Managing Human Activity

in Fiordland:

A Carrying Capacity Method

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EXECUTIVE SUMMARY

This report presents a method to assist with the integrated management of human activity in Fiordland's coastal marine environment. The method is intended for use by Environment Southland and the Department of Conservation, to facilitate co-ordinated management of the fiords.

The report comprises (1) a literature review of relevant international research, from which conclusions are drawn that are pertinent to the development of the method, and (2) a step by step description of the method, including issues associated with its application.

The proposed eleven-step method operationalises the concept of carrying capacity and tailors the experience gained from previous applications to Fiordland. The carrying capacity framework is underpinned by three prinicples: community 'buy in', protecting area-related values, and scientific robustness. The process is:

Phase One: Establishment	Step 1: Identify stakeholders
Phase Two: Information gathering	Step 2: Determine stakeholders' values and perceived threats
	Step 3: Outline management objectives, and threats identified by managers
	Step 4: Determine indicators
	Step 5: Develop indicative thresholds
	Step 6: Prepare information statement
Phase Three: Confirmation	Step 7: Confirm values and indicators, and set standards
Phase Four: Objective measurement	Step 8: Measure resource and social conditions
Phase Five: Acceptability assessment	Step 9: Compare existing conditions with proposed standards
	Step 10: Report results and discuss management options
Phase Six: Management	Step 11: Ongoing management

It is intended that this method will be administered first at a 'test' case study area. This will help refine the method and generate stakeholder confidence in the approach, in order to facilitate wider application of the method throughout Fiordland.

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ACKNOWLEDGMENTS

1.0 INTRODUCTION

1.1 Background and purpose

Environment Southland (ES) and the Department of Conservation (DOC) are working together to improve management of the coastal marine environment in Fiordland. They are seeking a method to assist with the integrated management of human activity in Fiordland, encompassing the marine environment, the foreshore and that part of Fiordland National Park within the coastal environment. Specifically, the Study Brief states:

> *How to determine carrying capacity for activities in Fiordland, accounting for different perceptions of values and their importance by different stakeholders and, if a critical value or ranking approach will assist, how we incorporate this ... We would like to develop a methodology that assists in determining how much activity is enough. We need a methodology that minimises bias and maximises buy-in from the wider community/stakeholders ... By developing an appropriate carrying capacity methodology, we hope to get direction about the acceptable level/types of and/or restrictions on activity and structures in different parts of Fiordland.*

Therefore, the study purpose is to develop a science-based planning method that assists ES and DOC to make decisions about the suitability of proposed and existing human activities in Fiordland, with a strong emphasis upon community involvement in the decision-making process. Existing activities range from tourism to fishing and research. The conduct of these activities may involve the erection of structures (such as jetties) and operational impacts (such as boat discharges). They generate an array of environmental, social, cultural and economic effects.

This report represents the first stage of a two-part study. In stage two, the method will be implemented at a case study area, in order to test the concept and approach. A second purpose of stage two is to generate stakeholder confidence in the approach, in order to facilitate wider application of the method throughout Fiordland. As an outcome of the test or 'pilot' application of this method, refinements to the method may be suggested.

1.2   The carrying capacity concept

This study is about ***carrying capacity***, a term which is often misunderstood. Early applications of the carrying capacity model had a narrow focus on defining a single number of users appropriate for an area. It is now widely recognised that there is no single capacity value for a natural resource area (Espiner, Higham and Corbett, forthcoming). Many factors influence the nature of the carrying capacity(s) for a site, including place, season and time, user behaviour, management objectives, facility design, patterns and levels of management, and the dynamic nature of the physical setting (Beaumont, 1997; Hall and Page, 1999; Manning, 1999).

Therefore the notion of carrying capacity has been reframed. The question 'how much use is too much?' has given way to 'what are the appropriate or acceptable conditions?' (Prosser, 1986; Manning, 2000; 2001; Moore, Smith and Newsome, 2003; McCool and Lime, 2001). This begs acknowledgement of what conditions are desired (the values of the area that require protection), and the definition of 'acceptability' for these conditions (a judgement about what condition standard is appropriate).

Contemporary applications of the carrying capacity concept provide structured processes for making decisions about human activities. Carrying capacity models have a major contribution to make to the challenge of increasing numbers and diversity of natural resource users, and the inevitable social and physical impacts they create. They are increasingly used in the management of high-use national park systems (Manning, 2001; Laven Manning and Krymkowski, 2005). A variety of such approaches now exists, including the Limits of Acceptable Change (LAC), Visitor Impact Monitoring (VIM) and Visitor Experience and Resource Protection (VERP) (Manning, 1999; 2005; Vaske, Whittaker, Shelby and Manfredo, 2002). These frameworks share a common focus on:

(1) identifying clear management objectives;

(2) defining the intended human experience at the natural resource area;

(3) selecting indicators of quality that reflect the essence of the management objectives; and

(4) the establishment of standards of quality that express the minimum acceptable condition for each indicator (Manning, 1999; 2000; Manning, Valliere, Wang and Jacobi, 1999; Freimund and Cole, 2001; Vaske et al., 2002; Budruk and Manning, 2004; Newman, Manning, Dennis and McKonly, 2005; Laven et al., 2005).

1.3　A carrying capacity framework for Fiordland

In the development of a carrying capacity method for the ***integrated management of human activity in Fiordland***, several underlying factors are critical, including community / stakeholder involvement, the identification and protection of values, and the use of a robust science-based approach.

Community/stakeholder 'buy in'

Past experience indicates that decisions about tourism/recreation use within Fiordland can be controversial and lead to protracted planning processes and disputed outcomes. The method therefore must provide a robust means to identify community views about the acceptability of human activities in the fiords, in order to maximise community/stakeholder 'buy in' for decisions. This requires a transparent and consultative approach, in which consensus stakeholder involvement is the ideal.

Protecting values

In order to manage human activity within Fiordland, the values of the places under consideration need to be identified and then managed to protect these values. This is contingent upon community acceptance of these values.

Science-based

A robust science-based approach is needed, in order to ensure decision-making is sound, fair and minimises disputes. For this reason, the method presented in this report has been developed from a review of carrying capacity research and case studies, including New Zealand applications.

1.4　Report outline

This report presents a review of the relevant international research literature (Section 2) which underpins the carrying capacity framework. Conclusions from the literature review that are pertinent to the development of a method for Fiordland are highlighted in Section 3. The

proposed method is outlined in Section 4, while Section 5 discusses general issues surrounding the application of the method.

2.0 LITERATURE REVIEW

2.1   Introduction

Over the last fifty years, the importance of understanding the management and use of natural resource areas has increased. This is a response to an enhanced global interest in the natural environment and a prolific increase in the capacity for people to travel. These social phenomena have contributed to the growing challenge of planning for and managing human activities in natural areas.

Owing to the spectacular growth in natural area tourism, much of the research literature about natural area planning is focused upon tourism and recreation. However, the imperative for natural area planning is to integrate touristic activity alongside other resource-dependent activity, such as fishing and timber harvesting.

At the intersection of increased tourist activity and the burgeoning concern about natural environments, are the national parks and protected natural areas of the world. The natural area planning literature has a strong association with these areas and many case studies are drawn from national parks. However, such planning techniques equally apply to publicly-owned and publicly-managed natural areas outside public conservation lands.

