

# Visitor and New Zealand Fur Seal Interactions Along the Kaikoura Coast

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## Kaikoura Case Study

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*Te Whare Wānaka O Aoraki*



# **Visitor and New Zealand Fur Seal Interactions Along the Kaikoura Coast**

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## Summary

Kaikoura is a major visitor destination for people who want to experience a close encounter with marine mammals. In addition, the Kaikoura area offers a range of places where visitors can observe wildlife independent of commercial tours, especially fur seal viewing. No study, however, has looked at the effect of this tourism on fur seals in the region.

This study aims to determine behavioural changes in fur seals in response to the activities of visitors and to determine visitors' behaviour towards seals and the factors influencing this behaviour. The biological aspect of the study examines the relationship between visitor numbers and seal behaviour and determines disturbance thresholds, knowledge that is essential for future management of seal/visitor interactions. The social science aspect of the study examines the visitors' behaviour towards seals, factors affecting this behaviour, visitors' perceptions of their impacts upon seals and aspects of their satisfaction with their seal experience.

A range of methods was used to address the different objectives of the study. Observations were undertaken of the seals, visitors and their interactions; experimental design was instigated to test seal responses to a range of levels of human interference, and interviews and questionnaires were used to elicit responses from visitors about their seal encounter and related factors.

This study was carried out at three sites; Ohau Point, Kaikoura Peninsula and Barney's Rock, chosen to reflect a range of visitor density, site regimentation and anticipated seal sensitivity. All sites include both breeding rookeries and non-breeding (haul out) sites.

Fur seal behaviour is influenced by sex. In this study it was found that their responses to human approach were also influenced by their sex. Adult females responded rapidly - once an adult female became aware of an approacher they responded by flight - in all cases they rapidly entered the sea. Juveniles (pups, year one and two age classes) also exhibited this behaviour although in the case of the pups they sought safety in rock crevices. In all cases the response of an adult female to an approacher and the presence of the approacher had a major effect - "the domino effect" - on neighbouring females and juveniles, triggering awareness and escape responses.

For adult males and sub-adult males there was a significant difference between when the animal first noticed an approacher and when they responded ( $t = 8.878$ ,  $df = 29$ ,  $p < 0.01$ ). Fifty-three per cent (16/30) of bulls reacted to the approacher with a threat response, forty-four per cent moved away from the approacher (one to five metres from their original resting spot) and, in contrast to the adult females, only one bull (three per cent) entered the sea.

Fur seals hauled out on the Kaikoura Peninsula were exposed to many interactions with visitors and in 60 per cent (68/113) of the events observed fur seals actively responded, i.e., their behaviour was modified. On average fur seals spent 16.7 per cent of their time while hauled out responding to visitors ( $5.0 \pm 1.9$  minutes out of a 30-minute sampling period; range = 0 - 23; n = 113). The cost to individual fur seals subjected to frequent visitor interactions may be high. Visitor activity by modifying the behaviour of a fur seal is decreasing the amount of time the animal spends resting and, linked to this, decreasing the time spent passively thermoregulating (basking). The magnitude of the response can range from a minor change in behaviour with no long term effects, to a major change in behaviour that is energetically expensive and could potentially lead to decreased vigour. Even in the fur seal/visitor interactions where the fur seal made no obvious behavioural response the event may have triggered a physiological response.

The distance between visitors and a fur seal was not correlated to the type of seal response although threat behaviour was not exhibited unless the visitors were within five metres. There was no correlation between visitor group size and distance to the fur seal for any of the fur seal responses.

Visitor disturbance at the non-breeding (haul out) sites, where the majority of animals are adult males and sub-adult males, appear to be very localised affecting only the animal/s on which the visitor is focused and lasting only the duration of the visitor visit. At breeding rookeries, where the majority of animals are adult females and juveniles, visitor activity causes wide spread disturbance that lasts well after the visitor visit ends.

Most visitors passively viewed seals. The study sites differed in the nature of the fur seal/visitor interaction owing to differences in site configuration and the nature of the visitors' visit. Ohau Point is a short stop 'impromptu' visit site, while a greater proportion of visitors to the Kaikoura Peninsula go there specifically to view seals.

Visitors' behaviour towards fur seals cannot be differentiated by socio-economic characteristics – no one type of person is more likely to harm a seal than another. Therefore any visitor control measures, such as education, must address visitors generally. Most visitors felt they (individually and as a group) did not affect the seals. As some visitors clearly were affecting seals in a negative manner, visitors' perceptions of their impact are misjudged. Similarly, it appeared that visitors did not perceive any danger from the seals, however each year some visitors are harmed by seals' reactions to visitor behaviour.

Most people are satisfied with their seal experience. An important component in this satisfaction was seeing seals in their natural habitat. Connected to this, was the visitors' interest in keeping the seal viewing sites natural and undeveloped. Most visitors did not read the on-site interpretation signs – and thus did not read the recommendation to remain five metres from seals. Despite this, many visitors wish for more information about seals.

Fur seals are protected under the Marine Mammals Protection Act 1978. Visitors are not supposed to approach a fur seal closer than five metres and harassing a fur seal is against the law. It was clear from the observations carried out during this study that these guidelines on appropriate behaviour around fur seals are inadequate and during this study many incidents of inappropriate behaviour (throwing stones, poking fur seal with a stick etc.) around fur seals were observed. Even visitors abiding by the guidelines and observing a fur seal from five metres will have normally triggered a response from the fur seal and the interaction is therefore modifying the fur seal's behaviour. From the data collected on fur seal/visitor interactions a minimum approach distance of 20 metres is a more appropriate distance and this is recommended as a new distance guideline.

More information about fur seals and their behaviour would enhance the visitors' visit and improve understanding about appropriate behaviour near fur seals. The nature and format of this information requires investigation.



# Chapter 1

## Introduction

### 1.1 Background

Kaikoura is a major visitor destination for people who want to experience a close encounter with marine mammals. Sperm whales (*Physeter catodon*), pilot whales (*Globicephala melaena*), orca (*Orinus orca*), common dolphins (*Delphinus delphis*), dusky dolphin (*Lagenorhynchus obscurus*), and New Zealand fur seals (*Arctocephalus forsteri*) frequent the waters off the Kaikoura coastline. They are sustained by a rich marine ecosystem. A wildlife viewing industry has grown up around these mammals, including whale watching, swimming with dolphins and swimming with seals. An underwater cage for swimming among sharks is currently being mooted. In addition, the Kaikoura area offers a range of places where visitors can observe wildlife independent of commercial tours, especially seal viewing.

New Zealand fur seals are the only marine mammals that are regularly found ashore on the Kaikoura coastline. Fur seals are diurnal, feeding at sea during the night and resting on land, at favoured sites known as “haul outs”, during the day. This period ashore is important for body maintenance allowing time for rest and recovery, basking, and moulting. Time ashore is also important for social interaction and breeding. Fur seals come ashore at “breeding rookeries” to mate, give birth, and nurse their young (Taylor et al., 1995). Haul outs and breeding rookeries are situated at separate but nearby sites.

Fur seals can be found ashore on the Kaikoura coastline throughout the year, although the numbers are highly variable over time. The numbers ashore are lowest during spring and summer (October-February) and are concentrated at breeding rookeries at this time. During autumn and winter there is an influx of fur seals at haul outs, which is probably due to an increased food supply because concentrations of fur seals occur where there are large, seasonally predictable concentrations of prey species (Best, in prep.).

The breeding and haul outs along the Kaikoura coastline are easily accessible and therefore visitors can visit these sites independently. The behaviour of visitors at these sites is therefore generally self-governing and guidance on appropriate behaviour around fur seals is limited to information displays or the visitor’s own knowledge. Guidelines are posted that suggest people should not approach seals closer than five metres.

Currently the only commercial tours with fur seals as the focus are guided “swim with seals”. Three operators are licensed to run “swim with seals” but another operator has bought out one operator so there are only two operators currently running tours. Two other operators, who operate whale watching and dolphin swimming tours, also take visitors by boat to view one of the breeding rookeries (M. Morrissey, DOC Manager, 1997, pers. comm.).

## 1.2 The Research Problem

Fur seals are a protected species found only in New Zealand, its Sub Antarctic Islands and the south coast of Australia. The Marine Mammals Protection Act 1978 provides for the protection, management and conservation of the New Zealand fur seal. Deliberate interference with a fur seal can entail prosecution under the Act. The Department of Conservation administers the Act. While seal population levels in the region appear healthy, the Department of Conservation is concerned that visitors are detrimentally affecting individual seals and that people are risking their own safety by inappropriate actions and closeness to seals (M. Morrissey, DOC Manager, 1997, pers. comm.).

Studies have been or are currently being carried out to examine the effect of tourism on marine mammals in the Kaikoura region (Slooten and Dawson – whales; Barr – dolphins) but no study has looked at the effect of tourism on fur seals in the region. The interaction between visitors and fur seals has the added dimension that the behaviour of visitors is largely self-governing and as fur seals are part of both the marine and terrestrial ecosystems tourism has the potential to affect fur seals in both environments.

Recent growth in the field known as the ‘human dimensions of wildlife management’ (see for elaboration the journal *Human Dimensions of Wildlife*) indicates the increasing recognition of the role of social science in informing wildlife management. Most previous studies have taken either a biological science or a social science approach to the study of wildlife. A small number of recent studies are trying to bridge the gap between disciplines (see for example Kazmierow, 1996). This study attempts to integrate both biological and socio-psychological aspects of the visitor/fur seal encounter. It does this by addressing the visitor experience (with seals) as well as examining the effects of visitors upon the seals.

The study of the visitor experience is multi-faceted. A wide range of factors may play a part in the motivations to visit seals, the physical nature of the visitor/seal encounter and the visitor’s satisfaction with the encounter. Many different factors related to the visitor themselves, the site, the seals and the wider visitor’s trip, may influence these things.

Studies examining visitors’ experiences with wildlife viewing to date have only started to provide an understanding of these factors and the nature of the experience for the visitor (see for example, Higham, 1994; Davis et al., 1997; Orams, 1997). A study in progress, however, offers useful insight to factors contributing to a satisfying experience with marine mammals. Moulin (forthcoming) suggests that women are more likely than men to be satisfied with their wildlife experience; that visitors value the opportunity to see marine mammals in their natural habitat and that the ‘intensity’ of the experience contribute to satisfaction. The intensity is positively related to the number of animals present, the degrees of the animals’ activity, the length of time visitors spend with the animals and their proximity to them.

### **1.3 Study Aims and Objectives**

This study aims to determine behavioural changes in fur seals in response to the activities of visitors and to determine visitors' behaviour towards seals and the factors influencing this behaviour. The research evaluates the fur seal/human encounter. The biological aspect of the study examines the relationship between visitor numbers and seal behaviour and determines disturbance thresholds, knowledge that is essential for future management of seal/visitor interactions. The social science aspect of the study examines the visitors' behaviour towards seals, factors affecting this behaviour, visitors' perceptions of their impacts upon seals and aspects of their satisfaction with their seal experience.

More specifically, the study objectives are:

- To determine the types of interactions (visitor actions, seal responses)
- To identify the factors that influence visitors' behaviour to seals
- To identify the factors that influence seal responses
- To identify behavioural changes in seals and potential long term impacts
- To examine visitors' perceptions of their impact on seals
- To examine visitors' satisfaction with their seal encounter.



# Chapter 2

## Study Area and Methods

### 2.1 Study Area

This study was carried out at three sites chosen to reflect a range of visitor density, site regimentation and anticipated seal sensitivity. All sites include both breeding and haul outs. The survey sites are: Ohau Point, Kaikoura Peninsula and Barney's Rock (see Figure 1).

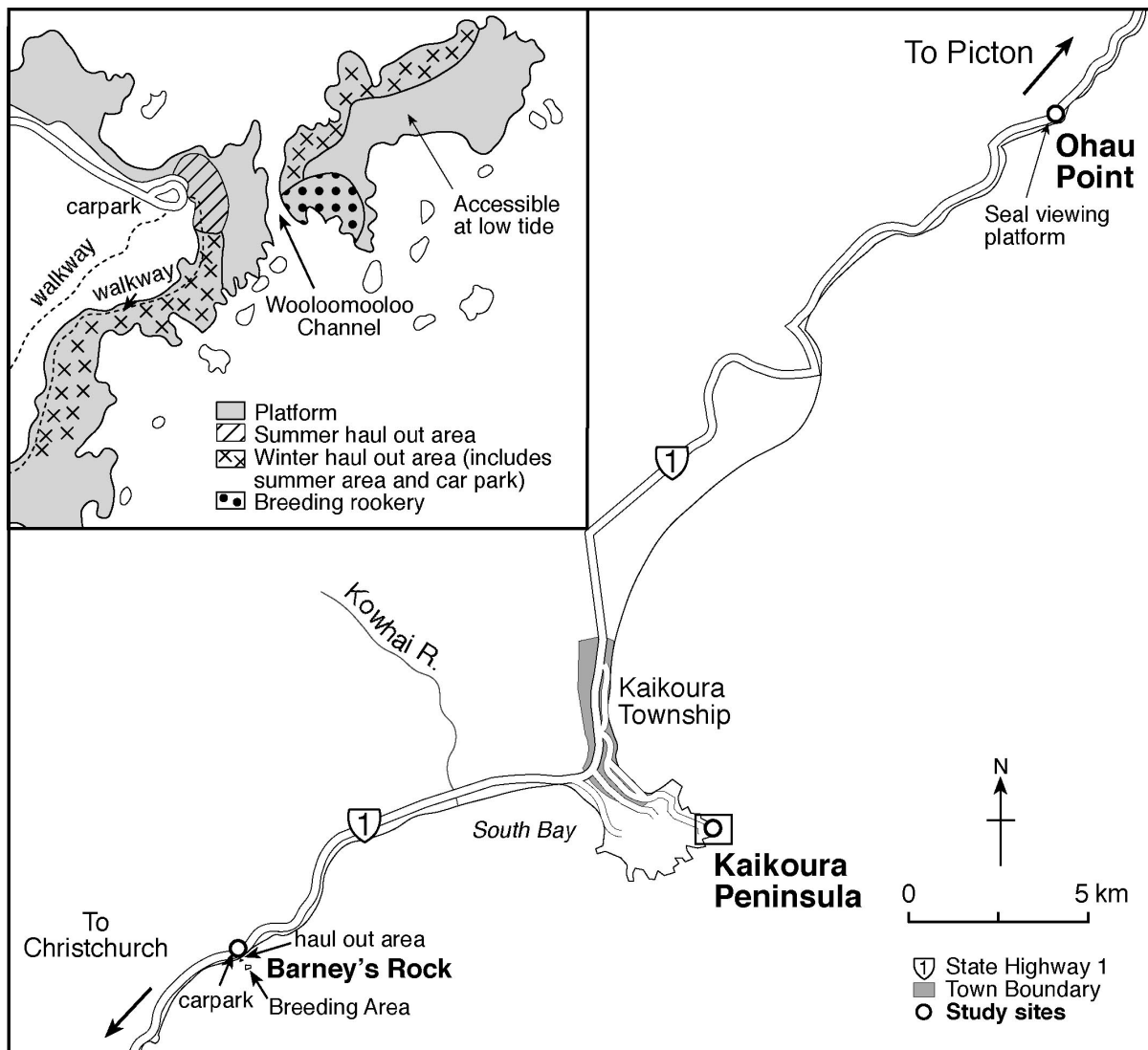


Figure 1  
Map of Study Area

### 2.1.1 Ohau Point



**Figure 2**  
**Photograph of Ohau Point**

The Ohau Point site, alongside State Highway 1 (SH1) 26 kilometres north of Kaikoura, has a special purpose viewing platform and parking bay built by the Department of Conservation (DOC) in conjunction with Transit New Zealand to allow people to safely stop there to view fur seals. The platform overlooks the non-breeding colony rather than the breeding rookery - a deliberate ploy by DOC to concentrate visitor activity at the haul out - where the majority of animals are large males, and are thought to be more resilient to disturbance than females and young animals, and thereby leave the breeding rookery disturbance free (M. Morrissey, DOC Manager, 1997, pers. comm.).

