1.0 About the Guardians

1.1 The Guardians' Vision

"That the quality of Fiordland's marine environment and fisheries, including the wider fishery experience, be maintained or improved for future generations to use and enjoy"

1.2 Turning the vision into reality

This Fiordland Marine Conservation Strategy represents a very significant step towards realising the Guardians' vision. The group has voluntarily devoted a very significant amount of time over a period of more than six years to gather information, identify issues, debate ideas, develop management suggestions, hold information meetings, consult the public and produce this strategy.

In the process of developing this strategy, the Guardians have produced a number of complementary publications. At the end of the first year (1996), the group launched a code of responsible fishing practices to inform and educate fishers about taking care of Fiordland's fisheries and the marine environment. The code has been in demand ever since and remains an important up to date resource. In 1999, the group published a characterisation report together with the Ministry of Fisheries that brought together all the available information about Fiordland's fisheries. Then in 2001, a comprehensive annotated bibliography was produced with the Department of Conservation including relevant research and reports about Fiordland's fisheries and marine environment. Each of these publications makes an important contribution to achieving the Guardians' vision.

1.3 Who are the Guardians?

The Guardians formed in December 1995 when groups that are actively involved in Fiordland's fisheries selected members to join the group. The selection was based on knowledge and experience of Fiordland's fisheries and the marine environment, a commitment to looking after the resource, a willingness to work with other interests and the time to invest in the group's operations. The original members are listed in the 1999 characterisation report.

Commercial fisheries organisations (rock lobster, paua, and wet fish), the Southland Recreational Fisheries Association (fishing and diving), charter operators (company and individually operated charter boats) and Ngai Tahu from Murihiku and Kati Waewae Runanga, selected members who were available and able to represent their views on the Guardians. John Steffens was appointed as Chairperson at the inaugural meeting and has performed that role since then.

Turnover of members has been low and replacements have been selected according to the original criteria, with emphasis on local knowledge and continuity.

Following the broadening of the Guardians' mandate to include the marine environment in June 2000, environmental interests were included on the group. The Department of Conservation selected Steve Wing, a marine scientist, on the basis of criteria submitted by the Guardians. Environmental representation was increased in 2002, when Forest and Bird approved the appointment of Alan Mark to the Guardians. Ian Buick, a helicopter operator, joined the charter operator representatives, and local community interests' are now represented on the group by Irene Barnes. In addition to that position, a number of other members have wider community interests and hold positions on other local community organisations. The Guardians all live within the Fiordland or Southland/Otago region.

Although not members of the group, Ken Grange, NIWA, and Chris Paulin, Te Papa, have generously provided support and advice to the Guardians about Fiordland's marine environment.

Laurel Teirney is the group's facilitator and documents the Guardians' outputs.

Collectively, the group holds a wealth of knowledge and experience about Fiordland's fisheries and marine environment. Most members have gained this by working in the area, some for many years. Valuable insights have been provided by members with a long family history in Fiordland and these have been particularly helpful in developing the strategy.

Without exception, members care deeply about what happens to Fiordland's fisheries and marine environment. A special working relationship has evolved within the group on the basis of this common bond - a relationship that has been fundamental to the group's cohesion whilst working through potentially contentious issues and formulating agreed positions and strategies.

1.4 Why was the group formed?

Concern about a number of issues affecting Fiordland's fisheries and marine environment and confidence that these could best be resolved at the local level were primary motivating factors in the Guardians' formation. This initiative was seen as both necessary and timely given the changes taking place. For Fiordland, the group initially believed a fence was needed at "the top of the cliff". However, as more information became available, it was clear that action was required in the short term to turn around undesirable changes taking place.

The following shared views are central to the group's undertaking:

- concern about rapidly improving fishing access into Fiordland and the potential impact of this on the sustainability of the fish stocks;

- awareness that the fishing experience available in Fiordland is outstanding and needs to be properly looked after to be retained in the longer term. Where else in New Zealand can fishing be combined with spectacular scenery both above and below water, wilderness, historic sites, hunting, tramping, kayaking, photography and diving?

- recognition that the inside fiord ecosystem is of special significance and warrants a conservative and responsible approach from commercial, recreational and customary fishing interests;

- acceptance that certain features warrant protection from human influences;

- confidence that both fishing and caring for the fiord ecosystem can be jointly accommodated;

- belief that management by the local community (and in particular those who have an active involvement in the fiords) supported by the relevant agencies, provides the best chance of success;

- expectation that solutions are best implemented under existing New Zealand legislative provisions and that some form of overarching mechanism is needed to ensure the integrity of the management package.

1.5 Who provides support and advice?

1.5.1 *Independent assessor*

Ken Grange holds the position of independent assessor. From his ground breaking research into Fiordland's marine communities in the 1980s and 1990s he brings an in depth understanding and appreciation of the marine environment. Ken has provided the group with advice, attended workshops and information meetings, and peer reviewed the draft strategy.

1.5.2 *Agency support and advice*

The Ministry of Fisheries (MFish) has provided support and advice about fisheries issues since the formation of the Guardians in 1995. Until recently, Tony Brett and Stephen Logie, respectively from Fisheries Management (Dunedin) and Compliance (Invercargill), attended group meetings in an ex officio capacity. As the group has worked through the process of developing the strategy, resources have been made available to assist with this task.

Ngäi Tahu Whanui[2] (Kai Arahi) Gail Thompson and Tamai Sinclair, respectively from Murihiku and Te Tai Poutini provided advice on customary fisheries matters from 2000/02 when the Kai Arahi programme was discontinued. Now, support from Te Runanga o Ngai Tahu is provided by Nigel Scott from Christchurch.

Department of Conservation (DoC) representative Allan Munn provided support and advice about conservation matters in an ex officio capacity from June 2000 - December 2002. Murray Willans has since taken his place. Lou Sanson, the Southland Conservator provided encouragement and supported the group's efforts by making resources available in a variety of ways during the development of the draft. Kevin O'Connor, the current Conservator, is continuing in that role.

[2] Ngai Tahu Whanui is defined under the Te Runanga o Ngai Tahu Act 1996 as the primary hapu of Ngai Tahu, Kati Mamoe and Waitaha.

Environment Southland (ES) representative Ken Swinney has provided invaluable support and advice about resource management issues and the process of developing the strategy in an ex officio capacity since June 2000. More recently, Mike Pearson has also contributed his advice and support. Ted Loose, Chairman of ES, has attended meetings and provided ongoing encouragement. ES has played an increasingly valuable role, assisting with publishing and distributing the draft strategy, administering part of the submission process and co-ordinating the publication of the final strategy.

Ministry for the Environment (MfE) has been represented over the past year by Alisdair Hutchison, whose support and wise counsel has benefited the Guardians significantly. Similarly, Jenny Whyte has made an important contribution.

The combination of Ngäi Tahu Whanui, recreational and commercial fishers, charter operators and environmental, science and community interests working together with ES, MfE, DoC and MFish, has proved to be particularly potent.

Our experience shows that effective solutions for issues within a local area are best developed on the basis of shared local knowledge supported by targeted research and agency advice.

