowledge scores.

#### 4.2.5 Hiker Response based on Whether the Hiker Prepared for Hiking in Cougar Country

Table 4.5 Knowledge of Cougar Ecology (Q22 to Q27) and Traveling in Cougar Country Procedures (Q28) by Whether the Hiker Prepared for Traveling in Cougar Country (Q4)

Knowledge Issue	Variable	Mean Score	Mean Difference	T-Test (t)	Sig.
<b>Q22 to Q27 Knowledge of Cougar Ecology</b>	<b>Prepared</b>	<b>3.31</b>	<b>0.263</b>	<b>2.643</b>	<b>0.008</b>
	<b>Not Prepared</b>	<b>3.04</b>			
<b>Q28 Knowledge of Procedures for Traveling in Cougar Country</b>	<b>Prepared</b>	<b>2.50</b>	<b>0.268</b>	<b>2.616</b>	<b>0.009</b>
	<b>Not Prepared</b>	<b>2.23</b>			

N=611

Results in this table show the relationship between hikers who prepared to hike the WCT and those who had not on knowledge scores. The results proved to be statistically significant and indicate that previous preparation for traveling in cougar country resulted in greater knowledge of cougar ecology and traveling protocol.

#### 4.3 Discussion

Effective public involvement in conservation efforts and policy development requires that the public make informed decisions. Research in Alberta (Parkins et al. 1999) and Ontario (Parkins et al. 2000) suggest that the public is not well informed about biodiversity and its complexity, nor about issues related to conservation. This can have implications for managers in achieving conservation objectives because the amount and type of knowledge that individuals have regarding natural resource issues may influence their attitudes towards conservation and ecological integrity (Watson et al 2004).

The analysis demonstrated statistically significant results for most of the independent variables. Rural residence and living in cougar country proved to increase hiker's knowledge of cougar ecology (Table 4.1 and 4.2). Previous encounters with cougars and prior preparation for traveling in cougar country increased hikers knowledge scores for cougar ecology and traveling protocol (Table 4.3 and 4.5). Results from this section also show that knowledge levels of cougar ecology and procedures for traveling in cougar country were generally moderate. Knowledge, as a key factor in the formation of value systems and hence attitudes, is an important characteristic in human dimension research (Tarrant *et al* 1997; Pierce *et al* 1989). Understanding the independent variables that affect knowledge could prove to be an important tool for managers when designing public awareness and consultation programs to garner support for carnivore conservation strategies.

Both physical and human-modified landscapes are known to affect development of values (Aitken *et al* 1989; Feldman 1999). Urban or rural residency has been shown to influence value formation (Inglehart 1997; Manfreda & Zinn 1996). This study suggests that residency may be one component of the cultural filter that shapes value formation. Residents of rural areas were significantly more knowledgeable about cougar ecology than urban residents.

Results of the experiential independent variables (Table 4.2 and 4.3) demonstrated statistically significant results. Both residence in cougar country (Q8) and previous encounters with a cougar (Q9) did demonstrate significant differences between sample groups. Research has demonstrated that attitudes can be learned and can change as new information is processed (Morford *et al* 2003; Aitken *et al* 1989). Hikers who resided in cougar country scored higher in the general knowledge of cougar ecology section (Q22 to Q27) than the sample that did not live in cougar country. As well, hikers that had previously encountered a cougar (Q9) were more knowledgeable about cougar ecology and procedures for traveling in cougar country (Q28).

Relationships between knowledge and strength of attitudes and positive effect on attitudes have been shown to exist (Bright and Manfreda 1997; Cable *et al.* 1987).

However, these relationships were not evident in the results for hikers that were previously aware that the WCT is in cougar country (Table 2.4). However, results for hikers that had previously prepared for traveling in cougar country (Q4) were statistically significant between samples. Prepared hikers scored higher than hikers who were not prepared against the cougar ecology questions (Q22 to Q27) the procedures for traveling in cougar country question (Q28). This suggests that previous exposure to material related to cougars significantly improves hiker's knowledge of both ecology and public safety issues and likely affects their attitudes towards cougars.