A fence runs along the edge of the roadside and around the edge of the platform to stop people climbing down the bank to the beach. DOC has placed signs on the fence asking people to view fur seals from the platform and not to go beyond that point. Included is a separate sign that reads “Please do not proceed past this point. Disturbing seals is an offence under the Marine Mammal Protection Act”. Three distinct tracks down to the beach, two running from the platform and one from the road, clearly indicate that some people ignore the fence and signs.

The Ohau Point colony (rookeries and haul out areas) used by fur seals covers approximately 500 m of coastline separated from SH1 by a steep grass slope. The breeding area which covers the northern half of the area consists of large stacked boulder beach, some large slab rocks and tidal pools. Ohau Point is the most significant breeding rookery in the region with  $113 \pm 5.4$  pups born there in 1997/98 (C. Bradshaw, 1998, pers. comm.). The southern half of the area is used as a haul out and consists of large rock stacks some connected to the beach and others just offshore. During summer 30-50 fur seals regularly haul out here and over winter over 300 fur seals use the haul out.

The area is signposted along the road by the AA (“Ohau Point Lookout 400 m”) and on site by DOC (“Ohau Point Seal Colony”). There is one interpretative sign within the platform area explaining aspects of the seals’ lifecycle and habitat.

### 2.1.2 Kaikoura Peninsula



Figure 3  
Photograph of Kaikoura Peninsula

The Kaikoura Peninsula is just south of the Kaikoura township. The colony occupies a large intertidal platform at the foot of the headland with many offshore rocks and reefs. The area is a popular visitor destination with a high number of visitors (approximately 4,000 visitors over a seven-day period in January 1996: source DOC). The site is widely promoted as a good place to view seals. A road runs from the township to the Peninsula and terminates in a landscaped car park. Parking spaces accommodate forty cars and two tour buses. A small rock wall separates the car park from the platform. Visitors can walk on this platform easily during low and medium tides. Basic visitor facilities are provided on site by the Department of Conservation including interpretative signs providing information on the area including the fauna and flora. The Peninsula Walkway departs from the car park.

Fur seals breed on Lynch Reef with a minimum of six pups born there in 1997/98 (C. Bradshaw, 1998, pers. comm.). Lynch Reef is separated from the platform by a channel approximately 20m wide at low tide. It is possible to wade across the channel at low tide and DOC has bolted a sign to rock on the reef asking people not to go beyond the sign into the fur seal mother/pup area. The reef consists of a series of jagged rock outcrops with some shallow cavities and tidal pools. Fur seals haul out on the platform, reefs, offshore rocks and the grassed area by the car park (non-breeding area). The offshore rocks, some of the reefs and the grassed area are the only areas suitable as resting places (haul outs) at high tide as most, if not all, the platform is under water. During summer only five to eight animals regularly haul out on the platform (the area easily accessible to visitors). This number increases to over 50 animals hauled out on the platform, the grassed area and even the wall by the car park during the rest of the year.

One of the “swim with seals” operations is based at the Kaikoura Peninsula. The swimmers walk across the platform and enter the water via the channel between the platform and Lynch Reef. The swimmers spend an hour with the fur seals, mainly females and juveniles, that are loafing in the water adjacent to the rookery.

### 2.1.3 Barney's Rock



**Figure 4**  
Photograph of Barney's Rock

Barney's Rock is on SH1 approximately ten kilometres south of Kaikoura. It is an informal pullover area with minimal management controls on site.

Fur seals breed on a small island - Barney's Rock - 200 m offshore and the haul out is on the adjacent mainland beach just 5 m from SH1. In 1997/98 a minimum of 11 pups were born at Barney's Rock (C. Bradshaw, 1998, pers. comm.). During summer only five to ten animals regularly haul out on the beach increasing to over

eighty animals during the rest of the year. The closeness of the haul out to the main road is a potential traffic hazard.

"People would see a seal up on a rock and would virtually stop where they were, right on the corner, or they would swerve straight across the traffic and then pull up on the other side. The other problem was when the sea was rough the seals were coming up and lying right on the side of the road or on the road and that was the section where we had most of the seals run over".

(M. Morrissey, DOC Manager, 1997, pers. comm.)

To reduce the chances of an accident, DOC, with the aid of Transit New Zealand, installed a small barrier fence along the edge of SH1, which reduces the visibility of the haul out from the road and prevents fur seals occupying the road. Access to the beach is via a path from the rest area just to the south of the beach or down the slight grass slope between SH1 and the beach. DOC has erected signs at both these access points requesting people not to go beyond the signs. Clear tracks run past the signs indicate that some people ignore these signs and enter the haul out.

Three tour operators run boat trips out to Barney's Rock to view fur seals. For two of these operators this is an additional attraction as their main focus is sperm whale and common dolphin encounters respectively. The third operator runs "swim with seals" trips out to Barney's Rock. During summer up to six tour boats (three operators twice a day) can be operating around Barney's Rock. The trips which view fur seals involve circumnavigating the island and are of a short time duration.

## **2.2 Formal Observations Methods**

A range of methods was used to address the different objectives of the study. Observations were undertaken of the seals, visitors and their interactions; experimental design was instigated to test seal responses to a range of levels of human interference, and interviews and questionnaires were used to elicit responses from visitors about their seal encounter and related factors.

Observational data on visitor activities and fur seal behaviour were collected during two sampling periods: 17-29 November 1997 and 4-17 February 1998. Sampling occurred throughout the day at Ohau Point and Barney's Rock, but because of the tidal nature of the Kaikoura Peninsula data on visitor numbers and activities were collected three hours either side of low tide. Data collection outside this period would not have included any visitor activities that focused on fur seals.

### **2.2.1 Index of Visitor Numbers and Activities at Each of the Study Sites**

At each site data were collected on arrival time, departure time, number in the group and activities of visitors. At Ohau Point the maximum number of visitors present on the observation platform was recorded for five minute time intervals for a 240 minutes observation period (start time: 10:00, finish time: 14:00). At Kaikoura Peninsula, where visitors could be involved in activities that did not involve fur seals, five minute instantaneous scan sampling i.e., one scan of the area every five minutes (Altman, 1974) was used for a 300 minute observation period (start time: 09:30, finish time: 14:30) to establish visitor numbers and activities pertaining to fur seals.

Activities that focused on fur seals were grouped into three classes:

- Interacting with fur seals on the platform - an interaction occurred when a visitor was within 20 m or less of a fur seal and was focused on the animal i.e., watching, photographing, talking, gesturing to or touching the animal;
- Watching fur seals across channel - visitors stood or sat on the bay-flat side of the channel and watched fur seals on Lynch Reef; and
- Entering breeding area - visitors crossed the channel, ignored the DOC sign and walked into the breeding area on Lynch Reef

### **2.2.2 Fur Seal Behaviour**

Fur seals observed for focal animal data collection were randomly selected from a group of animals that was the closest and most readily visible to the observer (Altman, 1974). This sampling regime was used to ensure that all behaviour could be observed, for logistic reasons. Some animals may be partially hidden from view behind rocks or on offshore rocks etc., and to ensure that the behaviour of the observed fur seal was not influenced by the response of other fur seals to the observer. Meteorological observations (temperature, cloud cover, and wind-direction and speed) and sea condition (tide, swell-direction and height) was recorded at the start of each sample period. Age, sex and state (wet, dry, semi-dry) were recorded for each animal observed.

## “Normal” Fur Seal Behaviour

At each site individual fur seals were observed for 30 minutes using the focal animal technique. Fur seal behaviour was recorded using the ethogram below (see Table 1).

**Table 1**  
**Ethogram**  
**Criteria Used to Define Fur Seal Behaviour (modified from Stirling, 1970) recorded during focal animal observations (after Kovacs and Innes, 1990)**

Fur Seal Behaviour	Criteria
Resting includes passive thermoregulation	<ul style="list-style-type: none"> <li>• Lying down with eyes closed</li> </ul>
Grooming	<ul style="list-style-type: none"> <li>• Using nails on the middle three digits of the hind flippers, teeth and foreflippers to groom coat</li> <li>• Scratching back/head against rocks</li> </ul>
Comfort	<ul style="list-style-type: none"> <li>• Weight shifting – repositioning body/head</li> <li>• Stretching</li> </ul>
Thermoregulation (active)	<ul style="list-style-type: none"> <li>• Spreading flat (hot) or curling up (cold)</li> <li>• Waving fore and/or hind flippers</li> </ul>
Sensory State of general awareness	<ul style="list-style-type: none"> <li>• Using hearing, site and smell to investigate the environment</li> </ul>
Mobile	<ul style="list-style-type: none"> <li>• Supporting body on fore and hind flippers and walking or running</li> </ul>
Interaction with another fur seal	<ul style="list-style-type: none"> <li>• Responding to behaviour, vocalisation, movement of another fur seal</li> </ul>
Interaction with other	<ul style="list-style-type: none"> <li>• Responding to a physical or auditory stimulus (e.g., train whistle, wave splash )</li> </ul>

## Fur Seal Behaviour During Controlled Approach By Researcher

- **Bulls and SAMs (sub-adult males)**

Fur seal behaviour was observed during the approach of one person. Fur seals were eligible for this treatment if they had not been disturbed by visitors for at least 30 minutes prior to the start of treatment and were resting (see Table 1). The same person was used for all the approaches to standardise the speed of approach and reduce possible confounding variables such as size, sex, and smell of approacher.

- **Cows**

As cows and juveniles have a very strong “flight” response, observations on cow response to approach by a researcher were carried out at Ohau Point during a pup tagging operation rather than subjecting the animals in the rookery to too much disturbance. Fur seal behaviour was observed during the approach of one person. Fur seals were eligible for this treatment as long as they were resting (see Table 1) and showed no response to the activity of the pup taggers working further along the beach. The leading tagger was observed for all the approaches to ensure that the cows had not already been exposed to disturbance.

Also recorded was the time taken by cows to return to their original haul-out spots after responding to the approacher and the distance of the approacher when reoccupation occurred. As none of the cows was individually marked it was not possible to record times for individual animals so the rookery was divided into 13 blocks, the boundaries marked by distinct rocks, and reoccupation time and distance to the approacher recorded.

### **Fur Seal Behaviour in Response to the Presence of Visitors**

Fur seal/visitor interactions were observed at Kaikoura Peninsula. Visitor behaviour (number in the group and activities), distance between fur seal and visitor group, and fur seal responses (Table 1) were recorded.

## **2.3 Informal Observations and Interviews with Visitors**

A two-phase approach to the social science aspect of this study was undertaken. Phase one utilised qualitative methods to explore the visitor/seal interactions and the visitor experience. Personal observation and in depth interviews were undertaken from August until December 1997 at the Kaikoura Peninsula, in addition to the formal observation regime discussed in Section 2.2. The Kaikoura Peninsula allows unobtrusive observation of visitors and seals from one of several lookout points on the adjacent hillside. The closeness of the seals to visitors facilitates a wide range of visitor/seal interactions.

The purpose of this qualitative phase was, first, to identify parameters of the visitors' interactions with the seals (such as length of stay, activities around the seal) and, second, to ascertain the factors which influenced visitor behaviour at each site. In addition, the role of each site in the visitor's trip and their perception of management of the site was explored.

People who had been observed interacting with the seals were interviewed. Care was taken to select people who had interacted in a range of ways (from touching the seals to keeping well back while viewing seals). Those who had no apparent interaction (e.g., sat in the car and read a book) were not interviewed.

Consideration was given to in depth interviews off-site for this study. It became apparent that the short stop nature of many visitors precluded this option.

## 2.4 On-Site Visitor Questionnaire Survey

The qualitative research informed the next phase of the 'visitor study', an on-site questionnaire survey. The purpose of this survey was to measure the factors influencing visitors' behaviour with respect to the seals. Questions were therefore designed to measure responses about factors identified in the qualitative phase.

Surveys were conducted at the Kaikoura Peninsula and Ohau Point in January and February 1998. A total of 111 questionnaires were collected from Ohau Point, 135 from the Peninsula, giving a total of 246 questionnaires. An error margin of plus or minus 6.2 per cent is associated with all results from the survey. Further details about the sample design are presented in Appendix 1. A copy of the questionnaire is presented in Appendix 2. Relationships within the survey data were tested using the Chi-Square non-parametric test.

The third study site, Barney's Rock, was not used as a survey site owing to a failure to find sufficient visitors at this site. During the forty hours of observation undertaken at Barney's Rock, only nine visitor groups were observed.

