

(Please Note: This meeting was the culmination of a study design process that involved people from many backgrounds and disciplines. Commitments of funding and of researchers were then sought. Subsequent funding levels determined that a portion of the questions could be pursued. The availability and interests of individual researchers were determined. Much progress has been realized since 2004. There are though, many questions remaining for the consideration of future researchers.

Bob Hansen, WildCoast Coordinator, 2010)

Carnivore-Human Relationship Research Planning Meeting

Summary of Notes

University of Victoria, Sept 18-20, 2004

1.0 Background:

Over the past 5 years Pacific Rim National Park Reserve has documented a marked increase in the number of human encounters with wolves and cougars. Conflicts have occurred with one or both species in each of the three components of the park (Long Beach, Broken Group Islands, West Coast Trail). Some cougars and wolves have become less fearful of humans and have learned to forage in areas of human activity. There have been instances of wolves becoming food-conditioned as a result of direct feeding by people. The park has made considerable efforts to educate visitors and residents about the need to frighten off carnivores when encountered and of the importance of not feeding carnivores directly or indirectly. Despite the educational initiatives conflicts are still occurring.

The symptoms of this type of conflict are well understood but the underlying dynamics are not. What dynamics are at work resulting in increased interactions between people and carnivores on the West Coast of the island over the last several years. The trends in conflicts that result in destruction point to key questions. Are our parks and communities becoming significant mortality sinks for carnivores? How viable are carnivore populations if the trends continue?

The park is developing a detailed multi-year research plan to identify and better understand the underlying dynamics around this issue. Using an ecosystem-based management approach, the park is interested in exploring both carnivore ecology as well as the human dimensions of the

issue on the West Coast of Vancouver Island. The goal of developing a research plan is to systematically identify the relevant research questions, methods and possible institutions and funding sources for both the human and ecological dimensions of the issue. The plan will be used to assist Parks Canada, and possibly other land management agencies, in understanding how the elements of proposed research contributes to addressing the carnivore-human interaction issue at hand. It will also assist managers in prioritizing where scarce research resources will be allocated.

2.0 Purpose of Meeting:

This meeting brought together academics, researchers, and Parks Canada staff interested in either the human or ecological dimension of the issue. The intent was to orient the respective groups to the contributions that both the ecological and social sciences could contribute to better understanding, and ultimately, managing the issue more effectively. With this understanding each respective science would identify a science-based approach to addressing the ecological or social research requirements. A framework for integrating the social and ecological research requires was also constructed to ensure that the research proceeded as integrated science and not independent social and ecological research streams.

3.0 Specific Questions to be Examined:

- *What are the research questions?*
- *What research method(s) can be employed to address the research question?*
- *How will the resulting information from the research contribute to addressing the research question(s)?*
- *What resources will be required to conduct the research and implement a monitoring strategy?*

4.0 Participants at Meeting

Sasha Wade	University of Victoria, Psychology	swade@uvic.ca
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5.0 Summary of Discussions

5.1 Ecological Research

5.1.1 Problem statement:

Having healthy numbers of bears, wolves, cougars in the greater ecosystem of Pacific Rim National Park Reserve and low levels of serious encounters between humans and carnivores is indicative of ecological integrity. However the number and seriousness of the wolf and cougar encounters with humans *within and outside park boundaries* has increased in the past five years.

Problems:

- We can not explain the increase in carnivore-human encounters in the past 5 years; and
- We do not know what factors are required to ensure healthy populations of bear, wolves and cougar within the park ecosystem.

5.1.2 Research Questions:

- What is the distribution and abundance of wolves, cougar and bears within the greater park ecosystem?
- What influences the spatial/temporal distribution of large carnivores?
 - a) Habitat (topography, regular cover corridors)
 - b) Prey (diet)
 - c) Humans (distribution, activity and abundance)
 - d) Competition (inter/intra specific)
 - e) Scale issue –resolution of data, problem definition

f) Modeling (past, present, future)

a) What are key characteristics of wolf, cougar, bear habitat within PRNPR?

-baseline studies

b) What influences the spatial/temporal distribution of Deer?

- Habitat (topography, vegetation)
- Predator levels (distribution and abundance)
- Human activity (type)
- “Resident v. migratory” populations

c) What influences the spatial/temporal distribution of Humans?