1.5.3 *Support for the integrated management strategy approach*

Ministry for Environment (MfE) awarded the Guardians a grant from the Minister for the Environment's Sustainable Management Fund in June 2000 to develop an integrated management strategy for Fiordland's fisheries and marine environment. In making the application, the Guardians acknowledged the need to develop a wider integrated approach to successfully look after the range of values in the Fiordland marine environment. In granting funds, MfE provided the Guardians with an opportunity to show how such an approach might work in the marine environment. The group is very grateful for the MfE's generosity without which this project would not have been possible.

Politicians: The Ministers of Fisheries, Environment, and Conservation have been kept informed about progress and all have expressed support for this initiative. In particular, the Hon Pete Hodgson, Minister of Fisheries, has shown special interest and provided ongoing encouragement for our approach. The Guardians were honoured that Hon Pete Hodgson, Hon Marian Hobbs, Minister for the Environment, Mayor Frana Cardno and Chaiman Ted Loose attended the launch of the draft strategy in October 2002.

Local and other interested MPs have kept up with progress, as have local politicians, all of whom are becoming more interested as the Guardians make progress.

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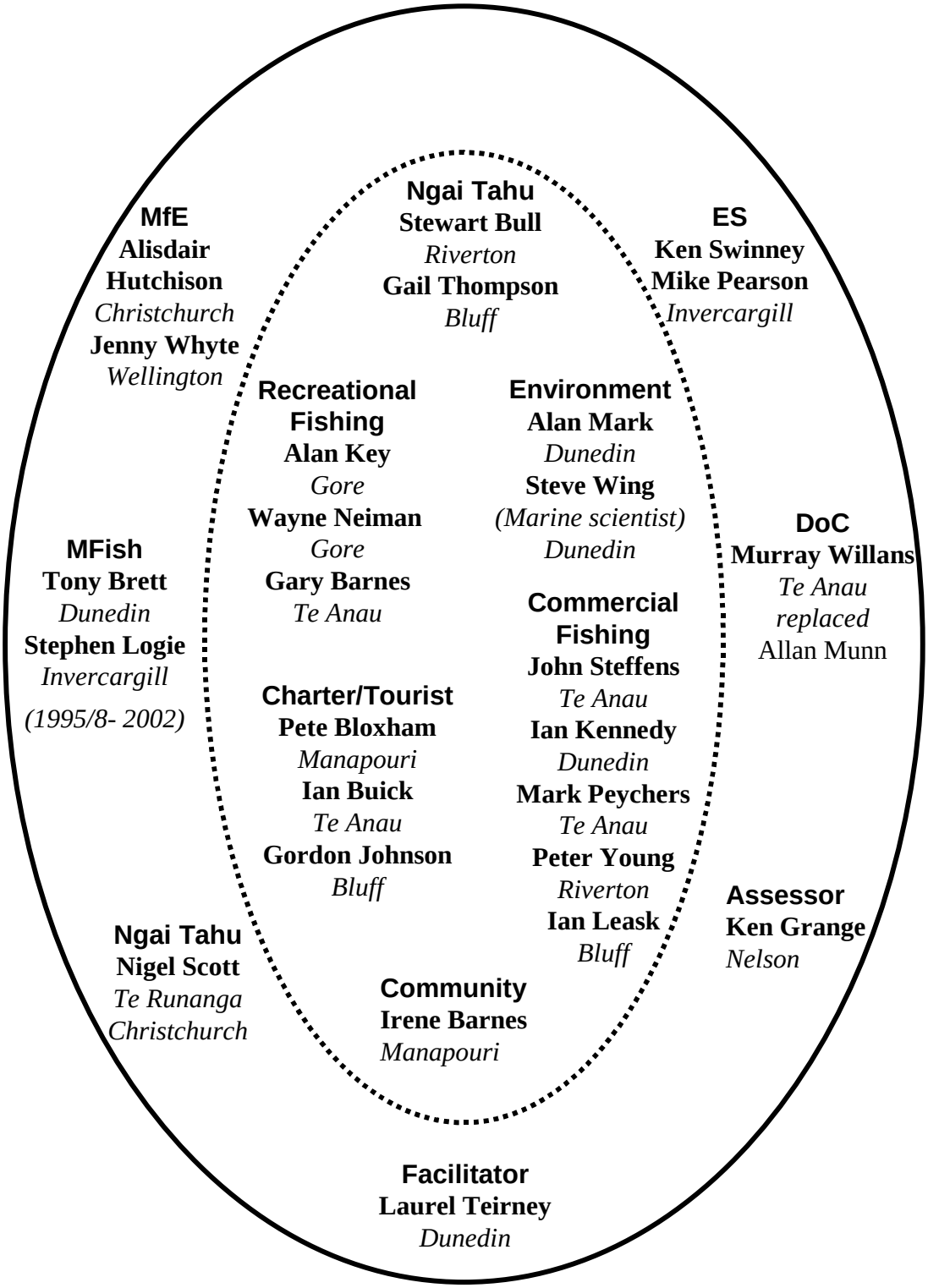


2.0 Developing the Strategy

2.1 The Process

Developing the Fiordland Marine Conservation Strategy has involved the Guardians working to a defined process with the following steps:

- defining a vision
- defining the Fiordland marine area of interest
- defining a set of objectives
- gathering information
- identifying and grouping issues

For each issue:

- determining information needs
- acquiring and documenting additional information
- analysing information and identifying patterns and trends
- deciding on management objectives
- designing frameworks to guide best solutions
- selecting the most appropriate management mechanisms
- informing and inviting feedback from eight meetings/hui with groups around the region who are represented on the Guardians
- adjusting suggested management measures

and then:

- compiling, releasing and distributing the draft strategy for consultation
- recording, summarising and analysing submissions
- Guardians' decisions about submissions incorporated to finalise the strategy
- strategy submitted for approval and implementation to MfE, the Ministers of Fisheries, Environment and Conservation, and the relevant agencies.

2.2 Defining the Fiordland marine area of interest

The marine area covered by this strategy extends from Cascade Point in the north to the Waiau River in the south. The seaward boundary is flexible, depending on the distribution of species of interest and associated Quota Management Area (QMA) boundaries. In reality, the group has focused primarily on the fiords and inshore coastal area. Migratory pelagic fish species (currently subject to proposals to be introduced to the Quota Management System) and species for which there appear to be few concerns have been discussed but not considered further.

2.3 Gathering information

Developing a comprehensive picture of Fiordland's fisheries and marine environment has been one of the Guardians' top priorities. Accordingly a strong emphasis on information has been incorporated in every aspect of the strategy. Whether based on

memory, local knowledge, observation, survey or research, every source of information has contributed in a complementary way to a better understanding of the issues and to more robust management suggestions.

The importance of basing the strategy on quality information is reflected in the Guardian's key object:

Key Objective

Take a pro-active role in identifying and advocating research and information needs to obtain the necessary information for advancing the Guardians' objectives.

Initially, the Guardians found a considerable amount of fisheries information was available at the entire Fiordland level. Information about species and communities at specific sites within the fiords was also available. What was missing was information about habitats, communities and fisheries at the individual fiord level.

To fill this gap, members of the group have shared their knowledge, targeted groups have been interviewed, surveys have been conducted and research advocated. The information collected has provided the Guardians with a very substantial data base. Patterns and trends that have been identified form the basis on which this strategy has been developed.