The questionnaire included a section asking visitors to report their interaction with seals. Given the potential for visitors to misreport their interaction (whether intentionally or not), the interviewer also kept a record of the interaction they observed (immediately prior to interview). In only one case was a difference recorded between the reported and observed interaction - a young boy reported no reaction from a seal, however the interviewer observed the seal hissing at him and then moving away.

During the qualitative phase from August until October, seals were close to the Peninsula car park area in large numbers. This facilitated a wide range of visitor/seal interactions. From November, with the start of the breeding season, the number of seals close to the car park dropped dramatically; often there was no seals on the landward side of the channel separating the mainland from the breeding rookery. The peak period of visitor use of the area occurs during the summer months (DOC statistics). The period of peak visitor visits, therefore, does not coincide with the period of peak seal haul outs on the bay-flat.

The withdrawal of the seals from the Peninsula car park area after November had the effect of reducing the range of visitor/seal interactions at this site. Most people did not have the opportunity for a close encounter with the seals during the survey period for this reason.

# Chapter 3

## Results

### 3.1 Introduction

This chapter starts with visitor numbers and activities at the three sites to set the scene. This is followed by the observations of fur seal behaviour in the absence of people, in the presence of the researcher and in the presence of visitors. Visitor behaviour is then recorded followed by their perception of their effects on seals and their satisfaction with the experience. The final section discusses perceptions of site management.

### 3.2 Visitor Numbers and Activities

The most common visitor activities around the seals were passive viewing (62 per cent) and taking photographs (21 per cent or 26 per cent if videos are included). Other activities observed included swimming with seals and talking to the seals. Occasionally people tried to touch a seal. People were observed poking seals with a stick, throwing stones at a seal and shouting at seals.

Results from the individual sites are presented below.

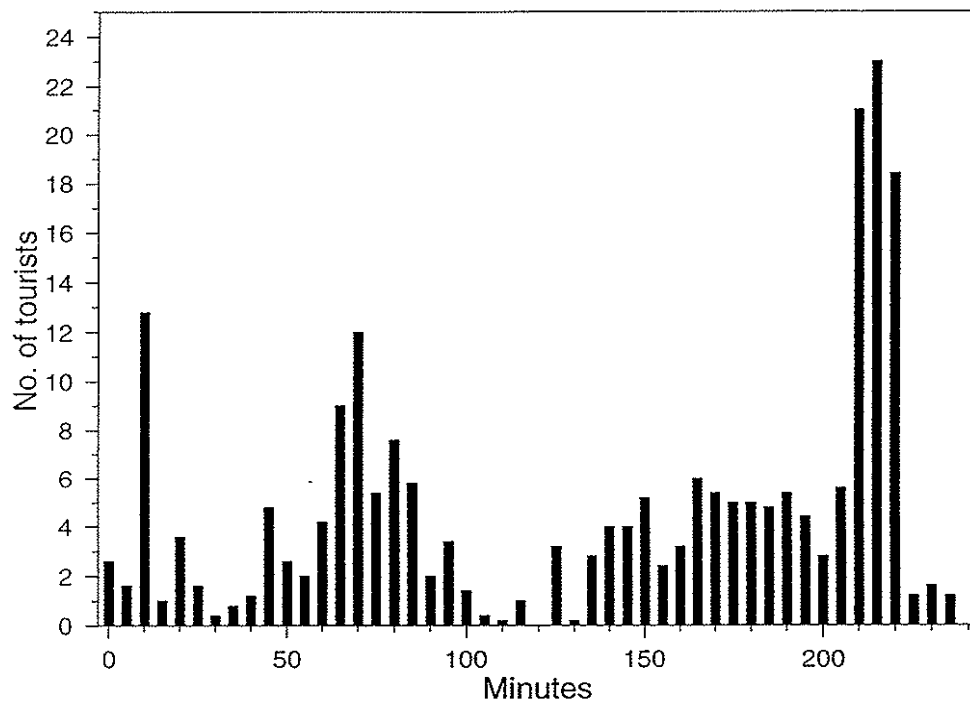
#### 3.2.1 Ohau Point

People that stopped at Ohau Point were generally in transit, travelling to or from Kaikoura. Their visit appears to be an impromptu stop (72 per cent of survey respondents at Ohau Point were “passing through”).

The mean length of time spent at the Ohau Point site was  $5.9 \pm 0.5$  minutes (range = 1 - 25 minutes;  $n = 74$ ). The mode group size was two (mean =  $2.1 \pm 0.2$ ; range = 1 - 16). Most people stopping at Ohau Point went down to the platform to watch and photograph fur seals and 47 per cent read the interpretative display. A few people did not go down to the viewing platform and viewed the fur seals from the road.

The data on visitor numbers to Ohau Point were collected over a number of days and at varying times in the day. It appears that there are visitors at Ohau Point for most of the day during summer although the numbers present at any time is highly variable. During the questionnaire survey period, at most times (seventy-nine per cent of the survey time), ten people or fewer were stopped at Ohau Point.

Results of the five-minute block count of visitors are presented in Figure 5. The highest number of visitors was recorded over a 15-minute period when two buses stopped at Ohau Point, one after the other. During the observation period, five people ignored the DOC signs, climbed the fence and walked down to the beach and approached to within two to ten metres of fur seals.



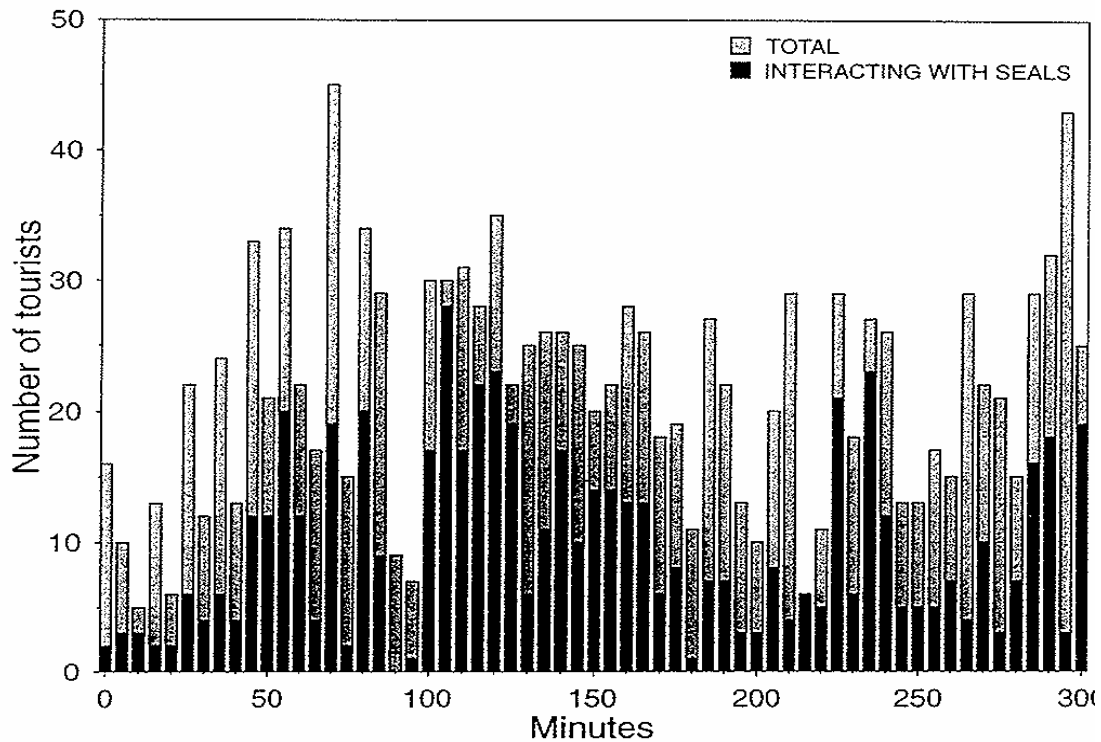
**Figure 5**  
**Five-Minute Block Count of Visitors Over 240 Minutes at Ohau Point**

### 3.2.2 Kaikoura Peninsula

The Kaikoura Peninsula, in contrast to Ohau Point, attracts more people who visit specifically to see seals. Many visitors to Ohau Point were stopping in transit and did not stop specifically to view seals. More of the visitors visiting the Peninsula stayed in Kaikoura overnight (compared with the visitors at Ohau Point).

The mean length of time spent at Kaikoura Peninsula was  $30.0 \pm 2.5$  minutes ( $n = 107$ ). The minimum visit recorded was 0 minute (people who drove into the car park but did not stop) and the maximum visit was 117 minutes. The mode group size was 2. The mean group size was  $2.1 \pm 0.2$  with a minimum group size of one and a maximum of thirteen. Only 19 per cent of visitors read any or all of the interpretative displays that include recommended behaviour when approaching seals.

The number of visitors present at the Peninsula during the 5-minute scan sampling was variable (range = 5 - 45), as was the percentage of visitors involved in an activity focused on fur seals (mean = 45 per cent  $\pm$  2.9; range = 0 per cent - 93 per cent) (Figure 6).



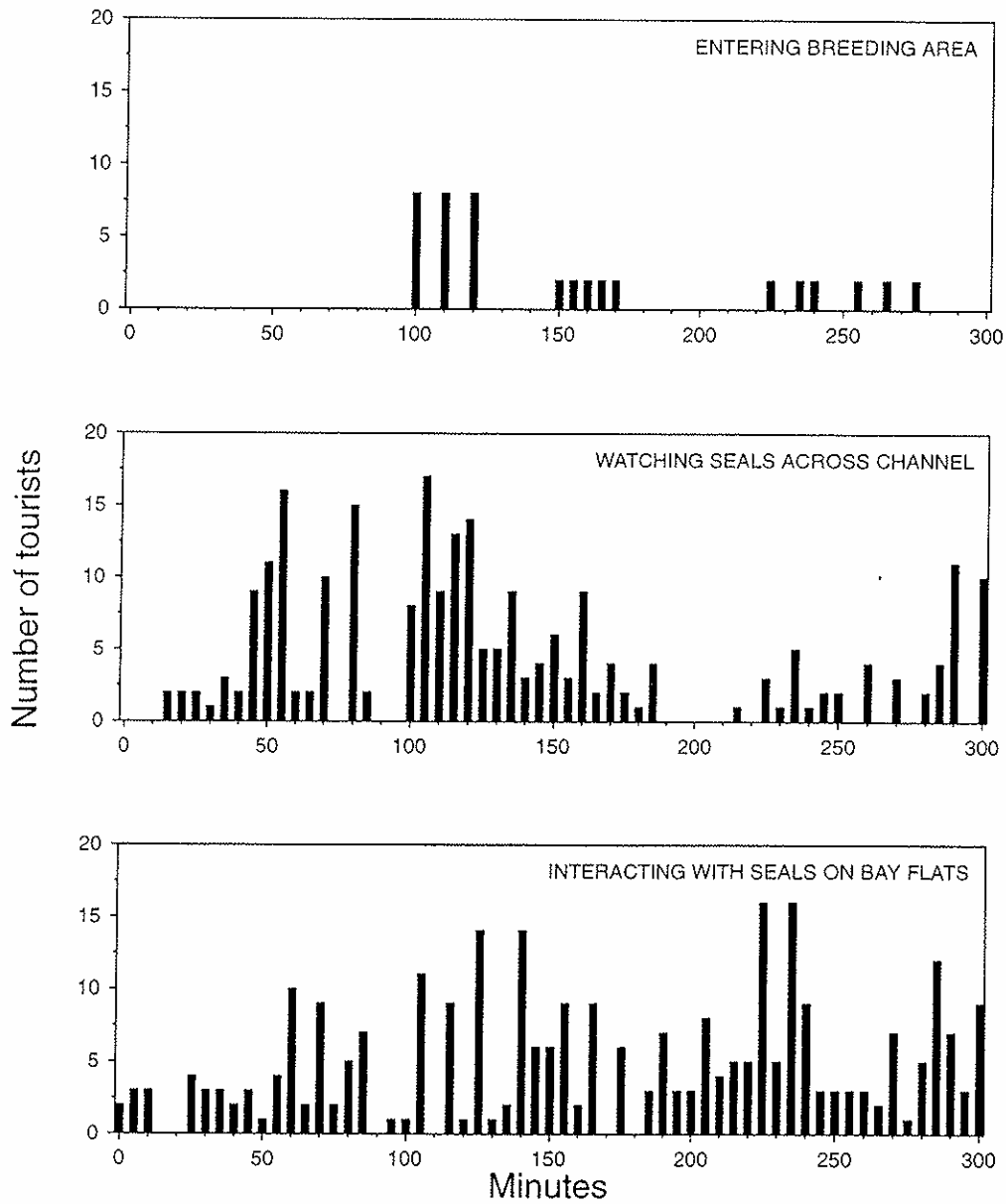
**Figure 6**  
**Five-Minute Scan Count Of Visitors Over 300 Minutes**  
**Including Those Interacting with Seals At Kaikoura Peninsula**

Activities that focused on fur seals were grouped into three classes:

- Visitors were interacting with fur seals on the bay-flat in 90 per cent (270/300 minutes) of the scans;
- Visitors were watching fur seals across the channel in 62.5 per cent of the scans; and
- Visitors were across the channel beyond the DOC sign in the breeding rookery in 23 per cent of the scans (Figure 7).

The number of visitors involved in the activities was variable. On average more people were involved in interacting with fur seals on the bay-flat (mean = 4.9  $\pm$  0.5; range = 0 - 16) followed by watching fur seals across the channel (mean = 4.0  $\pm$  0.6; range = 0 - 17). Visitors numbers entering the breeding area were lower (mean = 0.8  $\pm$  0.2; range 0 - 8) (Figure 7) and consisted of seven groups of two people and one group of eight people.

Doing the questionnaire survey period, it was uncommon to see fewer than ten people at the Peninsula. During 45 per cent of the time spent surveying at the Peninsula, 30 people or more were present and during 65 per cent of the time 20 people or more were present.



**Figure 7**  
**Activities Of Visitors Focussed On Seals Over 300 Minutes At Kaikoura Peninsula**

### **3.2.3 Barney's Rock**

Out of forty hours observation time at Barney's Rock, only nine groups of people stopped to view fur seals. People stopping at Barney's Rock were in transit, travelling to or from Kaikoura. The mean length of time spent at Barney's Rock was  $6.8 \pm 2.0$  minutes (range = 1 - 18). The mode group size was two (mean =  $8.8 \pm 4.2$ ; range = 2 - 32). Although only a small number of people stop at Barney's Rock, the incidence of visitors ignoring the DOC signs and entering the haul-out area is high. From our limited observations this occurred in three out of the nine visits observed. Two of the groups, 12 and 32 people respectively, that entered the haul-out were travelling by bus. Of the group of thirty-two people ten went within two metres, six within three metres and ten within five metres of the fur seals.