In New Zealand, protected areas form the backbone of a rapidly growing tourism industry (Booth and Simmons, 2000; Hughey et al., 2004; Kearsley, Russell and Mitchell, 2000). Such interest has increased the importance of, and interest in, monitoring these areas in ways that will help sustain both the quality of natural environments and the experiences that visitors seek.

Furthermore, the ways in which people use natural areas is rapidly diversifying. From a small number of outdoor recreation pursuits such as tramping and climbing thirty years ago (Devlin, 1995), natural areas now represent settings in which a growing number of commercial opportunities are realised. These include the development of nature and adventure tourism activities, and organised sporting events in national parks (Espiner, 1995; Cloke and Perkins,

1998). Understanding the varied implications of such changes, including the inevitable social and biophysical impacts, is vital to ensure sustained quality in natural resource conditions.

2.2   The nature and significance of social and biophysical impacts on natural environments

Several decades of research have demonstrated the importance of understanding both the social and biophysical environment. Changing conditions within each of these settings can have a detrimental effect on natural resources, the visitor experience and/or the natural character. In New Zealand, increasing numbers of both domestic and international visitors to conservation areas has led to growing concerns (among a variety of stakeholders - including the popular press, academic and management interests) that at some sites, current human activities may not be sustainable (DOC, 1996, Coughlan and Kearsley, 1996; Hughey et al,. 2004; Kearsely, Russell and Mitchell, 2000). In particular, there have been concerns about how changing recreation patterns and activities are affecting the quality of natural resources and experiences, including questions raised about the impacts of relatively new activities such as mountain biking, marine wildlife viewing, mountain running and sporting events such as the Kepler Challenge (Corbett, 1993; Preston, 1993; Horn, 1994; Espiner and Simmons, 1998).

The literature reporting the effects of human activity in protected natural areas typically differentiates between 'impacts' that are *social* and those that are *biophysical*. In this context, the term *impact* refers to the specific adverse effects of human activities that represent threats to values identified as significant within the area.

Biophysical impacts are normally described as the negative effects of human activity on wildlife, soil, vegetation and water (Booth and Cullen, 1995; Hammitt and Cole, 1998; Cole, 2000; DOC, 2005), although some New Zealand authors have categorised impacts as physical damage, wildlife disturbance and hazard introduction (Cessford, 1997). Impacts commonly associated with human activities in natural areas include removal of vegetation, reduction in species diversity, displacement and rearrangement in community structure, and changes in soil properties (Booth and Cullen, 1995). Wildlife disturbed by human activity may alter their foraging range, breeding habits, or have to compete more for diminishing resources. Compacted soils can lead to penetration resistance, increased run-off, erosion and ultimately, increased sediment levels in streams and rivers (Liddle, 1997). Motorised boats and other coastal or waterfront activities can impact upon water quality conditions, thereby threatening

aquatic life and future human use of these resources. Activities such as recreation and tourism encourage the concentration of impacts on or around facilities (Booth and Cullen, 1995).

The concept of social impacts emerged from recognition that many activities have a negative influence on people, including communities and individual groups (Latu and Everett, 2000; Cosslett, Buchan and Smith, 2004). In protected natural area contexts, the common social impacts studied are associated with outdoor recreation pursuits and tourism activities. Recreation managers and tourism operators are interested in these impacts because of their aim to facilitate quality experience opportunities for clients. Social impacts are also considered important because negative influences on visitor experiences potentially contribute to displacement of visitors to areas previously unaffected by human activity.

Studies investigating social impacts are often directed at either determining whether or not conflict exists between recreation activity groups (or between recreation and other resource users), or assessing the level of crowding perceived at a specific recreation site. Some of the New Zealand social impact issues include the social effects of sporting events held in national parks (Corbett, 1993; Preston, 1993; McKay, forthcoming); aircraft noise at tourism icon sites such as Aoraki/Mount Cook, the Fox and Franz Josef Glaciers, and the Milford Track (Oliver, 1995; Sutton, 1998; Booth, Jones and Devlin, 1999; Corbett, 2001); visitor perceptions of satisfaction and crowding on the Great Walks (Cessford, 1997; 1998a; 1998b) and the presence of crowding and conflict among and between various outdoor recreationists (Horn, 1994; Hawke and Booth, 2001; Corbett, 2001; DOC, 2004). See Figure 1.

As the popularity of national parks and other natural areas increases, there is growing concern about the impacts human activities have on the condition of the natural resource and on the quality experiences of visitors and residents. The literature suggests that social impacts are dependent on the number, frequency and type of other visitors encountered during a recreation experience (Manning, 1999; Eagles and McCool, 2002; Newsome, Moore and Dowling, 2000), as well as their actions and behaviour. In addition to these, biophysical impacts are likely to be determined by factors such as seasonality, soil structure and species sensitivity. These variables need to be monitored over time in order to assess the extent and scope of their influence.

Research has shown that both the natural and social environments associated with protected natural areas have the potential to be negatively affected by certain conditions, including the presence and activities of other people. Monitoring indicators of conditions known to detract from the visitor experience or natural character of a place ultimately allows managers to create appropriate limits to human activities and ensure that key values are protected.

Social impacts: Conflict and crowding

Conflict is a common and difficult issue in many natural areas around the world (Hammitt and Schneider, 2000), typically characterised by incompatibilities between different uses of the same resource (Ewert, Dieser and Voight, 1999). Conflict occurs when the goals of discrete user groups are disrupted by the actions or presence of another user group (Jacob and Schreyer, 1990). In this sense, conflict has been reported between users in the same activity, and between a variety of interest groups competing for the use of an area (or whose goals depend on the maintenance of specific conditions in a natural area, such as natural quiet, solitude, freedom to roam). Conflicts in natural resource settings have been found between *new* and *traditional* groups, *motorised* and *non-motorised* activities, as well as between farmers, recreationists, fishers, tourism operators, hydro-electricity interests and indigenous peoples.

Natural resource recreation areas, once the preserve of pioneer explorers and adventurers, are now shared by a variety of interests, creating interactions between individuals and groups who may hold sharply contrasting values for such settings (Ewert, Dieser and Voight, 1999). Growth in number of visitors and diversity of use, has contributed to the emergence of conflict as a key management issue in many protected natural areas.

Crowding has been one of the most researched aspects of tourism and recreation in natural resource settings (Shelby, Vaske and Heberlein, 1989; Manning, 2001). Interest in the concept is based largely on concerns over the increased use of these areas since the 1950s, and its effect on back-country and wilderness experiences. In these contexts, crowding occurs when the number of people within a defined recreation site (the density) reaches a point at which it is perceived to interfere with the values, activities, or intentions of visitors (Graefe, Vaske and Kuss, 1984; Manning, 1999).

While the nature of the crowding concept is a subjective one, it is an attribute of considerable importance in wilderness and backcountry settings in particular. As Freimund and Cole (2001, p. 3) contended: "Virtually everyone would agree… that to be wilderness (in the context of public lands) a place must be relatively uncrowded". Similarly, Hammitt and Patterson (1991) and Fredman (2004) argued that generally people seek privacy and quiet in wilderness and that 'too many' encounters can detract from the experience.

Figure 1: Description of social impacts

The next section of this review outlines the development of the carrying capacity debate and the emergence of objectives, indicators and standards (OIS) frameworks for understanding management of impact issues. The principles of effective indicators and standards are identified and discussed in terms of how they improve the carrying capacity framework, and the management of impacts.