Following is a summary of the information the Guardians have collected themselves, compiled or advocated for over the past six years:

2.3.1 *Fiordland's fisheries*

- Compiled Maori and early European association with Fiordland.
- Recorded recent history (1900 onwards) of commercial fishing from interviews with knowledgable locals whose families have been associated with Fiordland for many years.
- Recorded and mapped Guardians' knowledge about the distribution of harvested species and fishing pressure. Collectively, members of the group hold more than 250 years of knowledge about Fiordland's marine environment.
- Gathered available information about the Fiordland marine habitat and biology of each fish species.
- Recorded details of the commercial fishery for each species, including management provisions. *Note:* The CRA8 Management Committee is committed to an extensive ongoing rock lobster research programme in Fiordland. The results of this, and of paua research advocated by the NZ Paua Management Company, are available to the Guardians.
- Surveyed recreational fishing patterns by questionnaire.
- Recorded details of the recreational fishery for each species, including management provisions.
- Surveyed charter boat fishing patterns by interviewing charter operators.
- Described customary fisheries management provisions including customary fishing authorisations, mataitai and taiapure.

- Successfully advocated research into recreational fishing patterns and harvest (methods of identifying recreational fishers were not effective in the Fiordland situation which meant there was an inadequate response to analyse fishing patterns).
- Successfully advocated research into recreational fishing patterns and harvest in Milford and Doubtful Sounds (current).
- Successfully advocated research into charter boat fishing patterns and harvests (current).
- Surveyed knowledgable locals by questionnaire about commercial and recreational fishing patterns, species harvested and state of species by fiord.

2.3.2 *Marine habitats, species and communities*

- Successfully advocated research into methods of studying blue cod.
- Successfully advocated research into the movement and relative abundance of blue cod within and between fiords (results are presented in Section 3.3.2).
- Gathered knowledge about special values and areas by holding a workshop with experienced Fiordland researchers Chris Paulin and Ken Grange.
- Supported the development of a Geographic Information System (GIS) to construct a picture of the Fiordland marine environment (a major project currently being conducted by Steve Wing (a member of the Guardians), and others.
- Compiled an annotated bibliography of references to Fiordland's fisheries and marine environment.

2.3.3 *Publications*

Much of the information listed above is documented in the following publications:

Beneath the Reflections - A Characterisation of Fiordland's Fisheries. Compiled by the Guardians of Fiordland's Fisheries. 1999 120p.

Beneath the Reflections - Fiordland's Fisheries and the Marine Environment: A Bibliography. Compiled by Lisa Maria, Department of Conservation for the Guardians of Fiordland's Fisheries. 2001 74p.

Beneath the Reflections - Caring for Fiordland's Fisheries. A Code of Responsible Fishing Practices produced jointly by the Guardians of Fiordland's Fisheries and the Ministry of Fisheries. 1996 (pamphlet).

2.4 Defining "special nature"

In the process of developing the Guardians' vision and key objectives it became clear that the special nature of Fiordland's marine environment was going to be an integral part of every component of the strategy. Accordingly, the group defined special nature in terms of the Guardians' interest in both land-based features and the marine environment.

Special nature refers to*:*

> *"That which is uniquely Fiordland, from the mountain tops to the sea bed".*

The Guardians have a particular interest in two aspects of the fiord environment; the outstanding landscape features and the unique marine environment.

The special nature of *Fiordland's landscape* can be described by:

> "The combination of sheer-sided snow capped mountains, hanging valleys, impressive waterfalls, uninterrupted native forest extending to the water's edge and extensive sheltered waterways. Furthermore, the very scale of the landscape enhances the sense of wilderness that is an integral part of fishing in Fiordland and one that sets Fiordland apart from the rest of the country".

These landscape features would only be associated with management action on the part of the Guardians if specific land-based issues had the potential to adversely impact the marine environment or the fishing experience.

The special nature of *Fiordland's marine environment* can be expressed by:

> "At the individual fiord level - drowned u-shaped glacial valleys, sills separating the fiords from the open coast, the freshwater layer, estuarine circulation, deepwater emergence, a band of unusual wall communities and endemic species of special interest, and finally the deep floor of the glacier-carved fiord. At an ecosystem level, what sets Fiordland's marine environment apart, both within New Zealand and globally, is the diversity of communities represented over a dramatically compressed gradient. It is not unusual to find estuarine, fiord, outer reef/kelp forest, open water pelagic and deepwater communities represented over a distance as little as 10km. The proximity of the continental shelf to the coastline defines the seaward end of the gradient".

Not surprisingly, all aspects of Fiordland's marine environment are of direct relevance to the Guardians of Fiordland's Fisheries.

2.5 Understanding fiord habitats

The importance of understanding how this set of unusual features dictates the nature of plant and animal communities and fisheries was recognised. Since then, information gathering and research have shed increasing light on the subject. Two distinct habitat types can be identified - habitats inside the fiords and habitats at the fiord entrance/outer coast. Current studies are showing how the communities associated with each habitat type differ and what the implications might be for fisheries, special values and risks to the environment.

2.5.1 *Inside fiord habitats*

More than seven metres of rain fall in Fiordland most years. This runs off into the fiords carrying detritus and humic material from the forest. The result is a stained freshwater layer that floats on top of the salt water. As the freshwater flows out to sea, it causes a weak counter current of salt water from the ocean to flow over the sill at the entrance and into the fiord - a phenomenon called estuarine circulation.

The stained freshwater surface layer limits light penetration and inhibits the growth of kelps that are the energy source for productive outer coast communities. Despite algal growth in the intertidal zone, there is an absence of significant kelp communities further down, and animals that normally live at depth in the ocean have come to dominate the fiord wall communities from the surface to a depth of about 40 metres. Called "deepwater emergence", this phenomenon has resulted in an abundance and diversity of animals that would not normally be seen at these depths, though whether wall species are self sustaining inside the fiords or sustained by ongoing recruitment from the ocean is not known.

The stained freshwater layer not only limits kelp, it also has the potential to limit the growth of phytoplankton that can be an important energy source for marine communities. The possibility that primary production is limited inside the fiords raises the question of the nature of the energy source. Recent studies suggest that material entering the fiords from the forested catchments may play a role. Fallen trees, detritus and plant and animal material associated with the forest floor are regularly delivered into the fiords. Terrestrial energy sources, such as these are not comparable with ocean kelp based energy sources.

The combination of limited plant based energy inputs and land based energy sources suggests that productivity within the fiords is likely to be constrained. This is supported by studies that have found species living within the communities inside the fiords are generally sessile, slow growing and long lived. Stable communities with a low turn over of the main species generally indicate low productivity. However, there are still many unknowns about the inside fiord habitats.

Recruitment of fish species inside the fiords can take place directly from spawning or indirectly from passive transport of eggs or larvae over the sill in the incoming current. Once inside, the young do not find a very hospitable environment. There is the freshwater layer and the many stinging, biting animals of the wall communities to avoid. And then there is the issue of what to eat.

There is growing evidence that certain fish and shellfish species such as blue cod and kina that live inside the fiords are slower growing than the same species found at the entrances to the fiords. Given the nature of the inside fiord habitats these species are unlikely to be very productive. Consequently the fish stocks are unable to sustain a high level of harvesting pressure. Furthermore, it appears that stocks of these species from the inner fiords may be genetically distinct from stocks living outside.