### **3.2.4 Summary**

As anticipated, each site provides a different type of visitor/seal interaction. Ohau Point attracts short stop travellers, many of whom are passing through. The visit length is generally short. Less than half of the visitors read the interpretative information on-site. Kaikoura Peninsula attracts a higher percentage of people who visit in order to view seals. The average visit length is considerably longer than at Ohau Point, but the mix of visitor activities undertaken is correspondingly greater. Only 19 per cent read any of the interpretative signs. Barney's Rock attracts few visitors. Those who do stop stay on average a short time. Most people view the seals in a passive manner, but more direct and intrusive interactions also occur.

## **3.3 Fur Seal Behaviour**

This section has been divided into "normal" fur seal behaviour, seal behaviour in the presence of the researcher and in the presence of visitors.

### **3.3.1 "Normal" Fur Seal Behaviour**

Data on bull behaviour were collected from the haul outs at Ohau Point and Barney's Rock. The fur seals were never isolated from visitors long enough for "normal" behaviour to be recorded at Kaikoura Peninsula. There was no difference in the time spent by bulls on any of the behaviours at the two sites and the results were pooled. Data were collected on cow behaviour from Ohau Point breeding rookery only (cows were observed from SH1). Data collection at other sites would have involved entering the breeding rookery and this would have caused disturbance and affected the cows' behaviour.

The fur seals observed spent most of their time ashore resting. Results of the 30-minute observations ( $n = 50$ ) are listed in Table 2. The responses recorded during the 30-minute behavioural observations in the category "interactions with other" were all responses to noise: a truck driving past, a plane flying overhead, loud music, and a car backfiring.

No correlation was found between environmental variables and fur seal behaviour, although grooming time was positively correlated to state i.e., wet fur seals spent significantly more time grooming than dry fur seals ( $F = 4.62$ ;  $df = 2.22$ ;  $p < 0.05$ ).

**Table 2**  
**Pooled Ohau Point and Barney’s Rock Results of Time (Minutes and Per Cent of Time)**  
**Spent Per Behaviour**

<b>Behaviour</b>	<b>Time Spent Engaged In Behaviour (30 Min Sampling Period)</b>	
	<b>Bull Mean ± S.E. (%) (n = 25)</b>	<b>Cow Mean ± S.E. (%) (n = 25)</b>
Resting	20.7 ± 1.3 (67)	11.6 ± 1.4 (38.7)
Grooming	2.7 ± 1.1 (9.0)	1.6 ± 0.5 (5.3)
Comfort	2.6 ± 0.4 (8.7)	3.9 ± 0.6 (13.0)
Thermoregulation	1.5 ± 0.4 (5.0)	1.6 ± 0.4 (5.3)
Sensory	1.1 ± 0.4 (3.7)	4.1 ± 0.4 (13.7)
Mobile	0.3 ± 0.1 (1.0)	2.7 ± 0.3 (9.0)
Interaction with another fur seal/s	0.7 ± 0.3 (2.3)	3.5 ± 0.6 (11.7)
Interaction with other	0.4 ± 0.2 (1.3)	0.9 ± 1.5 (3)

Bulls spend significantly more time resting ( $t = 7.556$ ;  $df = 24$ ;  $p < 0.001$ ) than cows and significantly less time interacting with other fur seals ( $t = -5.601$ ;  $df = 24$ ;  $p < 0.001$ ) and on sensory ( $t = -8.026$ ;  $df = 24$ ;  $p < 0.001$ ), and mobile ( $t = -11.859$ ;  $df = 24$ ;  $p < 0.001$ ) behaviours.

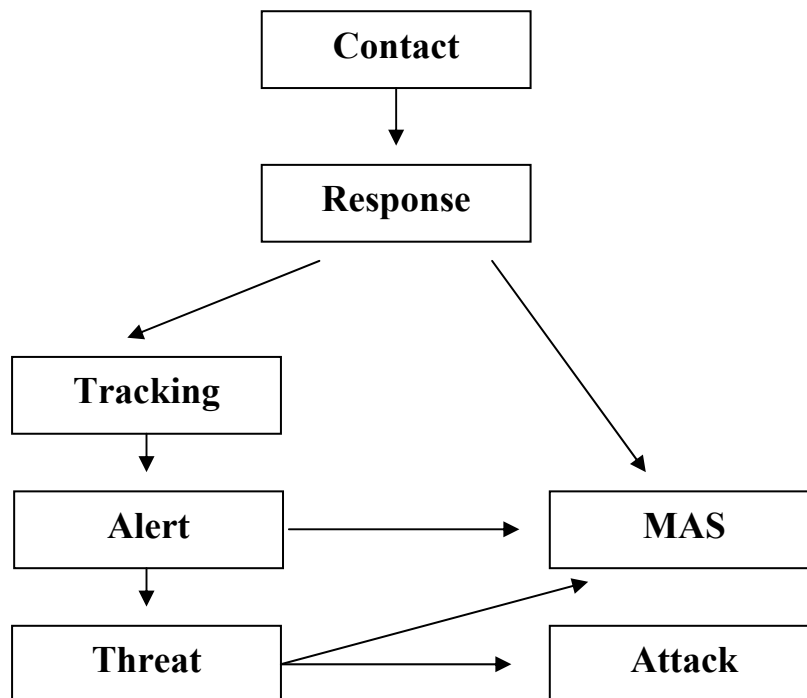
### **3.3.2 Fur Seal Behaviour During Controlled Approach by Researcher**

It was not possible to carry out experimental approaches at Kaikoura Peninsula as no fur seals met the criterion of being undisturbed by visitors for at least 30 minutes prior to the start of treatment.

As in other areas, fur seal responses to the experimental approaches fitted into six response classifications (Table 3) although no approach was continued past the point of serious threat to elicit an attack response. The order in which the responses occur and the way that they are linked is illustrated in Figure 8.

**Table 3**  
**Response Classifications and Identifying Behaviours for Fur Seals**

<b>Response</b>	<b>Identifying Behaviour</b>
Contact Response	Fur seal is aware of approacher - Eyes open
Tracking Response	Fur seal tracks approacher - Tracks approacher with eyes - Tracks approacher with head
Alert Response	Fur seal prepared to take action - Sitting alert or semi-alert - Continues to track approacher
Threat Response	Fur seal defends territory – ritual - Threat posture (alert, full neck display) - Vocalisation - Open mouthed threat - Mock lunge
Attack Response	Fur seal defends territory – physical - Attack
MAS Response (moving away from stimulus)	Fur seal escape response - orientates body towards sea - moves away from approacher
Flight	Fur seal escapes into the sea



**Figure 8**  
**Patterns Of Response to Experimental Approach**

Bulls and cows showed a significant difference in response distance between the approacher and the fur seal at point of contact, and point of final response, i.e., flight, MAS or threat response (Table 4).

**Table 4**  
**Pooled Results of Contact and Response for Bulls (N = 30) and Cows (N = 35)**

<b>Sex</b>	<b>Contact Mean ± S.E. (metres)</b>	<b>Response Mean ± S.E. (metres)</b>
Bulls	7.8 ± 0.8	3.7 ± 0.8
Cows	18.3 ± 1.4	17.0 ± 1.5

There was no significant difference between Contact Distance and Response Distance in cows i.e., once cows became aware of an approacher they responded by flight - in all cases they rapidly entered the sea. However there was a significant difference between Contact Distance and Response Distance in bulls ( $t = 8.878$ ,  $df = 29$ ,  $p < 0.01$ ). Fifty-three per cent (16/30) of bulls reacted to the approacher with a threat response, forty-four per cent displayed a MAS and, in contrast to the cows, only one bull (three per cent) entered the sea. The animals which displayed a MAS repositioned themselves one to five metres from their original resting spot.

Usually the response of a bull to an experimental approach and the presence of the approacher had no or little detectable effect on the surrounding animals. In all the cases where the bull gave a threat response, neighbouring bulls showed no response however, where the bull responded by MAS its subsequent behaviour impacted on a neighbouring animal. The bulls relocated to what appeared to be another favoured rock, based on the staining on the rock which indicated that it was frequently used by fur seals, and displaced a smaller animal.

In all cases the response of a cow to the experimental approach and the presence of the approacher had a major effect - “the domino effect” - on neighbouring cows, triggering alert, MAS and flight responses. The cow could trigger this response by physically touching another cow in her “flight” to the sea, by her vocalisation, or by her rapid movement. The number of cows (domino\_n) affected by the domino effect and distance to (domino\_d) the triggering cow is given in Table 5.

**Table 5**  
**The Domino Effect - Number of Cows (domino\_n) and Distance to (domino\_d) the Triggering Cow**

	<b>Mean ± S.E.</b>
Domino_n	9.5 ± 1.7 (range 1 - 30)
Domino_d (metres)	7.7 ± 2.0 (range 1 - 40)

The time between cow “flight” in each block and reoccupation of the block (reoccupation\_t) and the distance between the approacher and the block at the time of reoccupation (reoccupation\_d) is shown in Table 6. There was no significant correlation between reoccupation\_t and reoccupation\_d.

**Table 6**  
**Reoccupation Time**

	<b>Mean ± S.E.</b>
Reoccupation_t (minutes)	17.7 ± 6.3 (range 3 - 90)
Reoccupation_d (metres)	38.0 ± 5.3 (range 20 - 60)

### 3.3.3 Fur seal behaviour in response to the presence of visitors

At Kaikoura Peninsula 113 visitor/fur seal interactions were observed and data recorded on:

- Number on visitors (visitor\_n),
- Distance from the fur seal (visitor\_d),
- Fur seal response (see Table 3).

The results are presented in Table 7. Three new response classifications had to be added to the response repertoire. These responses were only observed in fur seal/visitor interactions and had not been observed during controlled approach by researcher (see Section 3.3.2):

- No response - interaction elicited no response from the fur seal although visitors\_d was within the range where other responses had been observed;
- Unknown response - the fur seal displayed a behaviour but the relationship between the behaviour and visitor activity was unclear; and
- Distress - the fur seal sat alert moving its head in circles trying to track all the visitors and appeared stressed.

Data on when the fur seal first responded to the visitor/s (contact response) was not collected as initial response behaviour can be very subtle and easily missed when there are several people around a fur seal. All the fur seals involved in the observed events were adult males. One event was recorded where a fur seal responded to a group of visitors’ 30 metres away and this event was included in the analysis.

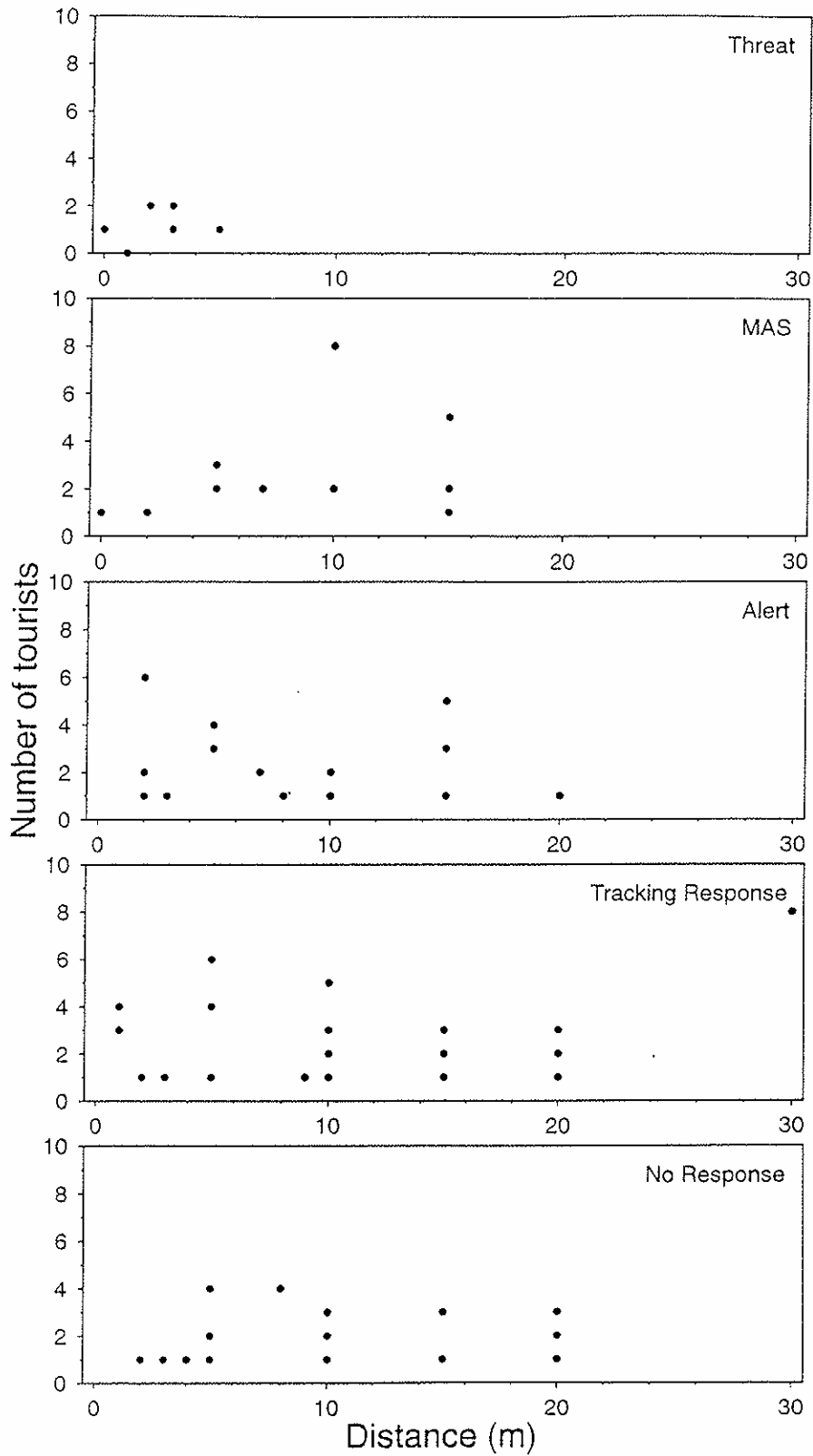
**Table 7**  
**Fur Seal Responses to Visitor/Fur Seal Events at Kaikoura Peninsula**

<b>Response</b>	<b>n</b>	<b>Visitor_n Mean ± S.E. (range)</b>	<b>Visitor_d (m) Mean ± S.E. (range)</b>
No Response	39	1.7 ± 0.2 (1 - 4)	9.6 ± 0.8 (2 - 20)
Unknown Response	6	1.2 ± 0.2 (1 - 2)	9.5 ± 2.8 (3 - 20)
Tracking	31	2.2 ± 0.3 (1 - 8)	10.5 ± 1.1 (1 - 30)
Alert	19	2.1 ± 0.3 (1 - 6)	9.3 ± 1.3 (2 - 20)
MAS	10	2.7 ± 0.7 (1 - 8)	8.4 ± 1.7 (0 - 15)
Threat	6	1.2 ± 0.3 (1 - 2)	2.3 ± 0.7 (0 - 5)
Distress	2	14 ± 4.0 (10 - 18)	5.0 ± 0.0 (5 - 5)

The responses in Table 7 are listed by degree of visitor impact on fur seal behaviour, based on the potential energetic cost to the fur seal of making the response and follow the pattern of responses illustrated in Figure 8. In the response classes of ‘tracking’, ‘alert’ and ‘MAS’, the mean distance between the fur seal and visitor/s is greater than five metres i.e., the current guideline for minimum approach distance to a fur seal and the responses have been triggered by visitor activity up to 30 metres away (Figure 9). For the response class ‘distress’, the mean distance between the fur seal and visitors was at the current guideline distance (5m) and the ‘threat’ response occurred when visitors were closer to the fur seal than the recommended guideline (Figure 9). All response distances recorded during these observations represent the terminal response (the last response in a sequence of responses) exhibited by the fur seal during the fur seal/visitor interaction and animals that had responded by MAS, threat or distress had already exhibited tracking and alert responses.