#### 4.4 Management Implications

In order for the public to make informed comments about their opinions on conservation, their attitudes and perceptions towards the particular species must be based on accurate information (Morgan *et al* 2004). Results from this chapter show that visitors to the WCT were more knowledgeable about cougar ecology and/or procedures for traveling in cougar country if they were from a rural environment, resided in cougar country, had previously encountered a cougar or had previously prepared for traveling in cougar country.

Wildlife managers can use this information to target communications resources, therefore minimizing financial and human expenses while accessing the segments of the public that most need to be informed. The results indicate that communications strategies to inform the public about cougar conservation should target urban residents, in general, to achieve the highest impact on knowledge and thus attitudes.

## 5.0 Conclusion

### 5.1 Key Findings

For many wildlife agencies, carnivore management stands at a crossroads. In some areas, carnivore populations have recovered to the point where regulated harvests are being considered. In others, threats persist despite conservation efforts. Faced with management decisions to minimize risks associated with wildlife-human interactions while conserving species, carnivore conservation at PRNPR has never been as complex.

Current literature suggests that the success of carnivore conservation strategies lies in integrating information about the sociological landscape with natural science data (Decker and Chase, 1997; Jacobsen and McDuff, 1998; Kellert, 1995; Innes, 2002; Mascia, 2003; Robertson and Hull, 2001; Treves and Karanth, 2003; Watson et al., 2004).

An assessment of attitude issues in Chapter 2 revealed statistically significant results for hikers who had previously encountered a cougar versus those who had not. Examination of the responses to the attitude results in this study provides a glimpse of the effect of independent variables on hikers attitudes towards cougars. While hikers generally expressed minimal increase in interest to visit the area due to cougars traveling through the region, they thought that cougars were an important part of a healthy ecosystem; that national parks should be first for cougars then for people, and; that knowing there is a healthy population of cougars in PRNPR was important to them.

While research suggests that urban or rural residency is linked to attitudes (Inglehart 1997; Manfredo & Zinn 1996), this study revealed an absence of statistically significant results with attitude related issue statements. As well, results of the experiential-related independent variables demonstrated no significant results when compared to attitude issues with the exception of comparisons between hikers who had previously encountered a cougar and those who had not. This was likely due to attitude issue statements being too generic to produce significant differences in the comparison between samples. The results for knowledge related independent variables revealed no significant results for attitude related issues that could be explained by the results.

The examination of perception issues revealed an obscure relationship between support for hunting outside national parks and residence in cougar country. Also, hikers with previous cougar encounter experience had greater support for the consideration of non-lethal management options. This suggests that their encounters were positive experiences. In relation to management of cougars, there was minimal support for hunting outside the park. However, because of the large impact hunters have on carnivore populations, this variable deserves particular attention and hunting groups

should be considered an important stakeholder in carnivore conservation. Support for destroying cougars if they threaten people, pets or livestock varied. In the case of public safety, responses were evenly distributed and showed an important undecided segment. Destruction of cougars if they threaten pets was strongly opposed. While approximately half of respondents opposed destruction of cougars if they threaten livestock, one-third of respondents were undecided.

Results from Chapter 4 related to knowledge of cougar ecology and procedures for traveling in cougar country demonstrated statistically significant differences between samples when examined against five independent variables with the exception of whether the hiker was previously aware of cougars in the WCT region. In general, visitors to the WCT were more knowledgeable about cougar ecology and/or procedures for traveling in cougar country if they were from a rural environment, resided in cougar country, had previously encountered a cougar or had previously prepared for traveling in cougar country.

## 5.2 Key Management Implications

The challenge before wildlife managers is to translate social science findings into policies that enhance conservation performance. The results of this study provide a baseline of data that can be used for further research and for designing carnivore management strategies. In general, these results suggest that visitors to the WCT are supportive of cougars and the role of parks and protected areas in prioritizing them in wildlife management concerns. Visitors to the WCT were not supportive of cougar hunting in regions outside the park and thus provide a clear mandate for pursuing strategies with other wildlife agencies that do not include cougar culls or regulated hunting.