As research on genetic structuring of populations and differentiation of the same species continues, further management implications will become clearer. In the meantime, the question of whether certain species move between fiords and the outer coast is now being investigated. The issue of movement is fundamental to managing fish stocks inside the fiords. If movement does not take place and some individuals of a species live only inside the fiords, management measures must be more conservative to ensure sustainability. Recent studies conducted in Dusky Sound revealed that blue cod movement is negligible from the coast to the head of the fiord.

2.5.2 *Transition from inside fiord to entrance/outer coast habitats*

In the transition zone, slow growing, long lived animal-dominated communities give way to kelp-based communities as the ocean influence penetrates into the fiord.

In some fiords such as Bligh Sound, the transition can be clearly defined between these two different types of habitat/communities. In other fiords such as Dagg Sound, the transition is not so clearly defined because ocean influences penetrate well into the fiord. Whereas the transition between these two habitat types takes place at the entrance of some fiords it occurs well inside other fiords. For instance, the topography of the southern fiords means that inner-fiord habitat is found further towards the head of these sounds than in the northern fiords.

2.5.3 *Outer coast habitats*

The outer Fiordland coast is dominated by kelp based communities. Such communities are typical of outer coastal habitats along the southern coastline. To discern whether there are differences between Fiordland's outer coast communities and those along other parts of the southern coastline requires a detailed study of biodiversity patterns.

2.6 Identifying issues

To identify issues affecting Fiordland's fisheries and marine environment a schematic diagram was constructed where natural features were placed around the inside of the oval and the influences that could impact on each of these were aligned along the outside (Figure 2). This was a useful way for the Guardians to identify and group issues. Relevant legislation and associated agencies could also be easily identified. The diagram proved helpful in discussions with both DoC and ES, when common interests were initially defined and each agency agreed to participate.

Against this background the Guardians brainstormed a list of issues that needed to be addressed if progress was to be made towards achieving the group's vision for Fiordland's fisheries and marine environment. Issues were grouped as follows:

- Fisheries
- Values of special significance
- Risks to natural values (human generated)
- Expressing kaitiakitanga

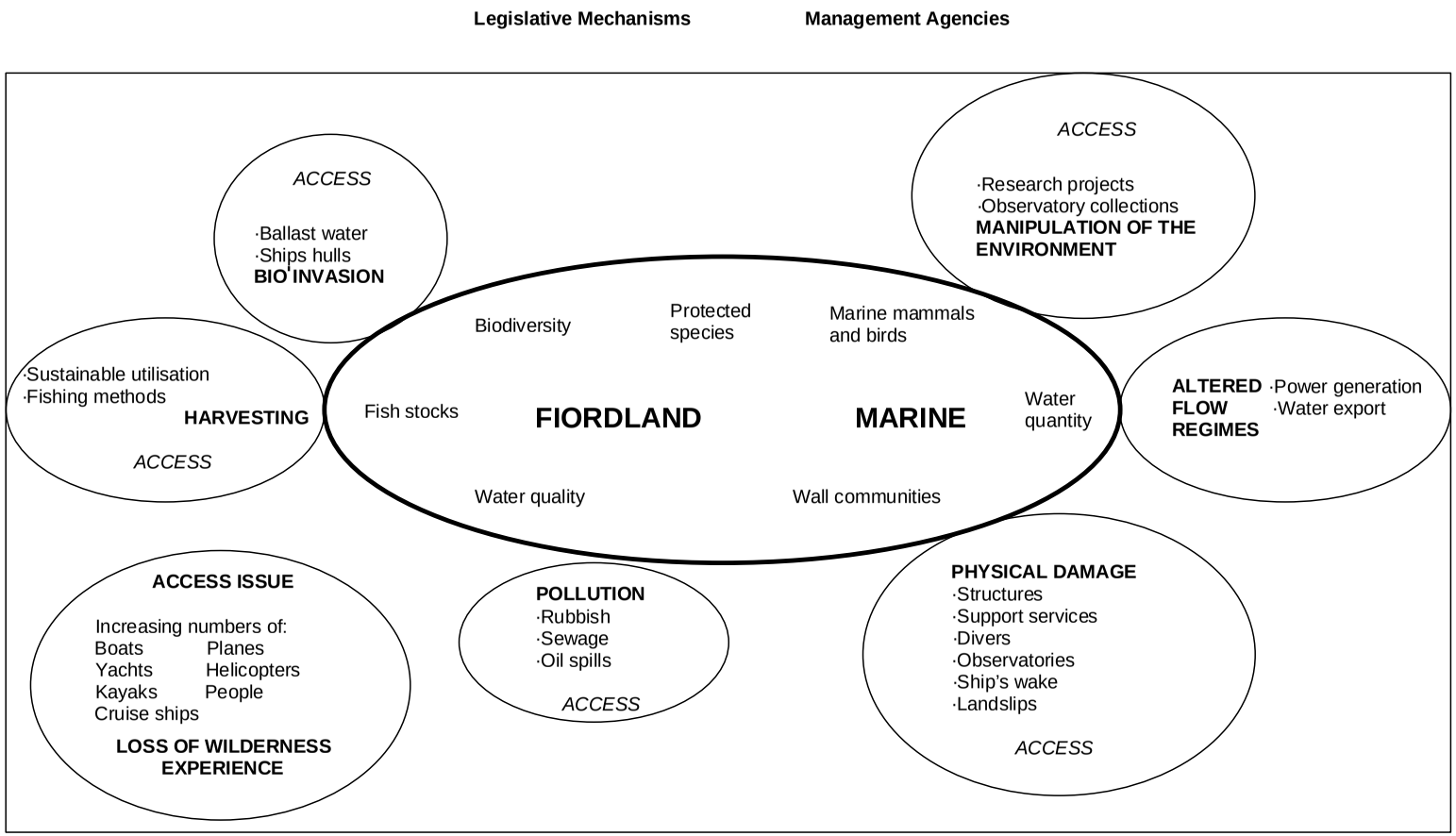
The Guardians defined key objectives for each group of issues to provide guidance and ensure a consistent approach was maintained through debate and decision-making. Subsequently, the following categories were identified that also warranted objectives.

- Implementing the strategy
- Compliance of the strategy
- Monitoring the performance of the strategy

2.7 A holistic approach

The initial priority was the fisheries component of the strategy. However, over the past three years work has proceeded concurrently on all four components. Given the interaction between components they cannot be treated in isolation. Each component is inextricably linked to the others and a change that affects one area will impact on the rest. For instance, certain risks such as the introduction of an unwanted species from the hull of a vessel could impact on the values of special significance, on fish stocks and fisheries and on kaitiakitanga. The Guardians recognised that a holistic approach was required because every aspect of the marine environment is part of an integrated whole and the variety of human influences exerted on this environment should be considered collectively rather than by individual influence.

FIGURE2 IDENTIFICATION OF ISSUES AFFECTING FIORDLAND'S FISHERIES AND MARINE ENVIRONMENT



3.0 Fisheries

Key Objectives

- **Ensure the sustainable utilisation of the finite fisheries resources, having regard to the special nature of the fiord environment.**
- **Prevent uncontrolled expansion of effort/harvest by all groups.**
- **Ensure that the rights of tangata whenua, recreational, charter operators, commercial and other user groups are identified and recognised and that these groups are involved in fisheries management decisions including access to the fisheries resource.**
- **Support overarching fisheries management frameworks.**
- **Encourage voluntary compliance with the rules and reinforce the view that non-compliance is unacceptable behaviour.**
- **Adopt a cautious and responsible approach to proposals for new developments.**

3.1 Top priority - local depletion

The Guardians considered addressing local and serial depletion within the fiords was the top priority fisheries issue within Fiordland.