For each response the effect of group size on visitor distance was investigated, as it was hypothesised that a large group of people would trigger a fur seal response at a greater distance than a small group of people, however there was no significant correlation between number of visitors and distance from the fur seal for any of the response classes.

Fur seals hauled out on the bay-flat were exposed to many interactions and in 60 per cent (68/113) of the events observed fur seals actively responded, i.e., their behaviour was modified. On average fur seals spent 16.7 per cent of their time while hauled out responding to visitors (5.0 ± 1.9 minutes out of a 30-minute sampling period; range = 0 - 23; n = 113).



**Figure 9**  
**Responses of Seals to Interactions with Visitors and Distance**  
**from Fur Seal at Kaikoura Peninsula**

Visitor behaviour around fur seals (all sites) judged to be inappropriate by the research is given in Table 8. The category ‘risk factor’ is a judgement of the risk taken by the visitor in behaving this way near a fur seal. About a third of all instances of people moving closer than five metres were children, posed by parents for photographs.

**Table 8**  
**Inappropriate Visitor Behaviour Around Fur Seals**

<b>Inappropriate Behaviour</b>	<b>Number of Time Behaviour Observed</b>	<b>Risk Factor</b>
Go closer than five metres	17	Medium – High
Shout at a fur seal	2	Low
Threw an object at a fur seal	6	Low
Poke a fur seal with a stick	3	High
Touch a fur seal	2	High
Stood on fur seal’s flipper	1	High
Feed a fur seal	1	High

### **3.4 Visitor Behaviour, Attitudes and Perceptions**

This section presents the results from the social science component of the study. The visitors surveyed are described first, followed by a description of the nature of visitors’ interactions with seals at Ohau Point and Kaikoura Peninsula. The influence of various parameters on the nature of these interactions is then discussed, followed by the visitors’ perceptions of their affect on the seals and their satisfaction with their seal experience and the sites.

Visitors’ behaviour is influenced by a range of factors that have been identified and examined within this study. The primary factors are now discussed (order does not indicate priority).

These results originate from the on-site questionnaire survey. Two limitations of the survey should be recognised:

- Two people went over the barrier into the seal colony at Ohau Point while the surveyor was present. The researcher was unable to interview these people as they subsequently avoided the interviewer.
- At the Peninsula most people were recorded at a distance of over ten metres from the seals – this result was influenced by the location of the seals across the channel during much of the research period. Twenty-one per cent of respondents at the Peninsula moved to within two metres of a seal. These cases occurred when individual seals appeared close to the car park (on the landward side of the channel). From observations undertaken during the survey period every hour, seals were on the bay-flat (the landward side of the channel) during 39 per cent of the time surveying.

The effect of these study limitations is to decrease the array of visitor/seal interactions and skew the interactions toward those likely to be less harmful to the seals.

### 3.4.1 Profile Characteristics of the Visitors and their Visit

A detailed profile of the personal characteristics of survey respondents (all sites) is provided in Appendix 3. In summary, the respondents were:

- 56 per cent international visitors and 44 per cent New Zealanders
- 57 per cent female, 43 per cent male
- Predominantly young (52 per cent between 20-39 years)
- 64 per cent staying overnight in Kaikoura
- 36 per cent members of a verified conservation organisation.
- Visiting in small groups (91 per cent were in groups of fewer than 5)
- Visiting with their partner/spouse or family (62 per cent).

At the Kaikoura Peninsula forty-two per cent of visitors moved closer than ten metres to a seal: twenty-two per cent within two metres, thirteen per cent within two to five metres, and seven per cent within five to ten metres. The nature of the site with barriers and a platform at Ohau Point controls the distance of visitors to seals (except for a small number of people who jump the barrier).

Visitors' interactions with seals were not influenced by visitors' socio-economic and demographic characteristics (i.e., age, gender, nationality, whether a member of a conservation organisation). No significant difference was evident in these characteristics in terms of:

- How close the visitor moved to the nearest seal
- Their activity near seals
- The type of seal encounter they desired.

Similarly, parameters associated with the nature of the visit to the study site (i.e., size of group, type of visit group) did not show a significant difference when analysed by:

- How close the visitor moved to the nearest seal
- Their activity near seals
- The type of seal encounter they desired.

At both sites most people visited for seal related reasons (rather than reasons such as the Peninsula walkway or general sightseeing). However, the Kaikoura Peninsula attracted significantly more people who were visiting to see seals than Ohau Point (Pearson's  $\chi^2 = 15.79578$ ,  $df = 1$ ,  $p = 0.00007$ ). Many people stopping at Ohau Point did not realise it was a seal colony but rather expected a scenic lookout (the road sign indicates 'lookout'). This suggests that Kaikoura Peninsula is a destination site for seal viewing, more so than Ohau Point, which is primarily a transit stop for travellers.

The type of people visiting the two sites is very similar. However, Ohau Point shows a more even distribution of age ranges in its visitor population, while the Peninsula site visitor population is skewed to younger visitors. Visitors at the Peninsula are more likely to be

staying overnight in Kaikoura than visitors to Ohau Point (Pearson's  $\chi^2 = 42.16575$ ,  $df = 1$ ,  $p = 0$ ). More people visiting the Kaikoura Peninsula (compared with Ohau Point) had already seen seals around the Kaikoura coastline (Pearson's  $\chi^2 = 5.72592$ ,  $df = 1$ ,  $p = 0.01672$ ).

### **3.4.2 Number of Visitors at the Site**

The number of people at the site did not influence the distance people kept from seals.

The majority of respondents did not consider the sites to be crowded - 65 per cent did not think Ohau Point was at all crowded, 58 per cent did not think the Peninsula was at all crowded. A mean crowding score of 2.0 was recorded for Ohau Point and a mean score of 2.2 for the Peninsula (where 1 is not at all crowded and 9 is extremely crowded (after Shelby and Heberlein, 1986)). People's perception of crowding shows a positive relationship to actual numbers of people on site, in that as numbers of people increased, the perception of crowding increased.

Most people felt that the other visitors at the site during their visit did not affect their enjoyment of the seals. Five per cent of respondents at the Kaikoura Peninsula and three per cent at Ohau Point felt that other people did affect their enjoyment. There was no significant difference between the two sites. This factor was not related to the number of people at the site.

### **3.4.3 Perception of Safety**

The survey asked people how safe they felt around the seals. This question was not asked at Ohau Point where people stand behind a high barrier. At Ohau Point, in general conversation, visitors said they felt safe – a reflection of the nature of the site with its platform and barriers.

At the Kaikoura Peninsula, the majority of respondents reported feeling very safe (77 per cent) or safe (19 per cent). Only two respondents (two per cent) reported feeling unsafe – both people were within two metres of a seal (both were young adults, one male, one female, a New Zealander and a German).

The visitor's perception of safety did not have any relationship to:

- Their activity near seals
- The type of seal encounter they desired (except that both of the people who said they felt unsafe near the seals wanted to touch a seal).

With respect to their closeness to the seals, people who were within ten metres of seals were more likely to say they felt safe rather than very safe compared with people who were over ten metres from the seals (Pearson's  $\chi^2 = 29.25$ ,  $df = 1$ ,  $p = 0$ ).

### **3.4.4 Perception of and Previous Experience with Seals**

Respondents were asked to suggest words to describe what they thought of seals. Most people used positive words (75 per cent). When asked to describe seals they used terms such as lovely, beautiful, friendly, funny, graceful, interesting, and cute. Negative words were suggested by 11 per cent and included terms such as aggressive, fat, blob-like, ugly, useless.

Fourteen per cent of respondents commented in a neutral way about the seals, using words such as big, sleepy, natural. These responses were used as an indicator of the respondent's perception of seals and analysed against other variables.

Respondents were not differentiated by their perception of seals on the basis of any socio-economic or demographic characteristics. Perception of seals did not influence the visitor's interaction with seals, i.e.,

- How close the visitor moved to the nearest seal
- Their activity near seals
- The type of seal encounter they desired.

Only five people surveyed (two per cent) had never seen a seal before. Most people had previously seen seals in natural settings (85 per cent had seen seals in natural settings, while 55 per cent had seen seals in a zoo or an aquarium).

Just over half of respondents (56 per cent) had seen seals around Kaikoura prior to visiting the site at which they were interviewed (63 per cent for the Peninsula site and 48 per cent for Ohau Point). Most people could not identify exactly where they had seen seals. Ohau Point, the Peninsula and the Whale Watch tour were frequently mentioned as sites where seals had been observed. Whether people had seen seals prior to their visit to the site at which they were surveyed did not influence how close people went to the seals.

#### **3.4.5 Visitors' Perception of their Effects on Seals**

When asked whether their individual presence affected the seals, most people thought not (87 per cent). Those visitors who felt they did have an effect (13 per cent), most commonly thought the effects were habituation (both sites), that the seal was aware or wary of them or they commented that their visit may "possibly" affect the seals. A statistically significantly higher proportion of visitors felt their presence affected the seals at the Peninsula than at Ohau Point (eighteen per cent of visitors to the Peninsula compared with six per cent of visitors to Ohau Point) (Pearson's  $\chi^2 = 7.2783$ ,  $df = 1$ ,  $p = 0.00698$ ).

Insight into how a person considered they affected seals was also evident from questioning respondents about their personal interaction with seals. First they were asked about their actions towards the seals and then about the seals' reactions. Many respondents thought the seal "did nothing" in relation to their actions (42 per cent).

Similarly, most visitors thought the presence of visitors (generally) at the site did not affect the seals (64 per cent). Of those that felt visitors did affect the animals (35 per cent), most comments were negative. The most common responses were that people got too close to the seals (twenty-seven per cent), that people jumped the barriers (at Ohau Point) (seventeen per cent), that there were too many people (nine per cent) and that the seals appeared habituated to visitors (nine per cent). Twelve per cent said that people did affect the seals but the effect was all right if people were well behaved. A positive relationship is apparent between number of people on site and visitors' perceptions of whether other people were affecting the seals (i.e., as the number of visitors on site increased, the perception of effect increased).

### 3.4.6 Visitor Satisfaction

Most visitors were very satisfied or satisfied with their visit (65 per cent and 27 per cent respectively). Only two people (one per cent) were dissatisfied. Focusing on visitors who indicated satisfaction, statistically significant differences are evident by site (Pearson's  $\chi^2 = 15.02917$ ,  $df = 1$ ,  $p = 0.00011$ ), proximity to seals (Pearson's  $\chi^2 = 6.65718$ ,  $df = s$ ,  $p = 0.03584$ ) and whether the visitor was a member of a conservation organisation (Pearson's  $\chi^2 = 7.59425$ ,  $df = 1$ ,  $p = 0.00586$ ). Visitors to Ohau Point were more likely to be very satisfied with their visit than people visiting the Peninsula, people who got closer to the seals were more likely to be very satisfied than people who did not and members of conservation organisations were more likely to be very satisfied than people who were not members.

At the Kaikoura Peninsula people were questioned about how their seal encounter could be enhanced. Twenty-eight per cent said they were happy with the experience they had and did not want any change. Those who did desire a different experience mainly wanted to get closer to the seals (35 per cent of responses). Touching a seal was desired by 11 per cent of respondents. Other responses related to the seal being more active (thirteen per cent), showing more interest in them/some form of recognition of their presence from the seal (five per cent). Five per cent wanted to swim with the seals. One person wanted more seals.

These results are likely to be influenced by 'The Satisfaction Trap' (Booth, in prep.). This concept refers to the likelihood that visitors will indicate a high level of satisfaction when asked about their recreational experiences. Those people who are not satisfied will either not visit again (be 'displaced') or 'rationalise' their experiences in order to avoid cognitive dissonance (Booth and Cullen, 1995).

When asked about factors that contributed to a satisfying experience with the seals during their visit, the following data were collected. A ratio has been constructed from response percentages as follows - very important and somewhat important compared with not very important and not at all important. In this ratio, neutral is left out and explains why the totals do not equal 100.