2.3   Carrying Capacity: An outline of early applications

Increasing levels of visitor use in some natural areas raised concerns about sustainability of resources and experiences as early as the 1930s (Manning, 1999; 2005; Freimund and Cole, 2001). By the late 1950s, North American researchers and managers perceived a need to develop tools that could be used to protect areas from excessive use, yet continue to allow public enjoyment of natural resources. The concept of carrying capacity emerged from the range management tradition as a promising framework through which use limits could be justified (Manning, 1999). In the biological sense, the term implies the maximum population of a given species that a particular environment can support indefinitely (Catton, 1978; Manning, 2000). In the recreation and natural areas context, the applications of carrying capacity focus on the effects of increased use on both the social and biophysical environment. The social dimension of carrying capacity has attempted to determine a use level past which visitors are no longer able to satisfy their recreational needs in a given recreation environment due to competition for the same resources (Manning, Lawson, Newman, Laven and Valliere, 2002).

Early researchers interested in the objective of establishing carrying capacities for recreation and tourism, hypothesised about relationships between the number of recreationists at a given site, perceptions of crowding among visitors, and the level of visitor satisfaction. These ideas led to the creation of a hypothetical satisfaction model, the basic assumption of which was the existence of an inverse relationship between user density and the satisfaction of recreationists (Manning, 1999). In simplified terms, the model proposed that as numbers of visitors increased, visitors' perceptions of crowding would rise, leading to lower levels of satisfaction. Similarly, in the biophysical context, early projections assumed a linear relationship between level of human activity and detrimental effects on the resource (Manning, 1999).

Most studies have now dispelled these early hypotheses about simple, linear relationships between the number of visitors and social or biophysical impacts. For instance, the complexity of the crowding concept (its normative dimensions, psychological and

behavioural responses), as well as the methodological issues linked to displacement of dissatisfied visitors, have made establishing clear social carrying capacities in natural settings very difficult. Likewise, biophysical carrying capacities cannot be claimed without a clear management context. Most authors now recognise that there are no set or standard capacity values for natural resource areas (Latu and Everett, 2000; McCool and Lime, 2001). Rather, carrying capacity varies depending on place, season and time, user behaviour, facility design, patterns and levels of management, and the dynamic nature of the physical setting (Beaumont, 1997; Hall and Page, 1999; Manning, 1999). Indeed, depending on managers' objectives, a site can have multiple objectives. A marine park, for instance, may have a very low carrying capacity if managers intend to provide opportunities for solitude in a pristine setting, or limit human interaction with wildlife to specific seasons. The capacity is likely to be very much higher, however, if the emphasis of management is wide public access or sociability (McCool and Lime, 2001). To this extent, the focus of the carrying capacity debate has changed from asking 'how much use is too much?' to the question 'what are the appropriate or acceptable conditions', given the values of stakeholders, and the ideals of management? (Prosser, 1986; Manning, 2000; 2001; Moore, Smith and Newsome, 2003; McCool and Lime, 2001). Such a shift in focus represents a more transparent carrying capacity framework within which there is acknowledgement of inherent value judgements.

2.4   Objectives, indicators and standards (OIS) approaches

Early applications of the carrying capacity framework have been criticised for being overly simplistic attempts to set 'magic number' limits for recreation and natural resource sites (Manning, 1999; 2000; McCool and Lime, 2001). The emphasis on quantification (implied by use limits) also suggests that decisions about carrying capacity are more objective than they really are. In reality, decisions about use limits are ultimately subjective, made by managers (in consultation with relevant stakeholders) in the context of specific management objectives for the area. The observation that carrying capacity is dependent on management objectives was a critical advance in the application of the concept within recreation and tourism contexts (McCool and Lime, 2001). With this acknowledged, there is an essential role for the public in providing the values and ethics to inform the objectives (McCool and Lime, 2001).

The carrying capacity concept has evolved into a range of more transparent frameworks which provide structured processes for making decisions about use levels. Far from losing

relevance, reinvigorated carrying capacity models are increasingly important in high use national park systems and other areas where human activities threaten natural resource values (Manning, 2001; Laven et al., 2005). A variety of such approaches now exists, the most frequently cited including the Limits of Acceptable Change (LAC), Visitor Impact Monitoring (VIM), Visitor Experience and Resource Protection (VERP) and the Beneficial Outcomes Approach (BOA) (Manning, 1999; 2005; Vaske et al., 2002; Nilsen and Tayler, 1997; Eagles, McCool and Haynes, 2002; Booth, Driver, Espiner and Kappelle, 2002).

The various expanded carrying capacity models are thoroughly reviewed and comparisons drawn elsewhere (see Sutton, 2004; Nilsen and Tayler, 1997; Eagles, McCool and Haynes, 2002). In summary, these frameworks share a common focus on identifying clear management objectives; defining the intended visitor experience at the natural resource site; selecting indicators of quality that reflect the essence of the management objectives; and the establishment of standards of quality that express the minimum acceptable condition of each indicator (Manning, 1999; 2000; Manning, Valliere, Wang and Jacobi, 1999; Freimund and Cole, 2001; Vaske et al., 2002; Budruk and Manning, 2004; Newman, Manning, Dennis and McKonly, 2005; Laven et al., 2005). The advanced carrying capacity framework has a major contribution to make to the challenge of increasing numbers and diversity of natural resource users, and the inevitable impacts they create.

Of the current frameworks, the LAC process has achieved the most widespread use and acceptance. As with the similar models, the LAC developed out of the Recreation Opportunity Spectrum (ROS) approach to recreation management, an internationally recognised planning framework for the management of outdoor recreation (Manning, 1999). The basic premise of the ROS is that visitors' recreation needs are best served when a diversity of opportunity is available. In practice, this implies that sites should be managed for different but equivalent experience outcomes. The ROS achieves this through the creation of recreation classes or zones, each of which is defined in terms of the expected conditions. These conditions are organised into three primary settings or environments: natural, social, and managerial. Changing conditions within any one of these three settings is likely to influence visitor perceptions of quality at recreation sites.

Although most known applications of LAC have been within the recreation, tourism and conservation management context, there is no apparent obstacle to its application in other natural resource management contexts where there is demand for human activities. Fundamentally, the LAC focuses on determining desirable environmental and social conditions for natural resource areas where human activities occur, and the management actions necessary to help achieve these conditions. The LAC process is systematic, explicit,

defensible and rational, and involves interested stakeholders to ensure relevance (Eagles, McCool and Haynes, 2002).

Few applications of carrying capacity models exist in New Zealand, despite their common use overseas. A recent New Zealand application of a LAC process aimed to strengthen the agency accountability, and stakeholder investment, in the results (Wray, Harbrow and Kazmierow, 2005). In addition to using a focus group to help generate data on the relevant values and issues associated with Mason Bay in Rakiura National Park, the researchers returned to the focus group for an assessment of the acceptability of each of 12 critiera initially generated by the group. This allowed the investigators to compare the actual resource condition (eg., 58% of visitors reporting crowding at the hut) to the maximum acceptable condition specified by the cross-section of stakeholders (eg., 28% of visitors reporting crowded at the hut). This method has considerable utility in the present research methodology as it potentially increases stakeholder commitment to the findings through direct involvement, transparency and appreciation of what the results mean. Further application of this augmented LAC approach is currently underway in Arthur's Pass National Park, where the researcher is examining visitor and stakeholder thresholds for change on the Mingha/Deception Track (McKay, forthcoming).