Local depletion is defined as:

> "*the localised decrease in abundance of a species due to over exploitation or changes to the environment*".

Serial depletion is when:

> *"a decrease in abundance of a species occurs in one local area and then extends sequentially to adjoining or wider areas*".

A localised area may extend from part of a fiord to an entire fiord, whereas an extension from one fiord to another would be regarded as an adjoining or wider area.

It was generally acknowledged that certain harvested fish stocks in Milford and Doubtful Sounds, the two most accessible fiords, were subject to local depletion. The uncertainty was the extent to which serial depletion might be taking place in other fiords and along the outer coast and what measures could be taken to prevent this from happening.

3.2 Information by fiord

Information documented in *Beneath the Reflections: A Characterisation of Fiordland's Fisheries,* includes detail about fish stocks and fisheries at the entire Fiordland level. As well as providing an important overview of Fiordland's fisheries, the report also contains a general summary of the characteristics of each fiord and what information exists about individual fiords. Despite the inside fiord habitats being recognised as distinct from other marine habitats around the rest of the coast, the fish stocks and fisheries within the fiords have rarely been studied. Therefore the detail required to evaluate the state of fish stocks and fisheries within individual fiords was not available.

Accordingly, research needs were identified and advocated by the group. Projects that are currently being conducted include:

- abundance and movement patterns of blue cod within and between fiords;
- fishing patterns and harvest of recreational fishers from private boats in Milford and Doubtful Sounds;
- fishing patterns and harvest of recreational fishers from charter boats for all the fiords;
- detailed description of fiord habitats developed by building a Geographic Information System.

At the same time, the Guardians resolved to compile what was known about fisheries within the fiords on the basis of their own knowledge and experience and that of informed members from their wider groups. Tapping into this substantial and diverse source of information was considered to be the best, and indeed the only way of determining the state of fish stocks and fisheries and developing an appropriate management approach.

3.2.1 *Gathering the information*

Between September 2001-December 2002, the Guardians went through a process of gathering information at the individual fiord level. First, members provided information about the fisheries in Milford and Doubtful Sounds, including fishing patterns by harvesting group, for blue cod, rock lobster, groper, paua and scallops. From first hand experience within the group the state of each species was evaluated, as were trends in harvesting pressure and accessibility.

From the experience of gathering information about Milford and Doubtful Sounds a questionnaire was designed to collect the same type of information for the rest of the fiords and the open coast. Commercial, recreational, charter operator and Ngäi Tahu fishers who collectively hold extensive knowledge about all the fiords were identified by the Guardians. Group members interviewed fishers from the list and completed questionnaires were returned.

3.2.2 *Interpreting the information*

The resultant information was collated by fiord, by species, by harvesting group and by access. This information was complemented by relevant knowledge the Guardians had

acquired since 1995. Significant features and patterns revealed in the grouping are documented as follows.

3.3 Fish stocks and fisheries of the fiords

3.3.1 *Features at the fiord level*

When information about the fish stocks and fisheries across all the fiords was considered, a general pattern emerged.

Stocks in both Milford and Doubtful Sounds, the two most accessible fiords, are subject to local depletion[3].

The steep sided narrow northern fiords fit within a group. These include from Bligh Sound in the north, where concern is being expressed about the state of all the main harvested species, to Dagg Sound, south of Doubtful Sound, where fishing pressure has only recently started to increase. Comments about increasing accessibility and harvesting pressure were recorded for all the fiords within this group.

In contrast, the southern sounds feature extensive waterways, lower terrain and wider, more open entrances. These sounds, particularly Dusky Sound and Chalky Inlet, support more plentiful fish stocks and fisheries than further north. However, comments were received about both Breaksea Sound and the headwaters of these larger sounds that suggest increases in harvesting pressure may not be sustainable in the longer term. Certainly, Vancouver and Broughton Arms, Wet Jacket Arm, Edwardson and Cunaris Sounds and Long Sound are much more like the northern fiords from a fisheries perspective and they logically belong in that group.

3.3.2 *Features of the harvested species*

- **Blue cod**

  Blue cod is vulnerable to depletion. In Milford and Doubtful Sounds local depletion of blue cod has been a feature for some time. The northern fiords all received comments such as; fishing pressure escalating; numbers have declined significantly over the past 3-4 years; never were abundant stocks; blue cod sparse and fishing poor. Positive comments were made about Dusky Sound, Chalky Inlet, and the outer reaches of Breaksea Sound and Preservation Inlet. Opinions were expressed though, that the situation in Breaksea had deteriorated, particularly over the past few years. There was agreement that stocks outside the fiords were not a source of concern and the distance to ports and markets is a disincentive to harvesting.

  This was supported by the results of a recent NIWA, blue cod relative abundance study carried out in Dusky Sound. Conducting the study in what is reputedly the best blue cod sound in Fiordland was considered necessary if adequate numbers of blue cod were to be captured. The Guardians could not guarantee that

[3] Pelagic species, such as tuna that are sought by big game fishers at the fiord entrances and along the outer coast, were not included in this evaluation.

sufficient numbers of blue cod would be present in any of the other sounds. Blue cod relative abundance was found to be high in the outer coast and entrance areas but not so in the middle or head of the sound. A movement study conducted at the same time showed an almost complete lack of blue cod movement between the study areas from the coast to the head of the sound.

It is clear from views canvassed and research conducted that blue cod stocks are not likely to be plentiful inside the fiords. Furthermore, blue cod do not undertake significant movements, meaning that increasing pressure, if not managed, will result in local depletion.

Note: *Now that a relative abundance method has been successfully tested for blue cod it is very important that comparative figures are collected for at least Doubtful and Bligh Sounds - respectively a large complex sound and a narrow northern sound where concerns are consistently expressed about blue cod stocks. The Guardians intend advocating this research with MFish.*

- **Rock lobster**

The same general pattern was reported for rock lobster stocks and the fishery as for blue cod. Increasing harvesting pressure was noted for all of the northern fiords. Whereas rock lobster stocks in Bligh Sound were a source of concern, the same was not true for Dagg Sound. Stocks are thought to have decreased throughout the Doubtful Sound complex during the 1990s as a result of combined commercial and recreational harvesting. Further south, stocks are harvested from the entrances of Breaksea Sound and both Chalky and Preservation Inlets. In Dusky, where harvesting takes place throughout the sound, the comment was made that the quality of the fishery seemed to be declining. Along the outer coast, research is showing that rock lobster stocks are rebuilding rapidly due to management actions the fishers have taken over the past few years.

Setting the Total Allowable Commercial Catch (TACC) for CRA8 is governed by a decision rule that guarantees a rebuild of the fishery. Depending on future management decisions, there is an expectation that rock lobster numbers in the fiords will increase with time due to their movements into and out of the fiords.

- **Groper**

The state of groper stocks and fisheries follow a similar pattern to both blue cod and rock lobster. Again, much concern was expressed for Bligh Sound where stocks appear to have declined. Increasing harvesting pressure is a feature of all the northern fiords apart from Dagg Sound that has only recently begun to attract fishing pressure. Both resident groper and the smaller school groper are harvested in moderate numbers from the Doubtful Sound complex. Whereas groper was thought to have declined since the 1990s in Breaksea Sound, both Dusky Sound and Chalky Inlet support good fisheries. Resident groper tend to be found in the entrance habitat whereas school groper are often associated with fresh water inflows into the Sounds.