**Table 9**  
**Factors Contributing to a Satisfying Seal Interaction**

<b>Factor</b>	<b>Importance Ratio</b>
Seeing seals in their natural habitat	98:00
The weather	81:13
Seeing marine mammals I don't normally see	81:50
Relaxing in a pleasant setting	79:14
Increasing my knowledge about seals	74:14
Getting a photo/video of the seal	61:33
Getting close to the seals	50:45
The level of activity of the seals	48:41
Facilities such as toilets, etc.	34:58

Seeing seals in their natural habitat stands out as a universally important factor, closely followed by seeing marine mammals I don't normally see, The weather, increasing my knowledge about seals and relaxing in a pleasant setting.

Getting a photo/video of the seals follows these factors.

Visitors were ambivalent about the level of activity of the seals and getting close to them. Getting closer to a seal, however, was often quoted as a desired improvement to the visitor's seal encounter (see results earlier in this section). It appears that in the overall context of their seal experience, closeness to seals is less important to the visitor than other factors.

Most people did not feel that the presence of facilities was important for their visit satisfaction. Many people made comments during the survey about the importance of keeping the site(s) "natural" (i.e., keep facilities basic and few). This supports the dominance shown by the factor seeing seals in their natural habitat.

### 3.4.7 Perceptions of Site Management

Most people felt that the site was well set up for them to view the seals (92 per cent). There was a significant difference in responses at the two sites - more people were happy with Ohau Point than the Peninsula (Pearson's  $\chi^2 = 13.21066$ ,  $df = 1$ ,  $p = 0.00028$ ). Comments volunteered about the sites were wide ranging and at times contradictory. Table 2.7 presents these data.

**Table 10**  
**Comments About Sites**

<b>Comments</b>	<b>Peninsula (No. mentions)</b>	<b>Ohau Point (No. mentions)</b>
Good the site is natural	21	3
Seals too far away	9	4
Don't change it	8	3
Need more facilities	4	4
Need a walkway/platform (Peninsula)	4	0
Good the people are not too near the seals	3	13
Don't allow commercialism	3	0
Ohau Point better than Peninsula/Nuggets/Cape Foulwind	2	5
Very accessible	1	1
Sign across the channel is good (Peninsula)	1	0
Excellent of snorkelling (Peninsula)	1	0
Need more information on seals	1	0
The platform is good (Ohau)	0	3
Site unsafe – road too close (Ohau)	0	2
Need better signage along road (Ohau)	0	2
Need more/bigger barriers (Ohau)	0	2

At the end of the survey visitors sometimes talked with the surveyor and were prompted to identify any further comments about their visit. Frequently mentioned additional comments included:

- Need more information about the seals (19 per cent)
- Great to see the seals in their natural habitat (17 per cent)
- Keep the site natural (14 per cent).

The theme of naturalness is again evident in these comments. It is interesting to note that while few people took time to read the existing interpretative signs at the two sites (47 per cent at Ohau Point and 19 per cent at Kaikoura Peninsula), many people wish to have more information about the seals provided. This suggests an area for further investigation – to ascertain why the existing information is not adequate or inappropriately presented.

See Appendix 4 for a full breakdown of visitors' concluding comments.

# Chapter 4

## Discussion

### 4.1 Introduction

The main part of this chapter discusses the impact of visitors on seal behaviour and emphasises the difference between seals in the breeding rookeries and non-breeding adults hauled out on land. Visitor behaviour and visitor perceptions of their effects on seals and their satisfaction with the experience are then discussed. Some of the problems of site management are raised at the end of the chapter.

### 4.2 Seal Behaviour

Understanding and assessing the impact of visitor activities on fur seals is a complex task. Visitor activity may directly impact fur seals by causing a change in fur seal behaviour. The level of impact will be affected by a number of factors including: the behaviour and number of visitors, the site of the visitor/fur seal interaction, and the fur seal's response (Kuss et al., 1990). Animal responses are often divergent even within a single species (Martinka, 1976 cited in Kuss et al., 1990). A fur seal's response will be influenced by its age, sex, condition, stage in the breeding cycle, and previous exposure to humans. Adult females (cows) and juveniles have a well developed 'flight' response and will escape to the sea as fast as possible if they feel threatened. Adult males (bulls) and sub-adult males (SAMs) will tend to stay and "fight" to defend their territory. The magnitude of the response can range from a minor change in behaviour with no long term effects, to a major change in behaviour that is energetically expensive and could potentially lead to decreased vigour. Such responses may in turn decrease productivity and even ultimately lead to death. The impact may be confined to an individual fur seal, affect a group of animals occupying the same site or even influence the population of the region.

Tourism, by attracting people to a region, may also indirectly impact on fur seals through the degradation of the environment. Fur seals are reliant on the sea for food, and human activity that pollutes the sea can disrupt the marine food chain. Physical pollution is already an issue along the Kaikoura coast with many fur seals becoming entangled in marine debris and starving to death if not caught and freed from the debris. An increase in the number of people using a region can also lead to competition between people and fur seals for resources - habitat and food. Habitat modification and increasing encroachment of human settlement on natural areas will result in marginalising animals, restricting their distribution and degrading their habitat (Speight, 1973 cited in Kuss, 1990). The main north-south road runs parallel to the Kaikoura coastline restricting the area that fur seals can haul out above the high tide mark and each year a few fur seals are run over by traffic on this road. Kaikoura has an inshore fishing fleet and fishers feel that they are competing against fur seals for their catches leading to a major conflict between fur seals and the fishing industry. Every year fur seals are killed as a result of by-catch.

Global weather and ocean patterns, and oscillations in these phenomena such as an El Niño, are the greatest known disturbances of ecosystems. In Otariids (Family group to which fur seals belong) El Niño events have been connected to increased abortion rates in females, decreased pup survival, and adult mortality (Trillmich and Ono, 1991). Associated events such as toxic algal blooms may also have an impact on fur seals. During February 1998 the waters off parts of the East Coast of New Zealand experienced a toxic algal bloom and the associated die off of marine life. Nine fur seals were found dead on the Kaikoura coastline during this time but the cause of death was not established (M. Morrisey, DOC Manager, pers. comm.). It is therefore necessary when considering the impact of tourism on fur seals to take into account the degree of stress the animals are under due to environmental conditions. A stressed animal is going to be far less resilient (i.e., able to adapt) to disturbance than an unstressed animal (Ream, 1979 cited in Kuss et al., 1990).

It was clear from the observations carried out during this study that fur seals hauling out on the Kaikoura coast are the focus of much visitor attention and also that the current guidelines on appropriate behaviour around fur seals are inadequate. Visitors abiding by these guidelines and observing a fur seal from five metres will have normally triggered a response from the fur seal and the interaction is therefore modifying the fur seal's behaviour. From the data collected on fur seal/visitor interactions a minimum approach distance of 20 metres (Fig 9) is a more appropriate distance. It was not possible to predict what response a fur seal would make during a fur seal/visitor interaction. The distance between visitors and a fur seal was not correlated to response class although threat behaviour was not exhibited unless the visitors were within five metres. A distance - response interaction may not be detectable in pooled data against the background of normal variation. There was no correlation between group size and distance to the fur seal for any of the fur seal responses, a finding similar to Kovacs and Innes' (1990) study on harp seals where group size was of little consequence. The only two incidents where group size seemed to be significant was when two bulls exhibited a distress response when encircled by visitors. A significant factor in these events appeared to be that the groups cut off the fur seal's escape route and the response was not only to the high number of visitors involved.

The cost to individual fur seals subjected to frequent visitor interactions, as occurs on the bay-flat at Kaikoura Peninsula may be high. Visitor activity at the Peninsula is obviously modifying the behaviour of individual fur seals by decreasing the amount of time an animal spends resting and, linked to this, decreasing the time spent passively thermoregulating (basking). In the fur seal/visitor interactions where the fur seal made no obvious behavioural response there is no proof the animal was unaffected and the event may also have had a cost to the fur seal.

It is highly likely that even in animals that are not displaying a response, a physiological response is occurring. In fur seals where there is a distinct "fight or flight" response to disturbance a precursor physiological response - the active defence response (the process by which the body prepares to respond to a disturbance with speed by increasing heart rate, respiration and blood flow to vital muscles and organs) - is occurring. The onset and level of this response - stress level - will vary depending on the degree of perceived threat. The onset and stress level experienced by a fur seal during a fur seal/visitor interaction is unknown.

However, in cows and juveniles onset is rapid probably occurring when contact is first made and the stress level is obviously high as the animals respond rapidly to disturbance by escaping into the water or trying to hide in rock crevices in the case of pups. The onset and stress level in bulls is less clear and would need to be measured experimentally, a difficult task with current methods as the methods used may induce the subject to be more sensitive to stimuli (e.g., Culik and Wilson, 1995).

From the behavioural responses displayed by fur seal during experimental and actual fur seal/visitor interactions, it is obvious that the age and sex of an animal is an important factor in determining how threatening a stimulus is perceived to be. Fur seal social organisation may partly explain this interaction as it is based on the establishment of dominance within a group. Bulls are large (up to four times heavier than cows), powerful and dominant, whereas cows and juveniles are small, submissive and therefore vulnerable. Vulnerable animals are going to increase their safety margin by classing any novel stimulus as a threat and respond rapidly to escape from a threat.

Visitor activity is obviously not novel to some of the fur seals hauling out on the Kaikoura Coast especially those hauling out on the bay-flat at Kaikoura Peninsula. These animals, mainly bulls and SAMs, are exposed to fur seal/visitor interactions most days throughout the year but especially in summer when the number of fur seals is low and the number of visitors is high. Frequent exposure to a stimulus may result in an animal becoming habituated to the stimulus. For example Wright (1998) found an apparent increase in tolerance by Hookers seal lion (*Phocarctos hookeri*) to the presence of humans. In contrast, the data collected at Kaikoura Peninsula does not demonstrate any measurable habituation. The response distances were the same or greater than those recorded during the experimental approaches at Ohau Point and Barney's Rock. However the data are not directly comparable as the approaches at the Peninsula were uncontrolled (actual fur seal/visitor interactions), may have involved more than one person, and the fur seal may have been sensitised to visitor behaviour by recent previous encounters.

Visitor disturbance at the haul outs, where the majority of animals are bulls and SAMs, appear to be very localised affecting only the animal/s on which the visitor is focused and lasting only the duration of the visitor visit. In the long term, frequent disturbance may decrease the site's desirability as a haul out but currently there is no evidence that this is happening and in fact the number of animals hauling out on the Kaikoura coastline is increasing.

At breeding rookeries visitor activity causes wide spread disturbance that lasts well after the visitors visit ends. Because of the domino effect cows and juveniles trigger a series of flight responses in other animals radiating from the point of fur seal/visitor contact. If this level of disturbance happens frequently the effect on an individual may be major. Time allocation is the ultimate measure of an animal's survival ability. An animal that can optimally allocate time to vital activities, resting, breeding, feeding, etc., will be best able to survive. Time spent consuming energy, in this case by responding to disturbance, instead of conserving it may have less energy available for growth or reproduction, therefore reducing an animal's fitness (Seddon, 1988).

The disturbance may also reduce the viability of the breeding rookery. Frequent disturbance may result in:

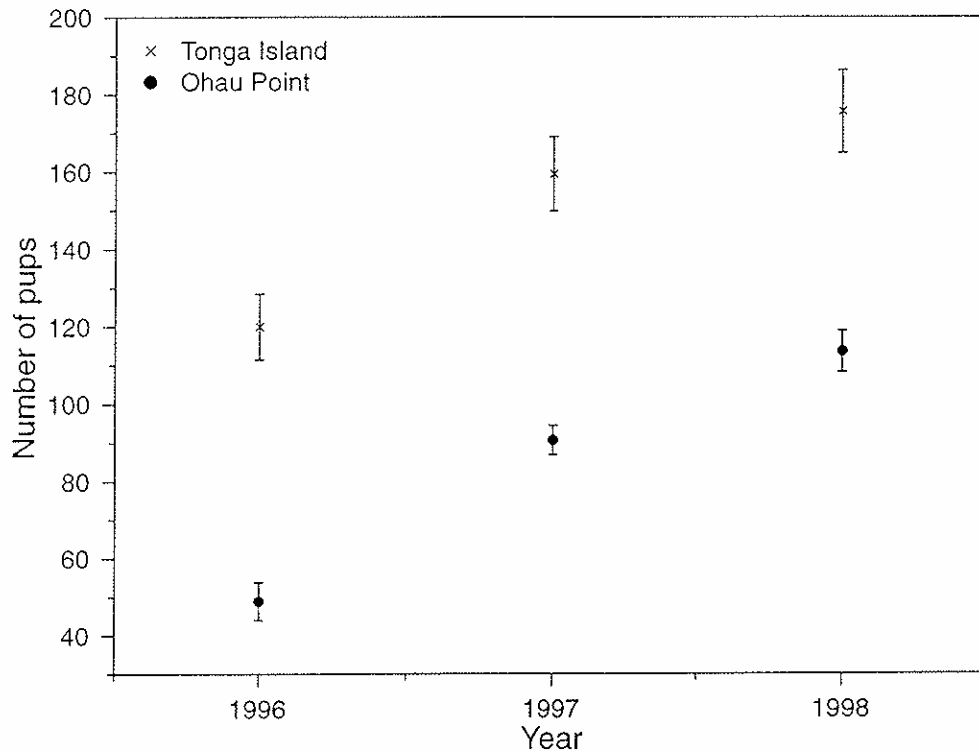
- Increased levels of conflict - an animal will react more quickly to the actions of another animal when their stress level is high and the chances of an interaction will be higher as animals have to re-establish dominance and resettle after each disturbance;
- Disrupt mother/pup bonds - cows will spend more time alert or in the sea and therefore spend less time attending their pups. This behaviour has been documented in the harp seal (*phoca groenlandica*) during disturbance by visitors (Kovac and Innes, 1990);
- Increased pup mortality - pups can be injured or killed when the cows stampede to the water, squashed during male fights or starve to death as a result of the breakdown of the mother/pup bond;
- Decreased recruitment - the level of disturbance reduces the desirability of the site as a breeding location;
- The cumulative impact caused by frequent disturbance can only be detected over time through long-term monitoring.