A partial application of the LAC approach is reported in Johnson, Ward and Hughey (2001) in their investigation of visitor and stakeholder concerns about natural attractions in Paparoa National Park. The researchers interviewed stakeholders individually and asked each for suggestions on indicators of change in the area. Indicators were later classified as either environmental or social. The researchers noted that the variety of indicators put forward by stakeholders would need to "… go through a refining process with biological experts and managers to determine those indicators that are appropriate, measurable and in-line with management goals" (Johnson et al., 2001, p.47). This latter point is an acknowledgement that stakeholder contributions are only one part of the process of identifying values and the choice of indicators also must be guided by management objectives.

In other New Zealand work, Hughey et al. (2004) developed an integrated approach to managing natural assets used by tourists. This approach aimed to classify natural assets by their biophysical *type* (such as 'wildlife' or 'vegetation') and *class* (such as 'marine mammal' or 'reptile'). In their approach, Hughey et al. (2004, p.362) assessed each natural asset in terms of its importance and fragility, then linked these to indicators that allow managers "…to evaluate the response of the asset to managed (and unmanaged) interventions". This approach provides a useful set of criteria for assessing the importance of various natural assets – a

framework that may have utility in the present methodology. The framework places emphasis upon a consultation process that is heavily dependent on the contribution of scientific experts.

Components of objectives, indicators and standards approaches

Using the basic steps set out in Figure 2, natural area managers have a sequential process for justifying and managing use levels and the associated visitor effects. It should be noted that adoption of these approaches involves considerable commitment of resources. It is especially important that adequate time is devoted to gathering relevant information on the agreed qualities of specific locations, and that these qualities are accurately reflected in the indicators chosen. Similarly, monitoring of resource and experience conditions must be sufficiently frequent to ensure that unacceptable deviations from the designated standard are indicated within a timeframe that allows managers to respond appropriately.

Common features of recent carrying capacity frameworks

1) Determine the significant resource and experience values, issues and concerns

2) Develop goals that specify the benefits to be achieved

3) Define appropriate experience opportunities for specific management objectives

4) Identify key impact indicators that reflect the resource and experience values

5) Set quantitative standards for the impact indicators

6) Create an inventory of existing conditions, and develop a process for monitoring

7) Determine specific management options available if indicators exceed standards

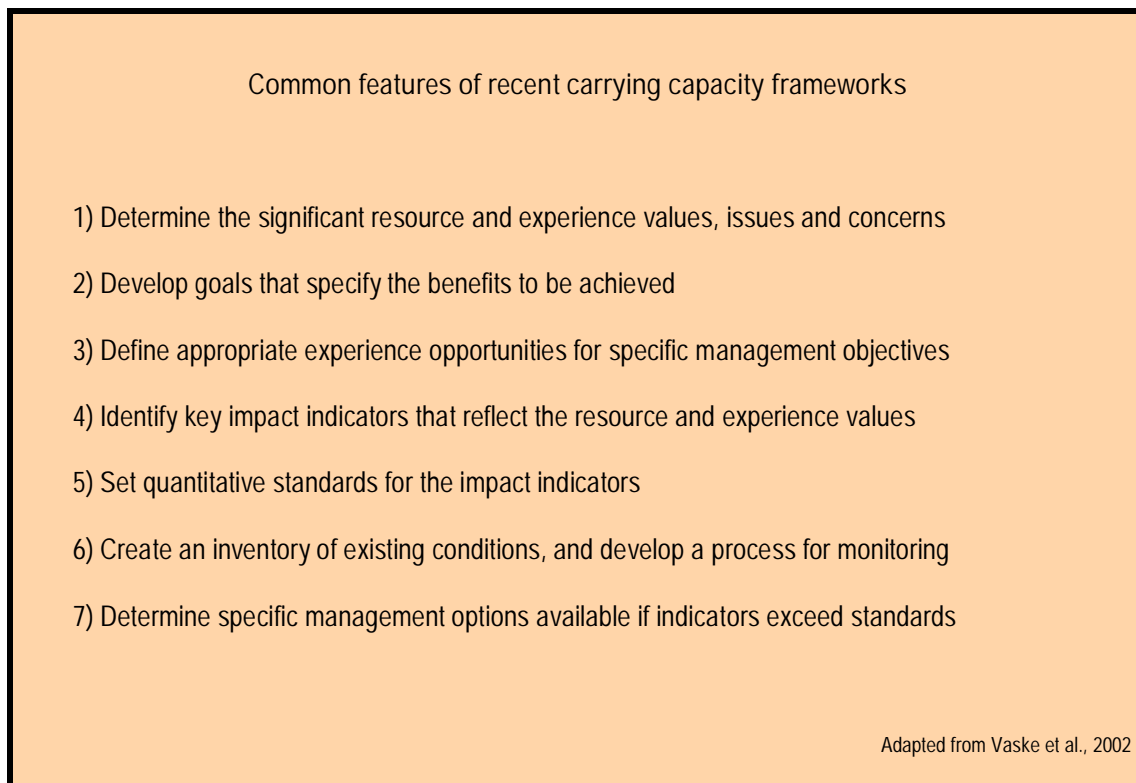Adapted from Vaske et al., 2002

Figure 2: Common features of recent carrying capacity frameworks

By removing the emphasis on single, numeric capacities for natural resource areas, and re-framing the question to focus on the *appropriateness* of various resource and social conditions, contemporary carrying capacity researchers are developing decision-making processes that make value judgements more explicit. McCool and Lime (2001. p. 384) contended that these approaches will "…encourage dialogue about what is important and how to protect it". Furthermore, these authors argued that systems (such as LAC and others) have the potential to "…achieve agreement first on overall goals and second on the specific means to achieve those goals while emphasising learning and consensus building would lead to far greater benefits to the local community and protected area than [those] built on the illusion of scientific objectivity".

Within the literature on the remodelled carrying capacity frameworks, there has been considerable focus on the identification of meaningful indicators to accurately reflect changes in valued social and biophysical resource conditions, and the establishment of standards that protect these (Borrie and Birzell, 2001; Budruk and Manning, 2004; Cole, 2004; Freimund and Cole, 2001; Hendee and Dawson, 2002; Hughey et al., 2004; Manning, 1999; 2001; 2005; Newman, Manning, Dennis and McKonly, 2005; Vaske, Whittaker, Shelby and Manfredo, 2002). There are a variety of specific attributes of effective indicators and standards largely accepted in the literature (Manning, 1999; Vaske et al., 2002). The characteristics of good indicators and standards of quality are summarised in Figures 3 and 4.