- **Paua**

The distribution of paua stocks is determined by the occurrence of kelp - their main food source. For this reason, patches of paua are not found a long way inside the narrow steep sided northern fiords. The main stocks are located along the outer coast and in Dusky Sound and Chalky and Preservation Inlets. The paua fishery in Fiordland is primarily a commercial fishery.

Very little recreational paua harvesting takes place because fishers prefer targeting rock lobster using underwater breathing apparatus. It is illegal to be in possession of this equipment for those who harvest paua. Reports about the disappearance of paua patches at and inside the entrances to Caswell, Charles, Dagg and Breaksea Sounds were accompanied by concern that rejuvenation of a number of these patches was not taking place. Along the coast south of Milford Sound where smaller paua harvesting boats are launched, serial depletion of paua stocks was also noted.

Concern that paua can no longer be hand gathered close to shore along the southern Fiordland coastline resulted in the Waitutu Land Incorporation initiating discussions about establishing a mataitai along the coast abutting their land. A mataitai application was lodged by the Oraka-Aparima Runanga and the Waitutu Land Inc for this part of the coastline. The outcome of the application is not known at this time.

- **Scallops**

Scallops tend to be found in beds that may be patchy and vary from year to year because of environmental factors. However, scallops can be depleted by over harvesting. For instance in Milford Sound scallops are now only found in low numbers. Comments were made that scallops get smaller with increasing distance up Doubtful Sound. The scallops in George Sound are said to be under high harvesting pressure. In the southern sounds, Dusky, Chalky and Preservation, scallops can be plentiful but they are very patchy in distribution and numbers vary from one year to the next.

- **Jock Stewart *(Sea Perch)***

Jock Stewart is reported to be caught in numbers by recreational fishers from Anita Bay, Milford Sound, and Doubtful Sound. In these fiords a shift in focus to species such as Jock Stewarts has occurred as species such as blue cod become scarce. Jock Stewarts are also caught, though not targeted in commercial fishing operations. Although this has not been a highly regarded species, Jock Stewart is growing in popularity as people discover it is a good eating fish. It also provides important first fishing experiences, particularly for schools staying at the Deep Cove Hostel on outdoor education courses. Harvesting pressure indicates that harvest limits are now warranted.

- **Kina *(Sea urchins)***

  Currently, kina is commercially harvested in Fiordland under a single special permit that operates within the Kina Development Programme (KDP) area in Dusky Sound. Although there are a number of fishing permits for kina in Fisheries Management Area 5, divers do not travel to Fiordland to harvest kina because it is not economically viable. In October 2002 kina was introduced into the QMS. Permit holders who are allocated quota and others who purchase quota in SUR5 can acquire an Annual Catch Entitlement (ACE) and harvest kina throughout Fiordland. From kina research conducted in Fiordland, stocks inside the fiords have been found to be slower growing than stocks along the open coast. Furthermore, there is evidence that stocks inside and outside are genetically distinct and do not mix. This has serious sustainability implications if commercial harvesting takes place inside the fiords.

3.3.3 *Features of the harvesting groups*

There was a remarkable degree of consistency between commercial, customary and recreational harvesting groups about the state of stocks and fisheries in each fiord and the patterns across all the fiords. What differed were the harvesting patterns.

Currently, a voluntary rahui is in place for issuing customary fishing authorisations for the inner fiords. This means fishing by tangata whenua is undertaken according to the amateur rules and represents a significant gift to Fiordland's fisheries on the part of Ngai Tahu Whanui.

Whereas, non-commercial[4] harvesting pressure for blue cod is increasing within the northern fiords, commercial fishing has not taken place inside the fiords from Bligh to Breaksea Sounds for many years. Stocks of blue cod are only considered to be in commercial quantities in Dusky Sound and Chalky Inlet but even in these more productive sounds commercial blue cod fishing is limited.

An increase in non-commercial rock lobster diving has taken place over the past few years inside all of the northern fiords, and in particular, George and Nancy Sounds. From Dagg Sound south, harvesting is focused in the outer sounds, except for Dusky Sound where diving for lobster takes place throughout the entire sound. Improvements in small craft design have extended the capability of divers who report diving in bays and along the outer coast in calm weather. In contrast, only a limited amount of commercial rock lobster harvesting takes place inside the fiords. Harvesting is being consolidated in the outer parts of the sounds and along the outer coast. Recent reductions in rock lobster quota for the CRA8 Quota Management Area (QMA) and the resultant unavailability of quota have seen a significant reduction in the number of boats, number of fishers and the rock lobster harvest. As mentioned earlier, the latest rock lobster stock assessment plenary report indicates a rebuild of the stocks is under way.

[4] Non commercial fishing is harvesting that takes place under the amateur regulations.

Non-commercial groper fishing pressure was reported to be increasing throughout the northern fiords and concern for the groper stocks was noted, particularly in Bligh Sound. Both groper and school groper are harvested but not in large numbers. A limited amount of commercial fishing takes place in George, Thompson, Doubtful and Dusky Sounds and Chalky Inlet. For the rest of the fiords comments indicated that groper stocks could not support a commercial fishery.

In summary, non-commercial fishing takes place predominantly inside the fiords where there are sheltered fishing opportunities. Although small private boats are capable of making trips along the outer coast, these are mainly to access other fiords rather than to fish outside. There are serious safety issues along the exposed Fiordland coastline that make it an unlikely destination for most small boat recreational fishing in all but the most settled weather. In contrast charter and larger syndicated vessels are capable of fishing on the outer coast. However, fishers on board may be less likely to choose this option when sheltered water fishing opportunities are available. When conditions permit, charter operators do venture outside to take advantage of better quality fishing.

Commercial fishing is focused towards the entrances of the fiords and along the outer coast. The type of vessels and servicing facilities make it possible for commercial fishing to take place over extended distances and periods as well as in difficult weather conditions.

3.3.4 *Access*

There has been easy access to Milford Sound and relatively easy access to Doubtful Sound for commercial, charter and private boat fishers for many years. Commercial fishing vessels continue to ply all Fiordland waters although the number of rock lobster vessels has more than halved in recent years. The modest charter boat fleet that operates within the southern fiords seems to have only expanded slowly. However, increasing accessibility was identified as a major issue by fishers who provided information.

Improved technology, different fishing patterns and new forms of transport all contribute to the phenomenon. For instance, over the past 3-4 years small trailer boats launched at Milford are heading south to spend the day fishing Bligh Sound. Similarly, recreational boats are heading north from Thompson Sound to spend a day or longer at Nancy, Charles or Caswell Sounds. The increase in day trips to Nancy Sound over the past 4 years was described as dramatic. Further south there has been an increase in fast 4-6 m boats that are capable of travelling from Doubtful Sound to Breaksea and even Dusky Sound, taking advantage of the sheltered water through the Archeron Passage. Then there are those few hardy folk who launch at Riverton or Bluff and risk the southern coast to reach Preservation Inlet, normally a 10 hour cruise for the larger charter vessels!