Currently there has been no measurable impact on breeding at the breeding rookeries in the Kaikoura region. Table 11 shows that the number of pups produced at Ohau Point has increased for the last three years (C. Bradshaw, 1998, pers. comm.) indicating that tourism is not reducing productivity or recruitment at Ohau Point. The rate of increase in productivity at Ohau Point is similar to that at Tonga Island (Figure 10), a breeding rookery of similar magnitude in the Abel Tasman National Park. Productivity is stable at Barney's Rock and Lynch Reef. Both sites offer limited habitat that is suitable for breeding and the breeding rookeries are probably at or close to peak carrying capacity. The fact that fur seals are breeding at Ohau Point and Lynch Reef, both areas that are easily accessible to visitors, suggests that visitor disturbance in the breeding areas is still infrequent or low impact as isolation from human disturbance is one of the main requirements cited by Taylor et al. (1995) as necessary for a breeding rookery.

**Table 11**  
**Number of Pups Born Each Year (1996-1998) at the Rookeries**  
**(C. Bradshaw unpublished data)**

<b>Year</b>	<b>Ohau Point Petersen Estimate <math>\pm</math>S.E.</b>	<b>Lynch Reef Total Count<sup>1</sup></b>	<b>Barney's Rock Total Count<sup>1</sup></b>
1996	48.9 $\pm$ 4.9	8	11
1997	90.6 $\pm$ 3.8	8	10
1998	113.5 $\pm$ 5.6	6	11

Notes: 1. Minimum number



**Figure 10**  
**Number of Fur Seal Pups Produced at Ohau Point and Tonga Island Over the Last Three Years**

Another aspect of tourism that can disturb fur seals is noise pollution. Richardson and Wursig (1997) suggest that man made noise could have three or four types of deleterious effects on cetaceans and other marine mammals:

- Disturbances reactions ranging from subtle changes in behaviour through brief interruptions of normal activities to short or long-term displacement.
- Masking of calls from conspecifics, echoes from their own echolocation pulses or other important natural sounds e.g., surf, predators, ice.
- Temporary or permanent hearing impairment if noise is strong enough.
- Noise induced physiological stress.

Interestingly fur seals at Barney's Rock showed no response to the train whistle that sounded prior to the train entering the tunnel even though it was a loud noise and occurred close (approximately 40 m) to the haul out. It may be that the fur seals at Barney's Rock are habituated to the sound because it is predictable, i.e., it happens at the same times every day and they know its not harmful (Geist, 1970 cited in Kuss et al., 1990).

The only guided and regulated visitor activities focused on fur seals in the Kaikoura region occurs on or in the water, the environment where fur seals are probably their most resilient to visitor activities. Fur seals, especially cows and juveniles, when they are in the water are inquisitive and interactive and will come within centimetres of swimmers and divers. Boats approaching fur seals hauled out on land do not cause the alert and MAS responses that land-based traffic does. People involved in water-based activities are obviously perceived by fur seals as far less threatening than people involved in land-based activities. If, however, the frequency of water based visitor activities increases beyond a critical level there may be a negative impact. During the breeding season cows are tied to the breeding rookery by their pups and spend a lot of time loafing in the water just offshore from the breeding rookery to cool down. At Tonga Island the number of boats visiting the island has increased every year. Currently about 150-200 boats, ranging in size from kayaks to ferries, visit the island every day during the peak visitor season and very few cows loaf in the water close to the breeding rookery.

Fur seals are protected under the Marine Mammals Protection Act 1978. Visitors are not supposed to approach a fur seal closer than five metres and harassing a fur seal is against the law. This study indicates that for most fur seals five metres are too close and that any visitor activity within a breeding rookery is highly disruptive due to the domino effect. During this study many incidents of inappropriate behaviour around fur seals were observed. Inappropriate behaviour includes obvious types of harassment, such as killing, injuring, touching, poking with an object or throwing objects at a fur seal (see Table 8). Subtler types of harassment are harder to categorise although the effect on the fur seal may be just as great. Fur seals displaying MAS, threat or distress responses are all being harassed - their behaviour is being modified by the behaviour of the visitor/s and this will have a negative impact on the time budget of the fur seal.

The only way to effectively prevent these types of harassment's is to educate visitors and locals about the effect of their activities on fur seals and provide realistic guidelines that prevent visitor activities from disrupting fur seals. Fur seals are highly mobile and found around much of the South Island coastline so physically protecting the animals by fencing them off from visitors is not a realistic option.

### **4.3 Visitor Behaviour**

This study has found that all types of visitors are undertaking a range of behaviours around seals. As a visitor's socio-economic and demographic characteristics do not differentiate their behaviour around seals (distance and actions), this study indicates that no one type of visitor is acting inappropriately near seals. No particular type of visitor can therefore be targeted for education about their behaviour or any other form of management control. Any such actions must be aimed at visitors generally.

While the survey found that many people (forty-two per cent) were approaching closer than ten metres to a seal, the survey was undertaken at a time when the number of opportunities for close encounters was limited. Therefore this figure may be understating proximity during winter months when more seals haul out closer to visitor sites. Thirty-five per cent of

respondents went closer than the recommended five metres to a seal. This study has suggested that the five-metre recommendation is too close. A high proportion of visitors is therefore potentially detrimentally affecting seals.

The activities of visitors recorded near seals, while including appropriate behaviours, include actions, which are harmful to individual seals (touching them for example). Individuals do not appear to perceive this type of behaviour as inappropriate.

#### **4.4 Visitor Perceptions**

Visitors do not perceive that they are affecting the seals. Most visitors do not believe they personally affect the seals at all, and two-thirds of respondents thought that the visitors (in general) to the site were not having an effect on the seals. Effects were more often reported at times of high visitor numbers onsite and were reported more often at the Peninsula than Ohau Point, perhaps reflecting the greater opportunity for people to get close to seals at the Peninsula.

Visitors do not perceive they are in any danger near the seals and few people identified seals as 'wild animals' when asked to describe seals. Some visitors are putting themselves in danger near the seals as a result of their misperception about their own safety. During the 1996/97 summer, seals near Kaikoura bit at least two visitors. (M. Morrissey, DOC Manager, 1997, pers. comm.)

Visitor perceptions of appropriate behaviour around seals appear to be often misinformed and/or misguided. This, coupled with their perception that they are not affecting the animals, means that visitors (in general) are unlikely to change their behaviour near seals. Education about appropriate behaviour around seals is needed to alter visitors' perceptions and therefore behaviour. This must be implemented with view to the low proportions of people who currently read the on-site signage.

#### **4.5 Enhancing the Visitor Experience**

While the usual problems of measuring satisfaction are relevant to this study, visitors appear to be happy with their encounter with seals. There are no obvious problems for visitors at either site. Specific site management suggestions from respondents are given in Table 10 (see Section 3.4) and in Appendix 4. Unlike Moulin (forthcoming), this study did not find any relationship between satisfaction and socio-economic or demographic variables.

While some people wanted to get closer to seals, this factor was not of primary importance in visitors' overall satisfaction with their visit. A relatively small, but significant, percentage (11 per cent) wanted to touch seals. This desire needs to be curbed, as touching seals is clearly intrusive and detrimental to seals. Again, it is likely that educating visitors (on site or off site) is likely to be the best approach to manage this problem.

## 4.6 Site Management

Ohau Point received a higher satisfaction ranking than the Peninsula site by visitors. This may be related to site factors and/or the context of the visitor's trip. At Ohau Point, the viewing facility is purpose built for seal viewing. Many visitors to Ohau Point do not know that they are stopping at a seal colony (the road signs only indicate a lookout). The presence of seals may therefore be a bonus to visitors who have chosen to stop at the lookout for scenic reasons. This would explain why more people were visiting the Peninsula for seal related reasons than Ohau Point.

There are a small number of people who do not remain behind the barriers at Ohau Point but climb over or around them to go down into the colony. This behaviour will be difficult to control purely with facility design.

At the Peninsula the presence of seals close to the car park (and therefore to visitors on arrival) is more variable over the year compared with Ohau Point, where seals are virtually guaranteed immediately below the platform. Visitors are not assured of seeing a seal on the Peninsula bay-flat (i.e., up close). The tide also influences the seal viewing opportunity at the Peninsula.

From responses of visitors at both sites, site managers are given clear indicators of what visitors want. A strong desire that the sites be kept "natural" dominates responses. The request for more information about the seals suggests that investigation of the existing interpretation signs is required. Are they in an inappropriate format and medium, do they offer the wrong or insufficient information, are they poorly located?

Crowding is not perceived to be a problem at either site and during the survey period (peak visitor months) neither site appeared to be operating beyond facility capacity (in terms of parking and space).

# Chapter 5

## Conclusions and Recommendations

### 5.1 Conclusions

The following conclusions can be drawn from this study:

- Visitors do affect seal behaviour along the Kaikoura coast.
- Current restrictions or measures to prevent disturbance to seals are inadequate.

Recommended minimum distance from seals of five metres is too close, 20 metres is more realistic. The current guidelines, governing human behaviour around fur seals, which prevent people approaching fur seals closer than five metres are not supported by this study, i.e., fur seals are actively responding to the presence/activities of people at five metres. The guidelines need to restrict people to a minimum approach distance where the presence/activities of people are not affecting fur seal behaviour. This study has shown that people approaching a fur seal closer than 20 metres will normally result in the fur seals responding to the activity/presence of visitors. Twenty metres would therefore be a more realistic limit to approach seals.

Any visitor activity within a breeding rookery is highly disruptive. Breeding rookeries should be specially protected and people excluded from these areas unless there is a strong reason for their presence i.e., all activities within a breeding rookery would need to be carried out under a permitting system. This study has shown that any human activity in a breeding rookery causes wide spread disturbance that lasts well after the visitors visit ends.

During this study many incidents of harassment were observed. Currently the guidelines provide no working definition of harassment. Defining harassment is difficult unless it is very obvious (killing, injuring, etc.). Subtler types of harassment are harder to recognise although the effects on the fur seal may be just as important. Fur seals displaying MAS, threat or distress responses are all being harassed - their behaviour is being modified by the behaviour of the visitor/s and this will have a negative impact on the time budget of the fur seal - the visitor however may not realise that they are negatively affecting the fur seal. One way to effectively prevent these types of harassments is to educate visitors and locals about the impact of their behaviour on fur seals and seal behaviour so that they recognise when a seal is likely to be adversely affected.

On-site signage is inadequate. The five-metre guideline is not obvious to visitors and the signs are not providing sufficient cues for visitor behaviour.

There is a general lack of knowledge about fur seals. Visitors express some desire to learn about fur seals, how to behave appropriately around fur seals, and seals' role in the New Zealand environment.

During this study many incidents of inappropriate behaviour were observed. This resulted in impact on the fur seals (see above), risk to personal safety as many visitors are getting too close to seals, and was related to ineffective information transfer.

- Inappropriate behaviour was not limited to a particular type of visitor.
- Visitors perceive their effects as minimal or nil.

During this study many fur seal/visitor interactions demonstrated a lack of understanding on the part of the visitor about the potential danger of getting close to a fur seal. Bulls and sub adult males will defend their territory and, if forced, will attack someone who is harassing them. People need to understand the potential risks associated with interacting inappropriately with fur seals.

Site improvements were identified such as improving on-site information for visitors on seals while keeping sites “natural”.

## **5.2 Recommendations**

- Increase recommended minimum distance from seals to 20 m to protect them from disturbance from inappropriate visitor behaviour and to protect the safety of the visitor from the seals.
- Prevent visitor activity in breeding rookeries to stop widespread disturbance and potential long term impacts on the seal population.
- Improve understanding of seals by visitors and thereby encourage appropriate behaviour around seals by educating visitors and encouraging voluntary behavioural changes and increased understanding and enjoyment of seals.
- Improve sites while keeping them “natural” so that visitor safety is emphasised along with more effective interpretative signs about fur seals and appropriate behaviour around them.

## References

- Altman, J. (1974). Observational study of behaviour: sampling methods. *Behaviour* 49, 227-67.
- Barton, K. and Burgess, O. (in prep). Human/fur seal interactions in the Marlborough Sounds; survey of residents perceptions.
- Best, H. (in prep). Dispersal of juvenile New Zealand fur seal from rookeries on West Coast South Island, New Zealand, 1991-1996.
- Booth, K.L., in prep. Proceedings of the Department of Conservation Workshop on social impacts, held in Wellington. May 1998. Department of Conservation, Wellington.
- Booth, K. L. and Cullen, R. (1995). Recreation Impacts. In *Outdoor recreation in New Zealand*. Department of Conservation and Lincoln University, New Zealand.
- Culik, B.M. and Wilson, R.P. (1995). Penguins disturbed by visitors. *Nature*, 376, 301-2
- Davis, D., Banks, S., Birtles, A., Valentine, P. and Cuthill, M. (1997). Whale sharks in Ningaloo Marine Park: managing tourism in an Australian marine protected area. *Tourism Management*, 18, 5, 259 – 71.
- Higham, J.E.S. (1994). Nature tourism and the Royals of Taiaroa Head. In Faulkener, B., Fagence, M., Davidson, M. and Craig-Smith, S., 1994. Tourism Research and Education in Australia. *Proceedings of the Australian National Tourism and Education Conferences*. Bureau of Tourism Research, Canberra. 141 – 150.
- Kazmierow, B. J. (1996). *Ecological and Human Dimensions of Tourism-Related Wildlife Disturbance at the Waitangioto White Heron (Kotuku) Colony, South Westland, New Zealand*. Unpublished Masters Thesis, Lincoln University, Canterbury, New Zealand.
- Kovacs, K.M. and Innes, S. (1990). The impact of tourism Harp seals (*Phoca groenlandica*) in the gulf of St. Lawrence, Canada. *Applied Animal Behaviour Science* 26, 15-26.
- Kuss, F.R., Graefe, A.R., and Vaske, J.J. (1990). *Visitor impact management. A review of research*. Volume One, National Parks and Conservation Association, Washington, D.C.
- Manning, R. E. (1986). *Studies in outdoor recreation: search and research for satisfaction*. Oregon State University Press: Corvallis, Oregon ,USA.
- Moulin, S., (forthcoming). Wildlife tourism: the psychological benefits of whale watching. *Pacific Tourism Review*.