- Seasonality – periods of no – high use
- Types of activities
- Scale of activities (inside and outside park boundaries)
- Intensity of use
- Location of use
- Location of encounters
- Visitor expectations/desires

- What roles do behavior (predator and human) play in the seriousness of “encounters”?
 - Coincidence (overlap between spatial/temporal distribution of people and predators)
 - Habituation
 - Distance
 - Human behaviors
 - Duration
 - Intensity
 - Number of previous encounters
 - Conditioning
 - Food
 - Direct vs. indirect (actively feeding vs. messy campsite)
 - Park influenced and non-park influenced (e.g. adjacent users of logging camp)
- What factors (ecological and social) would predict a negative encounter? (e.g. sub-adult v. adult; previous experience, food availability)

5.1.3 Ideas Related to Specific Research Requirements:

A) Research Project: Wolf/Prey – Erin Urtan

- Look at the diet of wolves on the inner islands as well as on the mainland.
- Trace marine inputs into diet
- Look for the percentage of terrestrial v. marine inputs.

Contributes to Research Questions (See Table 1.0):

1) What is the distribution and abundance of wolves, cougar and bears within the greater park ecosystem? A better understanding of distribution of wolves is achieved through understanding what percentages of wolf diets are coastal prey and what percent is derived from inland (internal and external to the park) sources of prey.

(e.g. only) This research is predicated on the assumption that wolves prefer marine prey to deer and other terrestrial prey sources when in coastal areas.

(e.g. only) The remaining gaps to the research question are:

- What is the distribution of cougar and bear within the greater park ecosystem?
- What is the abundance of cougar, wolf and bear within the greater park ecosystem?
- (Possibly depending on scale of research) What is the distribution of wolves outside the park boundaries but within the greater park ecosystem?

B) Research Project: Cougar – Human Interactions – Danielle Thompson

- Model cougar occurrence potential along the West Coast Trail using existing encounter data to identify habitat features that may have contributed to previous encounters eg. Rocky outcrops, distance to river drainages, vegetative cover, sightability etc.
- Monitor the spatial/temporal distribution of human use to recognize potential cougar-human convergence zones eg. Cougar travel routes/den sites and popular lunch spots/campsites
- Generate a risk assessment model to predict and/or understand cougar-human hotspots and the potential for encounters along the WCT
- Use/test non-invasive techniques to determine cougar distribution (and abundance if DNA samples are found) along WCT

Contributes to Research Questions (See Table 1.0):

Using my version of the research questions to be asked (see 5.1.2 Research Questions) my research interests would contribute to a greater understanding of the spatial and temporal overlap between cougars and humans along the WCT by recognizing key habitat features used by

cougars in areas of high human use. This project will attempt to get at baseline ecological information such as cougar distribution and abundance along the trail without the use of radio collars. By testing various non-invasive techniques, there is a potential to realize methods to detect cougar activity useful for long-term monitoring initiatives within the park. This study will help PRNPR managers to decrease the number of negative encounters occurring between cougars and humans on the WCT. It will also assist managers to understand the influence humans have on the spatial/temporal distribution of cougars.

C) Research Project: Deer Modeling – Nathan DeBruyn

- Deer modeling at a landscape scale
- Using vegetation and forest types
- See where nodes of occurrence are
- (Alton – habitat suitability model)

Contributes to Research Questions (See Table 1.0):

(yet to be completed)

D) Research Project: Wolves (Broken Group Islands and Barclay Sound) – Jennifer Wasylyk

- Similar to Danielle’s project (predictors of wolf occurrence, site descriptors etc)
- DNA – distribution/movement of wolves

Contributes to Research Questions (See Table 1.0):

(yet to be completed)

Research Questions	Erin (Wolf)	Danielle (Cougar)	Nathan (Deer)	Jennifer (Wolf)
1. What is the distribution/abundance of wolves, cougar and bears within the ecosystem?				
Distribution of wolves	X			
Distribution of cougar		X		
Distribution of bears				X
Abundance of wolves				
Abundance of cougar		possibly		
Abundance of bears				
2. What influences the spatial/temporal distribution of predator, prey and humans?				
Influences on wolf distribution				
Influences on cougar distribution		X		