Charter vessel operators have adopted different procedures in recent years. Those that fish north of Doubtful tend to visit fiords that used to be bypassed and stay overnight in more fiords. The length of operating season has also extended - for some up to six months. Further south, charter operators have adopted the practice of flying parties either in or out of the sounds. This not only avoids a long steam but also makes back-to-back trips possible. The recent appearance of an increasing number of larger

syndicate boats[5], particularly in the southern sounds, enables groups to make extended trips into the more remote parts of Fiordland.

Of all access innovations, probably the most novel is the practice of flying small boats and their occupants into the sounds by helicopter. Although this is not yet a common occurrence it has the potential to remove obstacles that have traditionally prevented numbers of people from reaching the more remote parts of the fiords. The use of helicopters to transport fishers within Fiordland appears set to increase. Distances that normally require a steam of several hours can be covered in a fraction of the time. Given this form of transport, it is possible to visit several fiords within a day though this would be prohibitively expensive for all but a very few.

3.4 Grouping Fiordland's fisheries

When the Guardians took all the available information about fisheries and the marine environment into account, it was clear that Fiordland's fisheries could be grouped according to three fundamental features:

- ***Habitat characteristics and productivity*** - are the habitats dominated by slow growing, long lived animals, or productive plant based communities?

- ***State of the harvested fish stocks*** - are the fish stocks depleted, vulnerable or is the stock being maintained?

- ***Current and future access and fishing pressure*** - what is the current level of harvesting pressure and how is that likely to change?

Collating information about these features for each fiord resulted in the fiords and coast falling logically into three distinct groups:

- **Milford and Doubtful Sounds**

  These two fiords feature typical animal dominated, inside fiord habitat. Certain harvested stocks are depleted. Easy access has been available to Milford Sound for many years and for those prepared to negotiate Lake Manapouri and Wilmott Pass, Doubtful Sound is also accessible. Consequently, they are the most fished of the fiords.

- **Inside the rest of the fiords**

  Also featuring typical animal dominated fiord habitat, inside the rest of the fiords certain fish stocks are declining or vulnerable. Both access and harvesting pressure are increasing. In fiords where concern about fish stocks is consistently expressed, such as Bligh Sound, harvesting pressure is already high. On the other hand where fish stocks are not causing concern, as in Dagg Sound, harvesting pressure is not yet an issue.

[5] Ex commercial fishing vessels in private syndicate ownership used for recreational fishing and diving.

- **Fiord entrances and outer coast**

  Productive, plant based, coastal type habitat is a feature of the entrances and outer coast where the state of fish stocks is of less concern than inside the fiords. Whereas access is increasing in the fiord entrances it is likely to increase more slowly along the open coast.

The difference between animal dominated habitats inside and productive plant based habitats outside the fiords has profound management implications. Tailoring management decisions to such remarkably different habitat types requires the boundaries or transition zones between the habitats to be defined.

3.5 Defining habitat lines

As a first step, Guardians with local knowledge identified the boundaries between the inside fiord and entrance/outside habitats for each fiord. Where boundaries were not clear-cut, transition zones were defined. Feedback about the position of the lines and zones was then sought from the wider groups during a round of information meetings. Input was also sought from researchers who had experience in Fiordland.

Work had also begun on developing a GIS model that would provide more information on which to base the habitat lines. Five physical features considered to be important determinants of habitats that support different types of communities were used in the model. Results of modelling surface salinity, wave exposure, bathymetry, slope of the rock walls and aspect - north or south, confirmed the position of the clear-cut habitat lines and were used to provide more information about the habitat features within the transition zones. A physical model such as this, needs to be validated (ground truthed) to ensure it accurately reflects biological reality. This exercise was unable to be carried out before the draft strategy was released.

Accordingly, where the transition takes place over a considerable distance, the group adopted a two step rule on which to base the habitat line:

- identify the position approximately midway along the transition (attempting to find a 50% plant/animal community position did not prove feasible);
- locate the line between two easily recognisable geographic features closest to the midway position.

Habitat lines were identified within each fiord and presented in Appendix 1 of the draft strategy.

During the ground truthing cruise that took place in October 2002, morphological changes in biological features such as kina test (shell) size and *Ecklonia* blade width were measured at 54 sampling sites located along the length of the fiords. Preliminary results were presented and discussed at the Guardians' meeting in February 2003.

The position of habitat lines from the preliminary GIS project results were presented and combined with the other information to revise the habitat lines. Decisions about the location of habitat lines were made as follows:

- at sharp habitat transitions;
- where there is a transition zone, there is flexibility about the placement of the line. The draft lines, GIS generated lines and placement of lines at easily identified and marked points were all taken into account. For Thompson and Doubtful Sounds safety of non commercial fishers was also considered;
- for the southern fiords, sampling sites around large islands tend to define the position of the GIS generated habitat line. Whereas the outer side of islands have entrance and coast communities, the inner side of the islands are characterised by inner communities. This resulted in habitat lines that tended to be located through the outer islands rather than across the sounds. On the basis of discussion, the Chalky Inlet line was relocated further towards the outer coast and the location of the Dusky Sound and Preservation Inlet lines were confirmed.

Revised habitat lines for all the fiords are shown on Figure 3. Habitat lines for individual fiords are shown in Figures 6-18. Given the management implications of the habitat lines, the location of each line will be clearly marked and publicised.

3.6 A management approach for Fiordland's three fisheries groups

Given three distinctly different types of fisheries in Fiordland, a single management response is not appropriate. For instance, commercial fishing is managed by the Quota Management System that allows bulk harvesting methods both inside and outside the fiords. Similarly, amateur daily bag limits of 30 blue cod, 6 rock lobster and 5 groper apply across all habitats, both inside and out. One of the most serious and criticised aspects of the amateur rules is accumulation. The ability to accumulate daily catches over extended trips in the fiords is thought to be an important factor contributing to local depletion. The view that Fiordland is a place to "fish for a feed" was expressed regularly at the information meetings.

If the needs associated with each of the three different types of fishery are recognised, management mechanisms can be tailored to achieve four of the Guardians' most important objectives:

- ensure the sustainable utilisation of the finite fisheries resources, having regard to the special nature of the fiord environment;
- prevent uncontrolled expansion of effort/harvest by all groups;
- fit management of fisheries to an appropriate spatial scale;
- encourage harvesting to take place at the entrances and outer coast.

3.6.1 *Milford and Doubtful Sounds*

Where fish stocks are depleted, harvesting pressure/harvest has to be drastically reduced to encourage a rebuild.

Excluding commercial fishing and bulk harvesting methods inside the habitat lines and adopting a combination of customary temporary closures and a "fish for a feed - no accumulation" philosophy for non commercial fishing is proposed to deal with the two most accessible fiords. Accumulation is described in 3.6.4.

3.6.2 *Inside the rest of the fiords*

Where fish stocks are declining or vulnerable, harvesting pressure/harvest needs to be reduced to reverse the decline and to provide for the expected increase in harvesting pressure. Daily catches have to be set at a level where the total harvest is reduced.

Excluding commercial fishing and bulk harvesting methods from inside the habitat lines, together with conservative amateur bag limits and no accumulation of catches is considered to be the most appropriate approach for this group of fiords.

3.6.3 *Fiord entrances and outer coast*

Where the state of fish stocks is dependent on future trends in access and fishing, it is desirable that harvesting pressure/harvest does not increase - indeed provision needs to be made for the expected increase in harvesting pressure.