By defining indicators and standards of resource or experience quality, carrying capacity can be determined and managed via a monitoring programme (Manning, 2001). However, it is important to recognise that the technical frameworks such as LAC do not remove the subjective challenge for managers to determine the standards of acceptability in any natural resource setting. In this context, the literature to date is clear that the management of carrying capacity involves both science and values (Cole, 2004; Manning, 2001; Nilsen and Tayler, 1997). Manning (2001, p.26) argues that:

> *Managers must ultimately make value-based judgements about the maximum acceptable levels of visitor-caused impacts to the resource base and the quality of the visitor experience. However, such judgements should be informed […] by scientific data on the relationships between visitor use and resulting impacts, and the degree to which park and wilderness visitors and other interest groups judge such impacts to be acceptable.*

Characteristics of effective indicators

Good indicators should be:

1) *Specific*:	Indicators should define specific rather than general conditions
2) *Objective*	It should be possible to measure the indicator in an unambiguous way
3) *Reliable* and *Replicable*	Indicators are reliable if measurement reveals similar results under similar conditions. This is important because monitoring of indicators is often conducted by many different people
4) *Related* to human activity	There should be a strong correlation between the defined human activity and indicators of change.
5) *Sensitive*	Indicators need to be sensitive to small changes in conditions over short time periods (eg., one year)
6) *Manageable*	Indicators need to be responsive to management actions
7) *Efficient* to measure	Indicators need to be monitored regularly in a relatively simple and cost effective manner
8) *Significant*	Indicators must reflect some attribute pertaining to the quality of the resource or stakeholder value

Adapted from Manning, 1999; Vaske et al., 2002

Figure 3: Characteristics of effective indicators

Figure 4: Characteristics of effective standards

In part, the social norm approach has made useful contributions to this evaluative task. The normative approach is based on the idea that "visitors share, on some level, agreement on what managers ought to provide in a setting…" (Freimund and Cole, 2001, p.5). As such, knowledge of resident/visitor norms pertaining to a specific attribute at a particular site can help managers establish standards for the condition of these attributes. In addition to establishing norms through social surveys, the basis for selecting social indicators and standards might include sources such as: legislation and agency policy documents; the professional judgement of resource managers; other forms of public involvement; lobby

groups; historic precedent; and regional analysis of supply and demand for use opportunities (Laven et al., 2005; Vaske et al., 2002). The final section of this literature review examines some of the principles of stakeholder involvement in the carrying capacity process for natural areas.

2.5   Involving the public in establishing standards: Some principles

A critical dimension of recent carrying capacity models is the acknowledgement that protecting natural and social values necessitates a degree of public participation and community investment in the management process. Inevitably, a considerable literature on public involvement in planning and management has evolved over the last 30 years (Forgie, Horsely and Johnston, 2001). Of particular relevance to the present context, are the guidelines set out by the World Conservation Union (the IUCN) on management and planning for protected areas (Eagles, McCool and Haynes, 2002).

Principles of the stakeholder involvement process

- Ideally, all participants should have the opportunity to contribute constructively to the process. This is more likely to lead to 'ownership' or acceptance of the management plan or decision

- Stakeholder involvement should permeate the process rather than serve as an 'add on' at the beginning or end

- Each public participation process should be designed to meet the specific needs of the situation (people, place, issues etc.)

- The credibility of the process (and of those leading it) will be maximised if an appropriate timeframe is created for public participation

Adapted from Eagles et al. (2002)

Figure 5: Principles of the stakeholder involvement process

The involvement of people who have a stake or an interest in how natural resources are managed is now part of best practice in protected area planning and management (Thomas and Middleton, 2003; Wilson, 2005). The benefits of consulting with stakeholders include increased commitment to management objectives and practices, community empowerment, and the chance to develop an on-going mechanism for communication between planners and the various interest groups.

Participation can take a variety of forms ranging from simply *informing* groups or individuals about proposed actions, through to processes that *share* decision-making and responsibility for implementation (Thomas and Middleton, 2003). The type of involvement chosen will ultimately depend upon what the agency aims to achieve from the process and the extent to which legislative and/or political mandates allow them to include others in the decision-making process (Thomas and Middleton, 2003). As a general rule, high involvement approaches will take more time and cost more, but are likely to result in more consensus and 'buy in' from those included. Figure 6 includes examples of specific community involvement techniques and the main objectives of each.

Technique	Main objective(s) and strength(s)
Surveying	▪ Receive information
Information sheet or media campaign	▪ Community contact ▪ Information delivery
Discussion document	▪ Deliver and receive information ▪ Resolve conflict
Individual stakeholder interview	▪ Deliver and receive information ▪ Address specific interests ▪ Establish 2-way communication ▪ Resolve conflict
Public meeting	▪ Deliver, receive and share information ▪ Community contact ▪ Establish 2-way communication
Stakeholder group or workshop	▪ Deliver, receive and share information ▪ Facilitate participatory decision making ▪ Community contact ▪ Establish 2-way communication ▪ Resolve conflict

Adapted from Eagles et al. (2002)

Figure 6: Examples of community involvement techniques

A focus group can be a practical way to develop and maintain community consultation, as a mechanism for sharing and receiving information and views and developing an appreciation of the perspectives held by different interest groups (Cameron, 2000; Kreuger and Casey, 1994). A focus group represents a selection of individuals, identified as possessing an interest in the topic under consideration, who are brought together by a facilitator to discuss a particular issue or series of issues (Kreuger and Casey, 1994; Wray et al., 2005). In order to maximise the range of views and information available, and to ensure that participation and interaction are not impeded, Hancock (1998) recommends that focus groups include between 6 and 10 people.

The focus group technique has considerable utility in the proposed Fiordland application. For instance, as Wray et al. (2005) noted:

- This form of community participation is especially useful where a range of competing interests is known to exist, requiring input from a variety of stakeholders

- Focus groups allow participants a perceived degree of control over the decision-making process

- Selection criteria for involvement allow managers and planners to ensure relevant sectors of the community are represented

- Participation rates in focus group approaches are generally higher than some other forms of community involvement (such as surveys and public meetings).

Planning processes associated with natural areas can potentially involve many stakeholders, each with its own values and objectives. One of the fundamental questions to address at the beginning of the planning process is who the main stakeholders are. Figure 7 contains some guidelines for determining relevant interests.

Guidelines on identifying the key stakeholders

Individuals with influence over the natural area might include:

- Leaders of the local community or action group

- Representatives of government (local, regional and/or national)

- Non-governmental organisations

- Indigenous peoples

- Affected landowners

- Occupiers (farmers, those renting property or holding leases)

- Business people and their representatives, involved in economic activities such as forestry, fishing and tourism

- Environmental groups

- Protected natural area planners, managers and their workforce

- Representatives of those who organise or influence visitors to the area

- Researchers with projects in the area

- Media

Questions that may help identify key stakeholders:

1. What are people's relationships with the area (eg., how do they use and value it?)

2. What are their various roles and responsibilities?

3. In what ways are they likely to be affected by any management initiative?

4. What is the current impact of their activities on the values of the area?

Adapted from Eagles et al. (2002); Thomas and Middleton (2003)

Figure 7: Guidelines on identifying the key stakeholders

These stakeholders can be summarised into core interests relevant to the specific situation. For instance, for natural area planning, the classification depicted in Figure 8 may be applied. In Figure 8, the public participation element is shown as one component of a two-part process

which identifies public involvement in the planning process as separate to the involvement of managers and scientists/other experts. Eagles et al. (2002) emphasised that success in natural area planning is dependent upon the integration of these two parts as a single coherent process. Application of a carrying capacity planning framework can provide this integration.