Respondents were evenly divided between responses with regards to destroying cougars for public safety purposes and there was minimal support for destruction of cougars if they threaten pets. With strong support for wildlife managers to consider non-lethal options, this suggests that to garner public support for management actions that involve cougar destruction, a greater level of information about the implications of managing carnivore-human interaction needs to be disseminated and/or policies need to be

reviewed. In either case, there is considerable support for the involvement of management in resolving human-wildlife conflict.

Half of respondents replied that destruction was unacceptable in the instance that livestock are threatened with a third of respondents were unsure. Resolving conflicts between large carnivores and livestock farmers may make important contributions to conservation. Techniques could include communication strategies aimed at developing stronger public opposition and including livestock farmers in stakeholder groups.

In order to effectively involve the public in conservation efforts and policy development requires that the public make informed decisions. Results from this study showed that visitors to the WCT were more knowledgeable about cougar ecology and/or procedures for traveling in cougar country if they were from an urban environment, resided in cougar country, had previously encountered a cougar and had previously prepared for traveling in cougar country.

### 5.3 Recommendations for Future Research

To compliment the data collected in this survey, targeted analysis of urban populations and local communities should be conducted. Age, gender and specific groups such as commercial outfitters, hunters and First Nations should be identified. The results can be compared to this survey to generate a mosaic of attitudes, perceptions and knowledge of cougars throughout the greater study area. As well, similar surveys of other carnivore species should be conducted to complete the baseline inventory of human dimension data on carnivore conservation.

Choice experiments may be the next step in identifying public priorities for cougar conservation by identifying possible conservation scenarios and asking respondents to choose between them. Long-term conservation of carnivores may require park visitors and staff to decide between closing areas, recreation opportunities and revenue generation. Managing for biodiversity at the landscape level may require the public, park visitors and Parks Canada staff to make choices between forest preservation, industrial uses and non-timber uses. Choice experiments will allow researchers to develop an

understanding of people's willingness to modify their behaviour to accommodate conservation actions.

Growing pressure on protected spaces by increased visitation and adjacent land alteration requires more intensive management and public education to maintain recreational opportunities without permanent harm to ecological integrity. Education can modify behaviours, increase the effective carrying capacity of recreational areas, and increase public support for conservation policies. Research into the development of communication strategies that specifically target conservation goals should be conducted.

Biology has provided us with the theoretical and analytic tools to identify rare and threatened species and ecosystems. It can estimate the limits to human use necessary to sustain these systems. Still, conservation strategies fail when based purely on biophysical evidence or insufficient sociological data. Recognition and integration of the human dimension in carnivore conservation is critical for preserving Pacific Rim National Park's ecological heritage. True integration of social sciences with conservation requires visionary leadership and a shift in organizational behaviour.

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## Appendix 1 – Hiker Survey

### Cougar Management on the West Coast Trail: Your Opinion

*Aussi en français*

Dear West Coast Trail Hiker,

This research project is part of the requirement for a Master's Degree in Science, Environment and Technology at Royal Roads University (RRU). The student concerned is Geoff Carrow whose credentials with RRU can be established by telephoning Vivienne Wilson, Director, Masters Environmental Management Program, (250) 391-2600 ext 4314 . The objective of the research is to characterize the knowledge, perception and attitudes of hikers on the West Coast Trail and to analyze the information so that it may be incorporated as the human dimension in a carnivore conservation plan.

Thank You.

Geoff Carrow, Park Warden and Principal Researcher  
Pacific Rim National Park Reserve of Canada

**Please circle the numbers to respond to the following questions...**

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Q1. Have you previously hiked the West Coast Trail?

1. YES
2. NO

Q2. Before arriving, did you know that cougars are in Pacific Rim National Park Reserve?

1. YES
2. NO – please go to **Question 6**.

Q3. How did the presence of cougars affect your interest in hiking the West Coast Trail?