Research Questions	Erin (Wolf)	Danielle (Cougar)	Nathan (Deer)	Jennifer (Wolf)
Influences on bear distribution				
Influences on deer distribution				
Influences on wolf abundance				
Influences on cougar abundance				
Influences on bear abundance				
Influences on deer abundance				
Human distribution/abundance (maybe move into social science?)		X		
Type of human activity		X		
Competition (inter/intra specific)				
Scale issue – problem definition				
Modeling (past, present, future)		X		
Influences on wolf diet				
Influences on cougar diet				
Influences on bear diet				
Influences on deer diet			X	
Influences on wolf habitat				
Influences on cougar habitat		X		
Influences on bear habitat				
Influences on deer habitat			X	
Influences on Deer:			X	
Habitat (topography, vegetation)			X	
Predator level (distribution/abundance)			X	
Human activity (type)			X	
“Resident v. migratory” populations			X	
Influences of Humans: (maybe move into social science?)				
Seasonality – periods of no – high use		X		
Types of activities		X		
Scale of activities (inside/outside park)		?		
Intensity of use		X		
Location of use		X		
Location of encounters		X		
Visitor expectations/desires				
3a . What roles do predator behavior play in the seriousness of “encounters”?				
Coincidence		X		
Habituation				
Required Distance				
Predator behaviors				
Duration				
Intensity				
3b. What roles do human behavior play in the seriousness of “encounters”? (maybe move into social science?)				
Coincidence		X		

Research Questions	Erin (Wolf)	Danielle (Cougar)	Nathan (Deer)	Jennifer (Wolf)
Desired Distance				
Human behaviors				
Duration		X		
Intensity		X		
Number of previous human encounters				
Conditioning				
Food				
Direct vs. indirect				
Park and non-park influence				
4a. What ecological factors predict a negative human-wolf encounter?				
What ecological factors predict a negative human-cougar encounter?		X		
What ecological factors predict a negative human-bear encounter?				
4b. What social factors predict a negative human-wolf encounter? (maybe move into social science?)				
What social factors predict a negative human-cougar encounter? (maybe move into social science?)				
What social factors predict a negative human-bear encounter? (maybe move into social science?)				
<p>Table 1.0 Summary of Ecosystem Research Questions and How Proposed Research Contributes to the Research Questions</p> <p>(note: there appears to be some repetition of areas to be researched in this chart- ecological people please check the chart)</p>				

5.2 Social Science Research

5.2.1 Problem Statement:

The problem (which needs to be validated) appears to be an increase in the number of human-carnivore interactions resulting in safety concerns for either humans or for carnivores within high visitor use areas of Pacific Rim National Park Reserve. Information that is required to better understand and validate the problem includes:

- Number of people, when they are in the ecosystem, where they go?
- Number of and characteristics around the negative interactions between humans and carnivores?
- The number of human-carnivore encounters that threaten the safety of humans or the safety of carnivores?

5.2.2 Research Questions:

Possible research questions, depending on how the problem statement is scoped could be:

- What factors contribute to choices by humans when they are in a wilderness setting/on holidays?
- What human actions (e.g. feeding, photos, touching) lead to habituation, and why do humans engage in these activities?
- What is the role of fear in human behavior choices, and is there a situation dependency?
- How can each species hold a healthy respect/fear for the respective species?
- What is the role of media (both Parks Canada and other external sources) in influencing the choices of humans when they a) venture into natural ecosystems; and b) when they encounter carnivores in that setting? How are carnivores co-evolving as a result of newly emerging human choices related to human-carnivore encounters?
- How has the meaning of 'wilderness' evolved within human constructs; what role does risk play in these constructs and in the choices made when a carnivore is present?
- What is the effectiveness of communications of the decision-making of humans when they encounter a carnivore?
- What percentage of visitors to Pacific Rim National Park are having encounters and does this differ from encounters in other areas of the ecosystem outside the park boundaries?

5.1.3 Ideas Related to Research Requirements:

There are three main categories of social science questions that exist related to any social science issue. These three categories are taken from *Designing Social Research - The Logic of Anticipation*. (Blaikie, 2000). There are 'what' questions that describe human behavior and behavioral antecedence; 'why' questions that describes the effect of the behavior; and 'how' questions that addresses the change that is required. In relation to the human-carnivore interaction issue, it is anticipated that there are five very broad categories of humans that would be associated with the issue(s). These groups are: residents of the ecosystem; transients (visitors) to or through the ecosystem; First Nations people residing in the ecosystem; Industry (two groups: 1. passive resource use industries such as ecotourism; and 2. resource extrication industries such as forestry operations); and land management agencies. The first three groups combined with the passive resource use industries are one distinct class of users who may interact directly (and accumulatively) with ecosystems. The resource extraction industries and land management agencies create a second class of users who have an indirect, but significant, influence on the ecosystem. See Table 2.0 for how social science research analysis and priorities would be structured for this research initiative.