Effective Natural Resource Plan

Depends on:

Public participation

- Learning
- Consensus building among:
    1. Local communities
    2. Business and industry
    3. Visitors
    4. Wider society

Technical Planning Process

- Management of the planning process
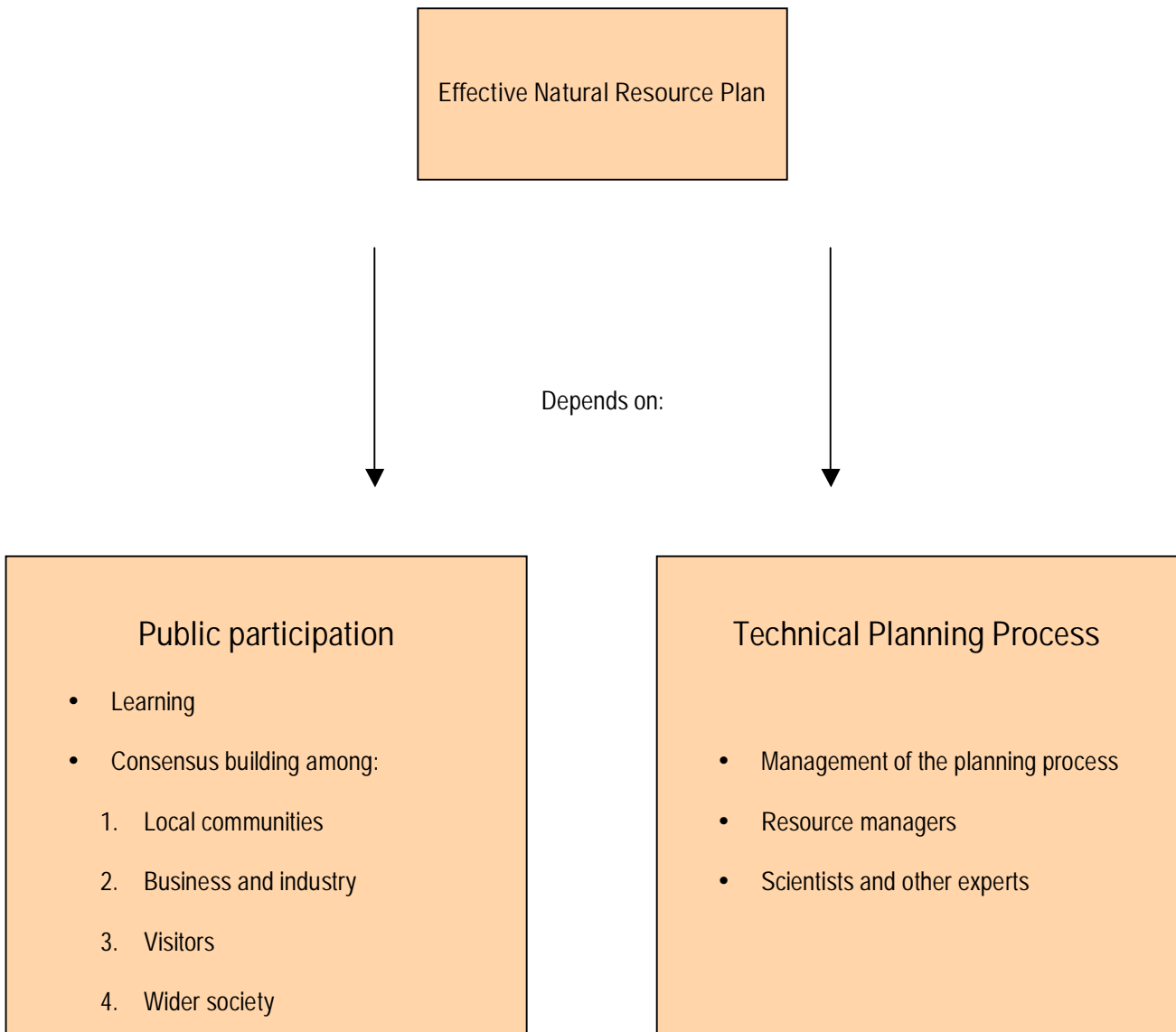- Resource managers
- Scientists and other experts

Figure 8: Effective planning for natural areas (adapted from Eagles et al., 2002)

3.0 METHODOLOGICAL PRINCIPLES AND DEFINITIONS

Key conclusions from the literature review that are pertinent to the development of a method for integrated management in Fiordland are presented in this section. These conclusions are configured as a set of principles to guide method development:

1. The relevant methodological paradigm is the carrying capacity framework.

2. This framework has developed from the basis of scientific examination of human activity within natural areas, especially recreation and tourism.

3. Carrying capacity is expressed as the 'limits of acceptable change' in resource and social conditions. This requires the definition of resource values, in order to identify parameters of the resource (indicators) which are to be managed within an agreed acceptable limit or threshold. This approach ensures that resource management achieves the desired resource conditions (standards).

4. Applications of carrying capacity include an objective (measurement) and a judgement (managerial) component.

5. Models developed to operationalise the carrying capacity concept establish objectives, indicators and standards for the natural area under consideration.

6. Stakeholder involvement is critical and the process for stakeholder selection is made transparent. Stakeholders have input into establishing the resource and experience values, identifying threats to these values, confirming the indicators and setting the standards for resource/social conditions.

7. The process is suitable for collaboration between public agencies and can address potentially controversial issues (resource conflicts).

8. Guidelines have been developed to assist with parts of this process (see Section 2).

9. The process focuses upon outcomes - desired resource/social conditions are defined and protected (encompassing the environmental, social and managerial setting).

10. The planning process is scientifically defensible: (1) its design is substantiated by a large international research literature; and (2) decision-making within the process is informed by scientific study of relevant parameters.

Various 'technical' terms are used in this report. These are defined as:

Resource value: An aspect of the environment that is important to someone (e.g. presence of native birds).

Experience value: A benefit gained by people from visiting the natural environment (e.g. tranquillity).

Indicator: An objective measure of the condition of a particular value (e.g. number of native birds observed at site X).

Threshold: Measurable levels for any specific indicator that relate to the condition of the resource/experience value. Thresholds can be considered as 'lines in the sand' (e.g. no fewer than X native birds recorded at site X within defined sample period).

Limit of acceptability: The threshold agreed (by stakeholders) to represent the minimum desirable resource condition. The limit of acceptability is a threshold – that threshold chosen as desirable by stakeholder(s).

Standard: The desired resource and experience conditions adopted by the management agency. Management actions (if required) are directed at achieving the agreed standards. In practical terms, most standards will be the same as the limit of acceptability (and expressed in the same way). However, the standard adopted by the management agency could be different from the limit of acceptability (defined by stakeholders) in some circumstances.

Stakeholder: A person who has an interest or stake in the area (e.g. local resident).

Based on the principles presented in this section, which have been drawn from the research literature, a carrying capacity method has been derived for use in Fiordland by Environment Southland and the Department of Conservation. The method is outlined in Section 4.

4.0   DISCUSSION OF METHOD

The method comprises six phases and eleven steps. Each step is discussed in this section, including a description of the objective(s) for that step, the approach to be taken, specific details about the method to be followed, and factors to consider when operationalising the process. Where appropriate, examples are provided to illustrate the step. The process is summarised in Figure 9.

Phase One: Establishment	Step 1: Identify stakeholders
Phase Two: Information gathering	Step 2: Determine stakeholders' values and perceived threats
	Step 3: Outline management objectives, and threats identified by managers
	Step 4: Determine indicators
	Step 5: Develop indicative standards
	Step 6: Prepare information statement
Phase Three: Confirmation	Step 7: Confirm values and indicators, and set standards
Phase Four: Objective measurement	Step 8: Measure resource and social conditions
Phase Five: Acceptability assessment	Step 9: Compare existing conditions with standards
	Step 10: Report results and discuss management options
Phase Six: Management	Step 11: Ongoing management

Figure 9: Summary of the planning process

Step 1: Identify stakeholders

Objective: To form a Stakeholder Group to contribute to the planning process.