1. IT INCREASED MY INTEREST IN THE AREA
2. IT DECREASED MY INTEREST IN THE AREA
3. IT DID NOT AFFECT MY DECISION IN ANY WAY

Q4. Did you prepare yourself, before arriving at Pacific Rim National Park Reserve, to be knowledgeable about cougars and what to do in the event of a cougar encounter?

1. YES
2. NO – please go to **Question 6**

Q5. Where did you access your cougar information?  
(Please circle all that apply to you)

1. TELEVISION
2. INTERNET
3. READ AN ARTICLE
4. PAMPHLET FROM ANOTHER PARK
5. INFORMATION CENTER AT ANOTHER PARK
6. OTHER

Please list:

Q6. How well has Parks Canada informed you about traveling in cougar habitat?

1. NOT AT ALL INFORMED
2. SLIGHTLY INFORMED
3. WELL INFORMED

Q7. In general, how informed are you about cougars?

1. NOT AT ALL INFORMED
2. SLIGHTLY INFORMED
3. WELL INFORMED
4. COMPLETELY INFORMED
5. VERY WELL INFORMED

Q8. Are there cougars in the area where you live?

1. YES
2. NO
3. DON'T KNOW

Q9. Have you ever encountered or seen signs of a cougar while recreating or working in the forest?

1. YES
2. NO

Q10. What do you believe is your probability of observing a cougar during your visit to the park?

1. UNLIKELY
2. POSSIBLE
3. PROBABLE

Q11. What do you believe would be the outcome of meeting a cougar during a visit to the park?

1. NO THREAT
2. THREAT / SCARE
3. INJURY / DEATH

**How much do you agree with the following statements?**

	Strongly Agree	Slightly Agree	Not Sure	Slightly Disagree	Strongly Disagree
Q12. Cougars, in their natural habitat, are necessary for a healthy ecosystem	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q13. National parks are first for animals, such as cougars, then for people	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q14. Knowing there is a healthy population of cougars in Pacific Rim National Park Reserve is important to me	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q15. Outside the park, I support the public hunting of cougars that live inside and outside park boundaries	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q16. Outside of park boundaries, I want to be able to hunt cougars	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q17. Wildlife managers should destroy cougars if they pose a threat to public safety	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q18. Wildlife managers should destroy cougars if they pose a threat to pets	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q19. Wildlife managers should destroy cougars if they pose a threat to livestock	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q20. Wildlife managers should consider non-lethal management options as a first priority	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Q21. Wildlife managers should take a "hands-off" approach – no management of any kind	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

**Please indicate if you think the following statements are true or false:**

	TRUE / FALSE / NOT SURE		
Q22. COUGARS GENERALLY HUNT ALONE	1.	2.	3.
Q23. COUGARS MOSTLY PREY ON SICK, YOUNG OR OLD ANIMALS	1.	2.	3.
Q24. HEALTHY COUGARS WILL OFTEN PREY ON PETS	1.	2.	3.
Q25. COUGARS ARE WANDERERS WITH NO HOME RANGES/TERRITORIES	1.	2.	3.
Q26. COUGARS HELP MAINTAIN HEALTHY POPULATIONS OF DEER, THEIR PRIMARY PREY	1.	2.	3.
Q27. TRAILS ARE IMPORTANT CORRIDORS FOR COUGARS TO TRAVEL IN SEARCH FOR THEIR NATURAL PREY, SUCH AS DEER	1.	2.	3.

Q28. Please list some things you can do personally to reduce the chance of being attacked by a cougar:

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Q29. Where do you live?

1. CANADA, IF YES THEN...WHAT IS YOUR POSTAL CODE?

2. UNITED STATES

3. OTHER

Thank you for taking the time to complete this survey. This information will be used to help us develop a management plan for cougars at Pacific Rim National Park Reserve of Canada.

**Research on the West Coast Trail**

*WildCoast Initiative:*

We need your input to help  
develop a cougar strategy for the  
West Coast Trail



**Please take 5 minutes and fill out a survey for us!**

Introduction slide from Visitor Services Power Point Presentation to Trail Users, West Coast Trail, August and September 2004