The three types of social science research questions and objectives that Blaikie (2000) identifies are:

1. WHAT questions that require a descriptive answer. For example:

- what types of people are involved?
- What characteristic knowledge, beliefs, values and attitudes do they hold?
- What is their characteristic behaviour?
- What social processes have brought this behaviour about?
- What are the patterns in the relationships between these characteristics?
- What are the consequences of these activities?

2. WHY questions that asks for either causes of, or the reasons for, the existence of characteristics or regularities in a common phenomenon. These questions bring understanding and explain the relationships between events, or within social activities and social processes. For example:

- Why do people think and act this way?
- Why did these patterns come to be this way?
- Why do the characteristics or social process change, or remain stable?
- Why does this activity have these particular consequences?

3. HOW questions that are concerned with bringing about change, with practical outcomes and intervention. For example:

- How can these characteristics, social processes or patterns be changed?
- How can they be made to stop changing, or to slow down or speed up their rate of change?

Blaikie (2000) states that these three types of questions form a sequence and emphasizes that it is important to know what is going on before it can be explained; and the need to know why something behaves the way it does before people can be confident about introducing an intervention to change it. Blaikie (ibid) also identifies that some research may not proceed beyond 'what' questions.

Types of Research Questions	Direct and Cumulative Influences				Indirect and Significant Influences	
	Residents	Transients (Visitors)	First Nations	Industry Passive Use	Industry Extractive	Land Mgmt Agencies
<u>WHAT</u> questions that require a descriptive answer						

Types of Research Questions	Direct and Cumulative Influences				Indirect and Significant Influences	
	Residents	Transients (Visitors)	First Nations	Industry Passive Use	Industry Extractive	Land Mgmt Agencies
<u>WHY</u> questions that asks for either causes of, or the reasons for, the existence of characteristics or regularities in a common phenomenon	Initial focus of this research				Tertiary focus of this research	
<u>HOW</u> questions that are concerned with bringing about change, with practical outcomes and intervention	Tertiary focus of this research				Secondary focus of this research	

Table 2.0 Social Science Research Analysis and Priorities for the Carnivore-Human Interaction Research in the Greater Park Ecosystem of Pacific Rim National Park Reserve

There are both internal and external processes that influence human behavior and decision making, see Figure 1.0. There are processes that are internal to the person that influence behavior such as aptitude to conform or behavioral predisposition. There are also processes that are external to the person that influence behavior such as media, friends/family, and social norms. Internal and external can also be examined as being influencing factors internal to the park, or influencing factors that are external to the park. Factors that are internal to the park would be easier for Parks Canada to manipulate than factors external to the park, where collaboration and possibly negotiation would be required.