Approach: This task has two parts. First, stakeholders are classified to identify the types of people with an interest in the area under consideration. Second, specific individuals are selected from each stakeholder category and asked to participate in the Stakeholder Group.

Method:

1. Follow the guidelines presented in Figure 7 (page 19) to list the different types of people who have an interest in the area.

2. People may be identified from formal lists (such as submittees on previous plans) and local knowledge.

3. For each type of stakeholder, identify individuals who could contribute to the planning exercise (based on local knowledge). Aim for individuals who could provide

an informed perspective on the social/environmental impacts in the area or would be demonstrably affected by changes in the management of the area.

4. Invite individuals to participate in the Stakeholder Group.

Factors to consider:

1. This step is critical to the successful implementation of the method. If the composition of the Stakeholder Group is criticised, then the integrity of the whole method is called into question. The process of selecting stakeholders must be transparent and defensible.. A record of stakeholder selection should be kept.

2. The recruitment of stakeholders in small communities like Fiordland can be challenging in terms of gaining community acceptance of Stakeholder Group membership. In the case of members from small communities, it is helpful if they are well-respected.

3. Not everyone who is interested can be involved. Stakeholder interests in the area may exist at local, regional, national and international levels. For practical purposes, national and international interests will be difficult to accommodate in the proposed process.

4. The Stakeholder Group should comprise people who know the area well.

5. Individuals are 'representatives' for each type of stakeholder. However, they do not fulfil the role of being a *consultative* spokesperson, as the method does not allow sufficient time for Group members to canvas their 'constituents'. Some *types* of stakeholder may be organisations, in which case it is appropriate to seek a nominated spokesperson.

6. Some interest groups will not be represented on the Stakeholder Group directly; for example, tourists. Tourists' interests may be covered by a tourism operator who puts forward a tourism perspective. This is different from the involvement of tourists in Step 8 (measurement of resource and social conditions), where tourists may be canvassed directly for their views.

7. Managers and scientists do not form part of the Stakeholder Group, although managers should be present at Stakeholder Group meetings to provide support for the Group and guidance about legislative constraints. Input from managers and scientists is obtained in subsequent steps.

8. For effective operation of the Stakeholder Group, the number of stakeholders should be limited to ten. If the number of stakeholder types is small (less than five), then multiple individuals may be chosen from each category.

9. At the first Stakeholder Group meeting, the planning process should be explained.

Example:

Stakeholder typology (adapted from McCleave, Booth and Espiner, 2005)

Stakeholder Type	Description
Recreation	Regularly (>once a week) recreates in the area
Tourism	Involved in a tourism business or the tourism industry contributes significantly to his/her business (e.g., accommodation owner, tour guide)
Business	Business owner/manager. Tourism only indirectly contributes to his/her business or not at all
Farmer	Farmer in the area
Industry	Currently works, or has worked, in an industry using the resources of the area such as milling or moss harvesting

Step 2: Determine stakeholders' values and perceived threats

Objective: To determine the values associated with the area, and the perceived threats to these values (area issues and concerns), as identified by the stakeholders.

Approach:

Convene the first meeting of the Stakeholder Group, to identify the range and extent of area values and issues of concern about the area held by stakeholders.

Method:

1. Run the meeting as a 'focus group' using a skilled, independent facilitator.

2. Identify all values, and threats to these values, for the area.

Factors to consider:

1. The use of a professional focus group facilitator is recommended.

2. Ranking of values is not part of the process. The purpose is to identify *all* values.

Example:

Values for Fiordland have been identified (Enviro Solutions NZ, 2005). Examples are: high water quality, presence of marine mammals, rare species of plants and animals, natural quiet, sense of wilderness, scenic grandeur, recreational climbing opportunity, Ngai Tahu spiritual values, lobster fishery, nationally-significant hydro-electric installations.

Value	Threat
Natural quiet	Increasing amount of motorised activity
High water quality	Discharges from tourist boats
Rare plant species	Trampling by visitors at site x

Step 3: Outline management objectives, and threats identified by managers

Objective: To identify existing management objectives for the area, and threats to the area's values as expressed by the management agencies.

Approach: Distill management objectives for the area and thus identify the 'boundaries' within which this process is operating. Input information into the process on threats to area values from relevant management agencies.

Method:

1. Review policy/planning documents.

2. Discuss with resource managers.

Factors to consider:

1. This step identifies existing policy and planning objectives. It is not intended to develop new objectives.

2. Acknowledged threats to the area (identified from management documents and resource planners) will supplement information on threats obtained from the Stakeholder Group.

Example:

Not applicable.

Step 4: Determine indicators

Objective: To identify indicators which measure the degree of impact (extent of change) for the values articulated in Step 2.

Approach: In order to protect the values that have been identified as important for the area, measurable attributes (indicators) which represent key values are identified. These indicators will be monitored to establish the resource/social conditions and to assess whether the existing conditions meet the determined standards (in later steps).

Method:

1. Management agencies derive indicators that represent the identified values, using scientific knowledge to do so.

2. Prepare a clear statement of the values and their associated indicators.

Factors to consider:

1. The set of indicators represents the objective measurement of the existing resource and/or social conditions.

2. Some values will be represented by one (or more) dedicated indicator(s), other values may share indicators (one indicator represents more than one value), while other values may be impossible to measure.

3. Research has been undertaken which assists with the identification of indicators relevant to New Zealand (for example, Hughey and Ward, 2002). Given the breadth of potential indicators, this scientific knowledge has not been reviewed in this report. This input will be provided by the scientists consulted in this step.

4. Guidelines for effective indicators (see Figure 3, page 14) should be followed.

5. Each indicator must be clearly linked to the pertinent value it represents.

6. Indicators must be determined with input from scientists (who may be on the staff of the management agencies), in order to ensure scientific validity (and community perception of such).

Example:

Value	Threat	Indicator
Natural quiet	Increasing amount of motorised activity	% of visitors adversely affected by noise generated by activity X
High water quality	Discharges from tourist boats	% of sample areas with water quality rating of less than X
Rare plant species	Trampling by visitors at site x	Number of species Y within 1m² quadrant at site X

Step 5: Develop indicative thresholds

Objective: To prepare draft statements of thresholds for the indicators.

Approach: In order to guide the assessment of indicator 'limits' at the second Stakeholder Group meeting (Step 7), drafts of scientifically meaningful thresholds are prepared. It is envisaged that this step will be undertaken at the same time as indicators are determined (Step 4).

Method:

1. Using scientific knowledge, identify possible indicator threholds.

Factors to consider:

1. A range of thresholds is appropriate. These will act as guidelines for stakeholders.

2. This step provides guidance to structure the later stakeholder assessment of acceptable limits of change for each indicator. Drawing on the research literature, certain limits can be anticipated and the threshold scenarios will incorporate these.

3. These indicative thresholds provide a range of scenarios within which the final standards will fall. Some scenarios may appear to fall outside current management objectives for the area. The intention is to maintain stakeholder participation (buy in) in determining resource condition standards (Step 7).