- Orams, M. B. (1997). Historical accounts of human-dolphin interaction and recent developments in wild dolphin based tourism in Australasia. *Tourism Management*, 18, 5, 317 – 26.
- Richardson, W.J. and Würsig, B. (1997). Influences of man-made noise and other human activities on cetacean behaviour. *Marine and Freshwater Behavioral Physiology* 29, 183-209.
- Seber, G.A. (1982). *The estimation of animal abundance and related parameters*. London: Griffin.
- Seddon, P.J. (1988). *Patterns of behaviour and nest site selection in the yellow-eyed penguin (Megadyptes antipodes)*. Unpublished PhD Thesis, University of Otago, New Zealand.
- Stirling, I. (1970). Observations on the behaviour of the New Zealand fur seal (*Arctocephalus forsteri*). *Journal of Mammalogy* 51(4), 766-778.
- Shelby, B. and Heberlein, T.A. (1986). *Carrying capacity in recreation settings*. Oregon State University Press: Corvallis, Oregon.
- Taylor, R.H., Barton, K.J., Wilson, P.R., Thomas, B.W., and Karl, B.J. (1995). Population status and breeding of New Zealand fur seals (*Arctocephalus forsteri*) in Nelson-northern Marlborough, region, 1991-94. *New Zealand Journal Marine and Freshwater Research* 29, 223-234.
- Trillmich, F and Ono, K.A. (Eds.) (1991). *Pinnipeds and El Niño: responses to environmental stress*. Ecological Studies v. 88. Springer-Verlag: Berlin Heidelberg.
- Wright, M. 1998. Ecotourism on Otago Peninsula. Preliminary studies of yellow-eyed penguin (*Megadyptes antipodes*) and Hooker's seal lion (*Phocarctos hookeri*). *Science for Conservation*: 68.

# Appendix 1

## On-Site Questionnaire Survey Sample Design

### 1. Survey Approach

An on-site interviewer-administered questionnaire survey was chosen as the most appropriate method because of the anticipated high response rate and high quality of data. Owing to their poor response rates, postal and self-return survey designs were rejected.

### 2. Survey Period and Survey Sites

The survey was conducted at two sites on the Kaikoura coastline – Ohau Point, a purpose-built seal viewing lookout, and the Kaikoura Peninsula, where a car park has been developed to cater for people visiting the site to view seals and walk the Peninsula walkway. Barney's Rock was initially part of the survey design however after two visits to the site, no visitors were located and this site was abandoned.

The survey was undertaken at these sites from mid January until late February 1998. It was not possible to sample later in the summer owing to the timeframe available for the study. This survey period covered New Zealand school holidays as well as non-school holiday times and included the Waitangi Weekend holiday.

### 3. Survey Population

The survey population is defined as all visitors to the Kaikoura Peninsula and Ohau Point who visit for recreational purposes where interacting/watching seals are a part of their visit. No estimates of the survey population are available for Ohau Point, however the Department of Conservation suggests that the Kaikoura Peninsula receives around 1,000 people on a busy summer day (M. Morrissey, DOC Manager, 1997, pers. comm.)

### 4. Sample Design

A stratified sample design was used to ensure adequate representation of different types of visitors at both sites. The sample was stratified by day of week (week day and weekend day) and by school holidays and non-school holidays. The survey day covered daylight hours to ensure a wide range of visitors were interviewed. The sampling unit was the recreational person visit.

Surveys were not conducted in bad weather, as it was not appropriate to interview people for 10 minutes in very cold conditions out of doors.

A small number of interviewers was used to minimise interviewer bias. One person administered the majority of surveys.

## **5. Respondent Selection**

The interviewer selected the 'next-to-pass' group and chose the individual respondent from the recreational group using the 'birthday rule' - the person with the next birthday was interviewed. In this manner the survey minimised interviewer bias in the selection of respondents.

Participation was voluntary. Only people 15 years or over were sampled. Fifteen years was chosen as a cut-off level for question comprehension - so data specific to children was not collected. Each recreationist was interviewed only once per visit, but was eligible for interview on subsequent visits, however, no-one was interviewed more than once during the survey period.

Individuals in large groups are under-represented in the survey as they had a smaller chance of selection for interview. This occurred because the data from the survey were not weighted by group size. Data could not be weighted because of a lack of suitable data on group size from which to calculate the weights.

## **6. Sample Size and Response Rates**

Sample size was self-determining owing to the nature of the sample design. A total of 246 completed questionnaires were collected; 111 from Ohau Point and 135 from Kaikoura Peninsula. The total number of visits to the sites during the survey period is not known, therefore a sampling fraction cannot be calculated. A total of eight people refused to take part in the survey.

## **7. Questionnaire**

The questionnaire was designed using information gained during the qualitative phase of the study. The questionnaire included the interviewer's observations of the respondent's actions towards seals as well as the respondent's reported actions towards the seals. This was to overcome potential misreporting of activity near seals by respondents.

Most questions had an open response format. On the questionnaire common responses were written for the interviewer's convenience but these were not shown to respondents in order to avoid bias in their responses. Some question responses were shown to respondents and these are noted on the questionnaire (e.g., choice of age categories).

Each questionnaire was attached to an observation sheet noting site variables, weather, seal locations (Peninsula only) and numbers of people. Observations were undertaken each hour during the survey. This observation system is separate to the formal observation regime discussed earlier in this report.

The questionnaire was pre-tested in both locations prior to the start of the survey to check question comprehensibility and the sampling approach. A copy of the questionnaire is presented in Appendix 2.

## **8. Analysis and Error**

All data were analysed using SPSS, a statistical package for the social sciences. An error margin of plus or minus 6.2 per cent is estimated for the frequency data. As the sample design was more complex than a simple random sample (on which these errors are calculated), this is an estimate only.





## Kaikoura Visitors' Survey about Seals

Hi. My name is \_\_\_\_\_ and I am part of a research group from Lincoln University that is studying the effects of tourism in Kaikoura. My particular area of research focuses on people's interactions with the fur seals at this site. Would you be able to give me 5 - 10 minutes of your time to answer some questions. Your name is not asked so your responses will remain completely confidential.

### Reason for Visit

#### 1 Why have you come here today? (can tick more than one)

1.  To see the seals
2.  Showing friends/family the seals
3.  Sight-seeing/ for the views
4.  Photographs
5.  To do the walkway (Peninsula)
6.  To fill in time
7.  Passing through
8.  Other \_\_\_\_\_

---

INTERVIEWER RECORD OF VISITOR/SEAL INTERACTION  
and SEAL BEHAVIOUR

## Seals Interaction

[OHAU POINT - MISS Q 2-7 UNLESS RESPONDENT JUMPED BARRIERS]

### 2 How close did you get to the seals?

1.  0 - 2 m
2.  2 - 5m
3.  5 - 10 m
4.  more than 10 m

### 3 What did you do then? (can tick more than one)

- |                                                                |                                                     |
|----------------------------------------------------------------|-----------------------------------------------------|
| 1. <input type="checkbox"/> Watch seals                        | 6. <input type="checkbox"/> Touch the seal          |
| 2. <input type="checkbox"/> Photograph seal                    | 7. <input type="checkbox"/> Poke it with a stick    |
| 3. <input type="checkbox"/> Photograph people and seal         | 8. <input type="checkbox"/> Throw stones at seal    |
| 4. <input type="checkbox"/> Video seal                         | 9. <input type="checkbox"/> Make a noise (not talk) |
| 5. <input type="checkbox"/> Converse with seal<br>(talk to it) | 10. <input type="checkbox"/> Other: _____           |

### 4 What did the seal do then? (can tick more than one)

- |                                                    |                                                       |
|----------------------------------------------------|-------------------------------------------------------|
| 1. <input type="checkbox"/> Nothing                | 8. <input type="checkbox"/> Yawned                    |
| 2. <input type="checkbox"/> Moved away             | 9. <input type="checkbox"/> Opened mouth, shows teeth |
| 3. <input type="checkbox"/> Looked at me           | 10. <input type="checkbox"/> Growled/barked           |
| 4. <input type="checkbox"/> Raised its head        | 11. <input type="checkbox"/> Snorted/sniffed          |
| 5. <input type="checkbox"/> Opened its eyes        | 12. <input type="checkbox"/> Sat up                   |
| 6. <input type="checkbox"/> Bit me                 | 13. <input type="checkbox"/> Rolled over              |
| 7. <input type="checkbox"/> Attacked: (how?) _____ | 14. <input type="checkbox"/> Lunged at me             |
| 15. <input type="checkbox"/> Other: _____          |                                                       |

**ONLY ASK Q5 IF EXTREME ACTION: POKING, THREW STONES, TOUCHED**

### 5 Going back to when you touched/poked/threw stones at the seal.... Why did you do that? PROBE

**6 How safe did you feel around the seals? (Show respondent)**

- 1.  Very safe
- 2.  Safe
- 3.  Neither safe nor unsafe
- 4.  Unsafe
- 5.  Very unsafe

**Desired Interaction**

**7 We've been talking about what has happened. In an ideal situation what would you have liked to have happened?**

PROMPT:                Seals behaviour  
                              Their behaviour

[OHAU POINT RESUME HERE]

**Wildlife Experience**

**8a Have you seen seals before?**

- 1.  Yes
- 2.  No

**8b If YES: Where?**

1.  Natural setting: \_\_\_\_\_  
\_\_\_\_\_

2.  Zoo or aquarium: \_\_\_\_\_  
\_\_\_\_\_



### Expectations and Satisfaction

**12 Overall, how satisfied are you with seeing the seals here today?**  
(Show respondent)

- 1.  Very satisfied
- 2.  Satisfied
- 3.  Neither satisfied nor dissatisfied
- 4.  Dissatisfied
- 5.  Very dissatisfied

**13 Please indicate your feeling on the extent of crowding at this site**  
(Show respondent)

<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>7</u>	<u>8</u>	<u>9</u>
Not at all crowded		Slightly crowded			Moderately crowded			Extremely crowded

**14 Did the other people here affect your enjoyment of the seals?**

- 1.  Yes
- 2.  No

**Comments:**

**15 Do you think the site is well set up for you to view the seals?**

- 1.  Yes
- 2.  No

**Comments:**

**16 How important are each of the following items to you in contributing to a satisfying experience with the seals today?**  
 (Show respondent)

	1	2	3	4	5
	Not At All Important	Not Very Important	Neutral	Some-what Important	Very Important
a) Seeing the seals in their natural habitat					
b) Getting a photo/video of the seal					
c) Facilities such as toilets, etc.					
d) Increasing my knowledge about seals					
e) Relaxing in a pleasant setting					
f) Seeing marine mammals I don't normally see					
g) The level of activity of the seals					
h) Getting close to the seals					
i) The weather					

## Visit and Visitor Profile

Finally just a few questions about you and your group

### 17 Where do you normally live?

- |                             |                          |                              |                 |
|-----------------------------|--------------------------|------------------------------|-----------------|
| 1. <input type="checkbox"/> | NZ (specify where) _____ | 5. <input type="checkbox"/>  | Sweden          |
| 2. <input type="checkbox"/> | UK                       | 4. <input type="checkbox"/>  | Japan           |
| 3. <input type="checkbox"/> | Germany                  | 8. <input type="checkbox"/>  | USA             |
| 6. <input type="checkbox"/> | Canada                   | 10. <input type="checkbox"/> | Denmark         |
| 7. <input type="checkbox"/> | Taiwan                   | 11. <input type="checkbox"/> | Other (specify) |
| 9. <input type="checkbox"/> | The Netherlands          |                              |                 |

### 18 Are you staying overnight in Kaikoura?

- |                             |     |                             |    |
|-----------------------------|-----|-----------------------------|----|
| 1. <input type="checkbox"/> | Yes | 2. <input type="checkbox"/> | No |
|-----------------------------|-----|-----------------------------|----|

### 19 What size is the group you are here with today?

### 20 Who are they?

- |                             |                 |                             |                             |
|-----------------------------|-----------------|-----------------------------|-----------------------------|
| 1. <input type="checkbox"/> | Visiting alone  | 5. <input type="checkbox"/> | Friends and partner/ spouse |
| 2. <input type="checkbox"/> | Partner/ spouse | 6. <input type="checkbox"/> | Friends and family          |
| 3. <input type="checkbox"/> | Friends         | 7. <input type="checkbox"/> | Business associates         |
| 4. <input type="checkbox"/> | Family          | 8. <input type="checkbox"/> | Special interest group      |

### 21 Gender

- |                             |      |                             |        |
|-----------------------------|------|-----------------------------|--------|
| 1. <input type="checkbox"/> | Male | 2. <input type="checkbox"/> | Female |
|-----------------------------|------|-----------------------------|--------|





## Appendix 3

### Survey Respondents' Profile Characteristics

This appendix reports the results of survey questions about the respondents.

#### Where do you normally live?

Domestic / International	Peninsula (n)	Ohau Point (n)
Domestic visitor (NZ) International visitor	58 77	51 60
Total	135	111

#### Are you staying overnight in Kaikoura?

Staying overnight?	Peninsula (n)	Ohau Point (n)
Yes No	111 24	47 64
Total	135	111

What size is the group you are here with today?

Size of group	Peninsula (n)	Ohau Point (n)
1	14	6
2	73	55
3	14	17
4	15	17
5	8	4
6	4	5
7	2	0
8	2	0
9	1	0
10+	2	7
Total	135	111

Who are they?

Group type	Peninsula (n)	Ohau Point (n)
Alone	14	7
Partner/spouse	55	41
Friends	24	15
Family	27	30
Friends and partner	1	1
Friends and family	8	8
Business associates	1	2
Special interest group	5	7
Total	135	111

Gender

Gender	Peninsula (n)	Ohau Point (n)
Male	55	51
Female	80	60
Total	135	111

What age group are you in?

Age	Peninsula (n)	Ohau Point (n)
15-19	5	1
20-24	13	13
25-29	30	16
30-34	19	11
35-39	11	14
40-44	10	7
45-49	14	7
50-54	11	12
55-59	6	9
60-64	10	10
65-69	3	6
70+	3	5
Total	135	111

Do you belong to an organisation concerned primarily with the conservation of nature?

Member of a Conservation Organisation	Peninsula (n)	Ohau Point (n)
Yes	51	38
No	84	73
Total	135	111

## Appendix 4

### Concluding Comments from Visitors

Comments	Per cent of mentions
Need more information on seals	19
Great to see seals in natural habitat	17
Keep the site natural	14
The seals are "no. 1"	10
Need more facilities	8
Good that no access to the seals	6
Beautiful/relaxing setting	6
Need better road signage (Ohau Pt)	6
Access to the seals is good	4
Need tide tables (Peninsula)	3
Good to see emphasis on environment in NZ	3
Ohau Point better than Peninsula	1
Seals are no good	1
Don't allow coaches here – space too small (Ohau Point)	1
Pollution	1