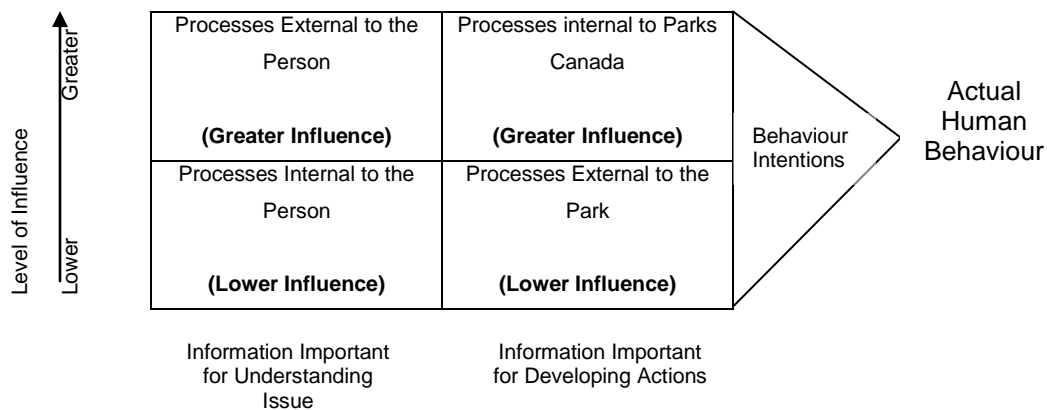
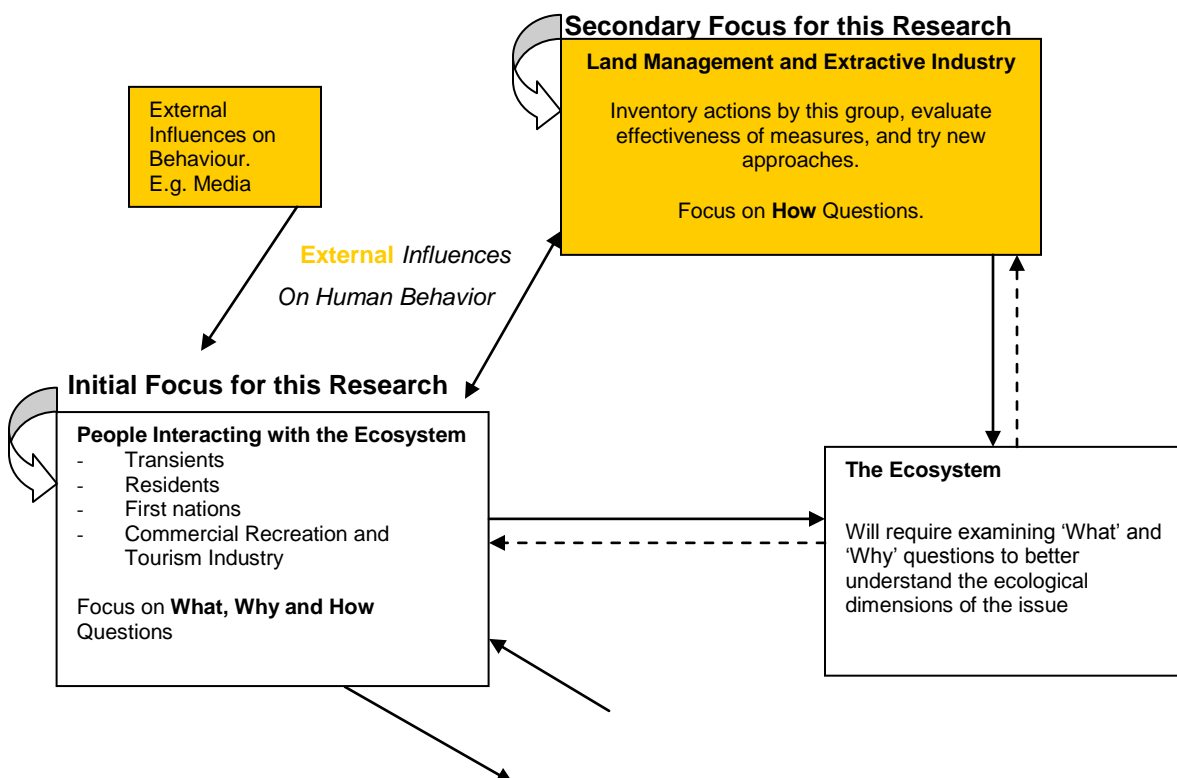


Figure 1.0 Internal and External Processes Influencing Human Behavior Associated with Human-Carnivore Interactions

Merging the concepts of internal and external processes with the concept of three main categories of social science research questions (what, why, how), three broad inter-related and co-evolving dimensions requiring research are identified. These three dimensions are: People Interacting with the Ecosystem (transients, residents, First Nations, and commercial recreation and tourism industry); Land Management and Extractive Industry; and the ecosystem itself. See Figure 2.0. Within the research requirements for this project the research on the required ecosystem elements would ideally occur simultaneously while research was initiated on the relevant elements of the social system. Within the social system research, the research would proceed by first identifying the problem and the evidence of the problem; then conducting research into the 'What and Why' questions related to people; and the begin research into the 'How' questions related to management and industry.

Figure 3.0 illustrates how the two social science research areas will proceed simultaneously with the 'people interacting with the environment' leading the research and focusing on 'what and why' types of questions. After relevant data is analyzed in this stream, the 'land management and extractive industry' research will be initiated to contribute to better understanding 'how' the issue is currently being managed and 'how' measures could be changed to produce more effective results. As data is attained on 'how' land managers or industry could modify their management approaches, and these approaches are implemented, then the 'people interacting with the ecosystem are, monitored to evaluate the effectiveness of the measures implemented. This results in an on-going adaptive management framework for the social science research.