Example:

Value	Indicator	Indicative standard scenarios
Natural quiet	% of visitors adversely affected by noise generated by activity X	No more than 10% of visitors are 'annoyed' or 'very annoyed' by noise generated by activity X
		No more than 20% of visitors are 'annoyed' or 'very annoyed' by noise generated by activity X
		No more than 30% of visitors are 'annoyed' or 'very annoyed' by noise generated by activity X
		No more than 40% of visitors are 'annoyed' or 'very annoyed' by noise generated by activity X
High water quality	% of sample areas with water quality rating of less than X	No more than 5 % of sample areas have a water quality rating of less than X
		No more than 10 % of sample areas have a water quality rating of less than X
		No more than 15 % of sample areas have a water quality rating of less than X
		No more than 20 % of sample areas have a water quality rating of less than X

Step 6: Prepare information statement

Objective: To analyse and articulate the information gathered so far: area values, threats to these values, management objectives, indicators and indicative resource condition thresholds.

Approach: (1) Synthesise the information gathered within the process to date, and prepare a succinct written statement, so it may be reported back to the stakeholders for verification. (2) Evaluate the information to identify priority indicators, in order to establish a monitoring regime that targets critical values and their measurement.

Method:

1. Formal write up of the material that has been gathered from the Stakeholder Group and from management agencies.

2. Priority ranking of indicators will be determined by analysis of the values and management objectives information.

Factors to consider:

1. Priority setting is required in order to develop a practicable system to monitor the area's values. If all values were measured as indicators, the monitoring process would be unwieldy.

2. Rankings of indicators will be informed by scientific advice (Step 4) and managers' input (Step 3) and alignment of management objectives with the identified stakeholder values.

3. Explain steps in the process since the last Stakeholder Group meeting. Provide this information to stakeholders in advance of the second Stakeholder Group.

4. Clear linkages between the area values, threats, indicators and thresholds is required.

Example:

Not required.

Step 7: Confirm values and indicators, and set standards

Objective:

1. To confirm acceptance of the values and indicators by stakeholders.

2. To ascertain standards for each indicator.

Approach: This step has two stages. First, contact the Stakeholder Group via (e)mail and seek acceptance of the values/indicators. Second, convene the second meeting of the Stakeholder Group, to assess the limits of acceptability and establish realistic standards for each indicator.

Method:

1. Send the information statement to the Stakeholder Group. Ask them to confirm their agreement with the values and indicators statements by return mail.

2. Amend values and indicators as required, to obtain consensus approval of values and indicators. Any points of disagreement can be discussed at the second Stakeholder Group meeting.

3. At the Stakeholder Group meeting, seek individual assessments of the thresholds for each indicator. Emphasise that this should be done individually and without discussion to avoid stakeholders influencing each other.

4. Aggregate the individuals' assessments (apply equal weighting), to obtain a single 'limit'. A scoring system for acceptability can be operationalised. For example, ask participants to rank each threshold scenario as *no effect* (score of 0), *acceptable* (score of 1), *unacceptable* (score of 2), or *very unacceptable* (score of 3).

5. Present aggregated results to the Stakeholder Group.

6. Confirm acceptability of limits for each indicator (effectively the standard to which that part of the natural/social environment will be managed).

Factors to consider:

1. A calculation spreadsheet can be designed in advance to minimise time taken during the meeting to compute collective stakeholder assessments (use a refreshment break to process calculations).

2. Different standards may be appropriate for different sites within the area under consideration (eg. inner and outer fiord).

3. Consensus acceptance of the environmental/social condition standards is desirable.

Example:

Not applicable.

Step 8: Measure resource and social conditions

Objective: To obtain an inventory of existing conditions, relevant to the area values that have been identified, via measurement of the set of indicators.

Approach: This step represents the objective collection and analysis of data.

Method:

1. Target the monitoring studies to provide data as specified by the set of indicators.

Factors to consider:

1. This part of the process is the objective component. It is envisaged that scientists may be employed to undertake some of the studies, while other monitoring will be undertaken by the management agencies.

2. Robust scientific methods must be used.

3. Timeframes will differ and be dictated by the nature of the measurements. For example, visitor surveys may need to be implemented during peak visitor months, while studies of dolphin disturbance will need to relate to time periods appropriate to dolphin behaviour.

Example:

Survey of visitors' reactions to motorised activity X.

Study of water quality.

Ecological survey of rare plant species Y.

Step 9: Compare existing conditions with proposed standards

Objective: To ascertain whether the existing resource conditions match the agreed standards.

Approach: Data from previous steps are compared and conclusions reached about management problems.

Method:

1. Compare data from studies (Step 8) with proposed standards (Step 7).

2. Identify which indicators show unacceptable conditions exist, or where indicators are close to minimum acceptable thresholds. Where the proposed standard has been breached, a management problem exists.

Factors to consider:

1. This step should be straight forward, providing the monitoring has addressed the indicators specifically.

Example:

Not applicable.

Step 10: Report results and discuss management options

Objective: To present the results of Step 9 to the Stakeholder Group and discuss management options (where standards are breached or close to being so).

Approach: Convene the third meeting of the Stakeholder Group. Representatives of the two resource management agencies (ES and DOC) take an active part in this Step.

Method:

1. Present the results from the studies (Step 8), identify the agreed standards (from Step 7), and highlight which indicators are currently in breach of these (and so represent 'problems').

2. Managers present the range of management options to address the identified problems.

3. For each identified problem, the Stakeholder Group to discuss (1) whether is it appropriate to amend the standard, and (2) possible management responses.

Factors to consider:

1. Potential management responses may vary within the area, effectively management zones may be required.

2. Managers will need to prepare management options (in indicative form) between Step 9 and Step 10.

3. This step ensures that stakeholders have a 'say' in the outcomes from the process – the resultant management actions (if any) which are implemented within the area. Agreement (consensus) over management actions may not be reached. The intention of the process is to promote acceptance of the need for any actions, and understanding of the reasons why the actions have been chosen.

4. This step does not make the Stakeholder Group the managers of the area – they do not represent 'the management regime', but rather, a critical component of it.

Example:

Not applicable.

Step 11: Ongoing management

Objective: To continue to manage for the articulated values of the area.

Approach: Monitor indicators. Liaise with stakeholders as appropriate.

Method:

1. Continue monitoring at appropriate time intervals.

Factors to consider:

1. Periodically review the relevance of the values and their indicators.

2. The Stakeholder Group may be reconvened for this purpose, as necessary. However, it is not intended that the Group will operate indefinitely. The timeframe for the Stakeholder Group should be discussed at the outset of the process.

Example:

Not applicable.

5.0 APPLICATION OF METHOD

This section discusses factors relevant to the implementation of the method (rather than those specific to a particular step in the method).

1. The method is designed to be transparent; clear but succinct written statements are required by the process. A paper trail is important (to allow non-participants to follow events, and jog memories later in the process if disputes arise). Detailed notes of all Stakeholder Group meetings (perhaps audio records) should be kept.

2. The heart of the method is stakeholder involvement. Every effort should be made to keep participants happy with the process. Vested interests will exist – it is important to ensure the Stakeholder Group is professionally facilitated to avoid domination by any one interested party.

3. Because values and standards are likely to be place-specific, the geographical area of interest will need careful consideration. Individual fiords may be separately considered, or perhaps groups of fiords with similar values may be identifiable. Geographical delineation could be taken with community involvement.

4. Decisions about management of the area ultimately rest with the resource management agencies. The planning process outlined in this report allows input from stakeholders into that decision-making process.

5. The method does not have a definite timeframe. It is proposed that three months will be required for Steps 1-7. The timeframe for Step 8 is difficult to judge prior to establishment of the indicators.

6. The method is designed to be implemented by researchers familiar with the carrying capacity method. Advantages will accrue from using the same researchers for each application of the method, owing to consistency.

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