Internal Influences
On Human Behavior

Internal Influences on Behaviour
E.g. Social Norms Modelling

Figure 2.0 Social Science Research Requirements and Priorities based on Internal and External Influencing Factors on Human Behavior.

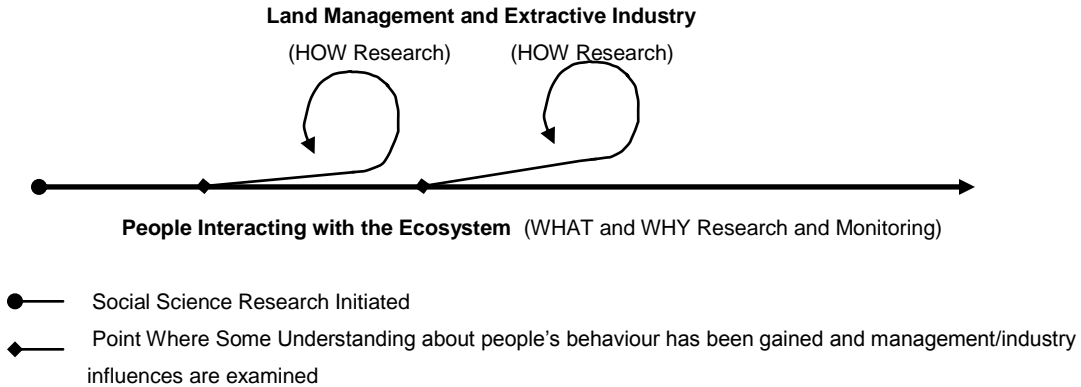
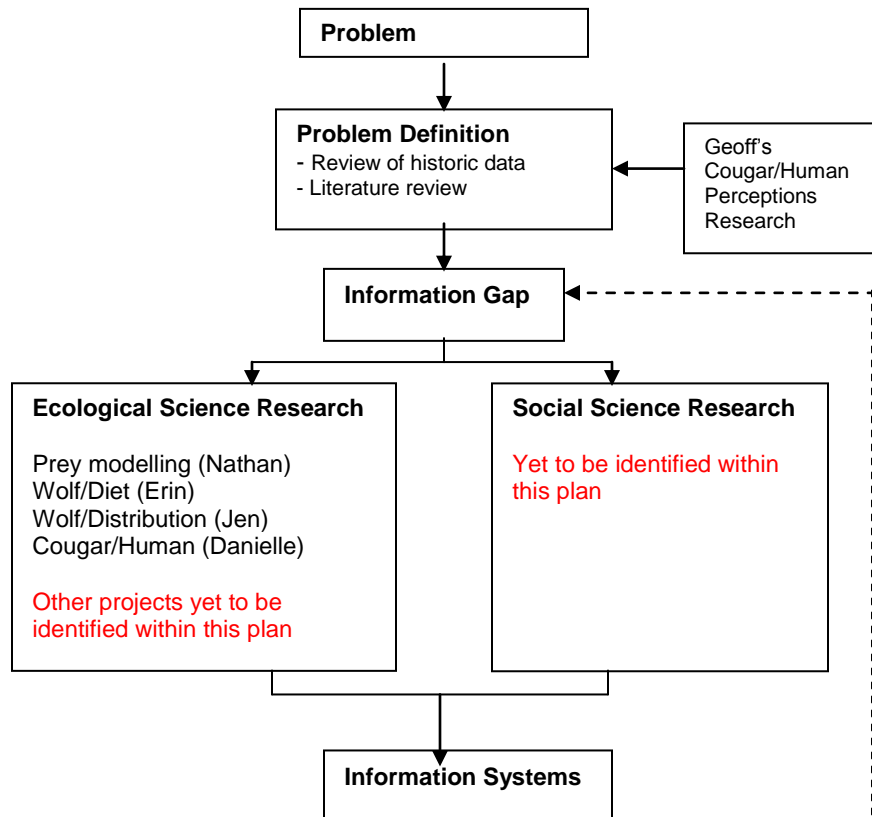
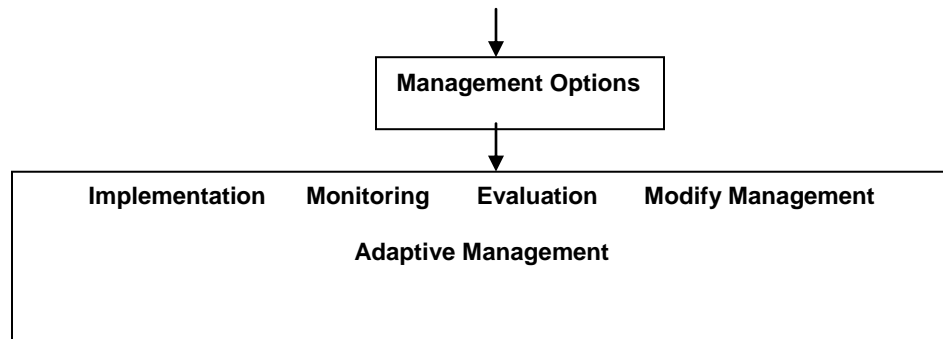


Figure 3.0 How Social Science Research Could Proceed for the Carnivore-Human Interaction Research

5.3 Integrated Model for Research





6.0 Next Steps

6.1 Ecological Research

The ecological research working group still needs to flush out the full scope of ecological research required to better understand the dynamics of the carnivores within the park and broader ecosystem. The four proposed research projects will provide some information that will contribute to better understanding the carnivore ecology of the area, however the research gaps that will remaining after the four research projects must still be documented and prioritized.

6.2 Social Science Research

For this research to proceed as an integrated social-ecological research initiative, there is an immediate need to conduct broad social analysis that would be used to create a problem definition as well as a series of research questions for the human dimension of this issue. It is recommended that this research be conducted through a contractor gathering the relevant social and some ecological data to verify and validate the existing scope of the social issue(s). A literature Review is also required in the education, psychology, sociology fields to examine what social science research has already been conducted that will contribute to the social science requirements for this project. An estimated \$10K would be required for each of these basic research elements.

There are also two conservation psychology honours students who are keen on gathering field data to complement this initiative. It would be timely and beneficial to the project for Parks Canada to invest some funds to assist these students with their research. Their research methods could be scoped around the funds available, but an initial request for \$5 K per student would be a good starting point.

Funding sources that were identified for the social science research requirements are as follows:

WHAT and WHY Questions

- SSHRC
- Parks Canada (e.g seed funds to lever other funds)
- Masters Student/Universities
- Foundations (partner with NGOs)
- Business/Other government partners

HOW Questions

- Parks Canada operational funds for on-going monitoring
- Parks Canada Innovation and Engaging Canadians Funds for research
- SSHRC
- Business/other government partners

A core social science working group was agreed upon for this on-going research. The group would be facilitated by Jennie Sparkes (Parks Canada). The following people would be part of the core social science group:

Robert Gifford	University of Victoria, Psychology
Cecile Lacombe	Optimal Environment
Wolfgang Haider	Simon Frasier University (REM)
Craig Paskin	Clayoquot Biosphere Trust
Richard Kool	Royal Roads University (Environmental Education)
Rick Rollins*	Malasapina University College
Marlow Pellatt	Western Canada Service Centre
Nadine Crookes*	Pacific Rim National Park Reserve
Eugene Thomlinson*	Western Canada Service Centre
Jennie Sparkes	Western Canada Service Centre
Pam Wright*	University of Northern British Columbia
Brian Bantheimer*	BC Parks Social Science Research

* their interest yet to be confirmed

There was agreement that the social science research should be conducted in a way that the communities surrounding the park (both First Nations and non-First Nations) can take ownership for part of the research and resulting management requirements. To do this the WHAT, WHY

and HOW questions should be developed with the communities. There will also be an on-going need through all phases of this research to liaise closely with, and correlate emerging data with the ecological research being conducted.

7.0 Resources

Blaikie, N. 2000. *Designing Social Research - The Logic of Anticipation*. Malden, MA: Blackwell Publishers Inc. [H61.B47763 2000]

Appendix 1.0

Possible 'What', 'Why' and 'How' Social Science Questions for the research Segments Identified (Residents, Visitors, First Nations, Recreation and Tourism Industries, Extractive Resource Industries and Land Managers)

A. Examples of 'What' Questions for Residents, Transients, First Nations and Recreation and Tourism Industries

(Note: there will be some variation in how these questions are framed, or what questions are asked based on which group is being researched.)

- What groups of people encounter carnivores?
- What activities are they engaged in when they encounter carnivores?
- What do these people do when they encounter carnivore and how did they know what to do?
- What perception of risk do these people have around carnivores?
- What species of carnivore are they encountering?
- What is the response of the carnivore?
- What would you do differently if you encountered a carnivore again in the future?
- What is the level of attachment that residents/transients/First Nations have to the greater park ecosystem (land)?
- What is the desired experience that resident/transients/First Nations wish to have with carnivores?
- What values exist within these groups of people related to achieving desired experiences?
- What are the demographic and socio-economic profiles of these groups of people?
- What is the level of wildlife knowledge and experiences of these people with carnivores?
- What are the barriers to making educational messages amenable to these groups of people?
- What level of risk or fear do you expose your clients to?
- What types of messages do you provide your clients?
- What tools can be developed to assist people to be more conscious of their own behavior around carnivores?

B. Examples of 'What' Questions for Land Managers and Resource Extractive Industries

- What human activities are anticipated to emerge that may affect/impact carnivores?
- What are the values of the managers and of the companies related to working collaboratively, the environment and related to the attachment to land/ecosystem?

- What do agencies perceive as their role in influencing the public-industry's behavior, and in influencing the stewarding/well-being of the ecosystem?
- What are the economic realities of agencies and industries within the ecosystem?
- What is the current and foreseeable product demand?
- What is the reputation of the industry?
- What new technologies are available to advance industry?
- What laws govern over industry and agencies within this ecosystem?
- What is the perceived economic impact of this initiative?
- What is the agency's or industry's experience with ecosystem based management?
- What is the political structure governing over the ecosystem?
- What are the political priorities of the existing political structures?
- What pressures are communities placing on agencies/industries?
- What pressures are non-government organizations placing on agencies/industry?
- What conflicting mandates of governance agencies exist within the landscape?

C. Examples of 'Why' Questions for Residents, Transients, First Nations and Recreation and Tourism Industries

- Why are specific market segments aligning their behavior around specific media or marketing efforts?
- Why is education/communications around carnivores not being effective?
- Why is education/communications around carnivores being effective?
- Why are specific cultures and subcultures, and their associated lifestyles, more susceptible to interacting poorly with carnivores?
- Why is objective and perceived risk associated with carnivore-human interactions not aligned?
- Why do laws and rights not motivate people to act prudently around carnivores?
- Why do the perspectives of other people hold such a strong influence over people's behavior?
- Why does weather and time of year (not) play a role in the frequency of human-carnivore interactions?
- Why does the monetary investment visitor make to visit an area have an influence on choices people make?
- Why do some people choose to use carnivore deterrent devices such as Mace, and other not?
- Why do some visitors /ecosystem users choose not to properly prepare and equip themselves when they venture into an ecosystem?

D. Examples of 'Why' Questions for Land Managers and Resource Extractive Industries

- Why would other land managers or extractive industries want to partner with Parks Canada?
- Why is the well being of wildlife important to your industry?
- Why is reputation (not) important to the agency or industry?
- Why are the laws governing within an ecosystem not being reflected in practices?
- Why are laws not being changed?
- Why are laws not being enforced?

E. Examples of 'How' Questions for Residents, Transients, First Nations and Recreation and Tourism Industries

- How can perceived and objective risk within people be better aligned?
- How can Parks Canada encourage people to make their goals more congruent with those of Parks Canada?
- How can ecosystem managers increase personal commitment to personal and carnivore safety as well as gathering knowledge about carnivores?
- How can ecosystem managers 'reach' the sub-cultures that are on the 'tail' or outskirts of behavior that are considered social norms for interacting with wildlife?
- How can law enforcement be used more effectively to address this issue?
- How can having a stronger agency presence within these areas model appropriate/desired behavior?
- How can a Behavior Conformity Strategy that leads into a Compliance Strategy be developed?
- How can ecosystem management agencies develop tools that will assist people in being more conscious of their behavior around carnivores?
- How can a communication strategy that identifies the types of messages, the target audiences be developed?

F. Examples of 'How' Questions for Land Managers and Resource Extractive Industries

- How committed is the agency/industry to Corporate Social Responsibility?
- How can industry be encouraged to more strongly steward ecosystem?
- How can government encourage industry to take an interest in carnivores and their habitat?