In the fiord entrances and along the outer coast commercial harvests are capped by the Quota Management System (QMS) and can be reduced for sustainability reasons as has occurred in the rock lobster fishery over recent years. Amateur daily bag limits and accumulation provisions need to be realistic for the Fiordland situation and changes in future fishing pressure.

3.6.4 *Accumulation of daily fish possession limits*

Both the present Fisheries (Amateur Fishing) Regulations 1986 and the Fisheries (Southland and Sub Antarctic Areas Amateur Fishing) Regulations 1991 provide a defence mechanism to allow recreational fishers to possess and accumulate more fish and shellfish than the daily limit on extended fishing trips. To exercise this defence the fisher must be able to prove that the fish or shellfish was taken within the prescribed daily limit on each day fished.

Why is accumulation detrimental?

Accumulation of amateur fish possession limits most frequently occurs in Fiordland due to recreational fishers engaging in extended fishing trips of several days' duration. Due mainly to the difficulties and cost of access, recreational fishing trips normally occur for extended periods ranging from overnight trips to seven days or longer. While trailer borne vessels can operate from Milford and Doubtful Sound, the majority of recreational fishing takes place aboard charter vessels and private syndicate owned vessels, where recreational fishing and diving are two of the primary activities most often combined with deer hunting. Both the charter vessel fleet and the growing numbers of ex-commercial fishing vessels in private syndicate ownership are well equipped to accommodate fishing parties up to 12-14 people including freezer storage for accumulated catch.

The present accumulation regime allows excessive harvesting of some target fish species contributing to localised depletion of vulnerable resident fiord fish stocks. In one of the most excessive reported cases, a 14-person charter party, plus skipper and crew brought home 672 rock lobster from a 7-day dive charter, while claiming that no rock lobster were consumed during the trip.

Accumulation encourages "aggregation" of extra catch taken for non-fishers in the party and is exacerbated by "double dipping" of additional catch consumed during the trip but not reported. Whilst it is recognised that the defence provision is not generally subject to abuse, when this happens it gives rise to strong negative reaction from fishers who adhere to a "fish for a feed" ethic, environmentalists and the general public concerned about excessive catches. Accumulation, combined with unrealistic fisher expectation, can contribute to a common behaviour where the success or otherwise of a trip is measured by achieving the species limit, each day - limits that many consider are set too high or are unrealistic for inside the fiords.

3.7 Proposed management measures

The following package of management measures has been devised to meet the needs of Fiordland's three different groups of fisheries. It represents an agreement between commercial and recreational fishers, Ngäi Tahu Whanui (customary), charter operators and environmental and community interests on the Guardians. All the fishing groups

have made significant sacrifices in the interests of looking after Fiordland's fisheries and marine environment. Reaching an agreement indicates that a balance has been struck between the groups.

Note: *Current and proposed amateur fishing rules are detailed in Appendix 2.*

3.7.1 *Milford and Doubtful Sounds*

Commercial fishing

- No commercial fishing inside the Doubtful Sound habitat lines (Milford Sound has been closed to commercial fishing since the 1950s).

Non-commercial fishing (customary and amateur measures)

- Section 186B, temporary two-year closure for blue cod plus two additional years if necessary.
- Groper daily bag limit of 2, no accumulation.
- Rock lobster daily bag limit of 2, no accumulation.

3.7.2 *Inside the rest of the fiords*

Commercial fishing

- No commercial fishing inside the habitat lines.

Non-commercial fishing (customary and amateur measures)

- Blue cod daily bag limit of 3, no accumulation.
- Groper daily bag limit of 3, no accumulation.
- Rock lobster daily bag limit of 3, no accumulation.

3.7.3 *Fiord entrances and outer coast*

Commercial fishing

- Harvest capped by the QMS.

Amateur fishing

- Blue cod daily bag limit of 20, no accumulation (this includes the 3 blue cod limit from within the fiords).
- Groper daily bag limit of 5 with no accumulation (this includes the 3 groper limit from within the fiords).
- Rock lobster daily bag limit of 6 with an accumulation limit of 15 for three days or more. This measure is associated with a bag and tag provision relating to each day's catch.

3.7.4 *Measures that apply both inside the fiords and along the coast*

Customary fishing

- Managed by tangata tiaki.

Amateur fishing

- Bag limits:
  - Scallop daily bag limit of 10 with no accumulation.
  - Paua daily bag limit of 10 with no accumulation.
  - Groper included in the total finfish bag limit.
  - Jock Stewart (Sea Perch) daily bag limit of 10 with no accumulation – inside the combined daily finfish bag limit.
  - Total finfish bag limit of 30 with no accumulation.

- Bulk harvesting methods:
  - Inside the habitat lines where conservative daily bag limits are proposed, bulk harvesting methods are not appropriate. There is an increased risk of exceeding daily limits if cod pots, dahn lines with 25 hooks, dredges and set nets are used. For non-divers, pots are the only method of harvesting rock lobster. Given that rock lobster can be released alive three rock lobster pots per boat are considered to be appropriate both inside and outside the habitat lines.

- No cod pots inside the habitat lines of any fiord.
- Dahn lines limited to 2/boat and 5 hooks per line.
- Rock lobster pots limited to 3/boat.
- No scallop dredges.
- No set nets.

- Hook size that promotes the survival of blue cod:
  - Given the vulnerability of blue cod to overfishing it is important to minimise fishing method induced mortality of blue cod that are caught but not kept. NIWA research into the effect of hook size on blue cod mortality conclusively shows that the use of size 6/0 Kahle or larger hooks reduces the mortality of returned undersized blue cod. Larger hooks are not swallowed and can therefore be removed without fatally wounding the fish. The use of large hooks may also reduce the number of undersized blue cod captured.

- Number six (6/0 Kahle) or larger hooks to be used whilst fishing for blue cod using bait (non regulatory measure).

3.7.5 *Storing rock lobster and holding (coff) pots*

Outside the commercial rock lobster harvesting season (generally from February to June), pots are stored in sheltered locations on flat muddy or sandy substrates. This type of habitat is relatively plentiful in the southern fiords where the practice of setting a line of pots connected by bridles with a float at either end is considered to be the most appropriate pot storage method. Further north, where suitable substrate is more restricted, pots are stored individually. Anchorages are avoided.

In Section 4 values of special significance are discussed, including the definition and identification of china shops and representative areas. The Guardians agreed that rock lobster pot storage should not take place inside the areas designated as china shops (Figure 4). Within three of the proposed seven representative areas, restricted areas are being defined where rock lobster and coff pot storage can take place without compromising biodiversity values (Figures 8, 11 and 18).

Adopting a recommended pot storage method, excluding pot storage from china shops, and designating restricted areas where pot storage is able to take place within representative areas, are all important steps towards developing a comprehensive pot storage management approach for Fiordland. Developing this further is a priority for the CRA8 Management Committee that has the knowledge and practical experience to devise workable solutions for the Fiordland situation.

3.8 Package of fisheries measures - for the fish and the environment

The proposed package of fisheries measures not only benefits Fiordland's fish stocks and fisheries[6] but also the marine environment. Certain fisheries management measures can play a role in looking after values of special significance. For instance, if commercial fishing is withdrawn from inside the habitat lines this will complement other measures proposed for the animal dominated inside fiord areas. Similarly, the adoption of conservative amateur harvesting limits within the fiords means the removal of methods such as scallop dredging, with positive implications for the benthic communities. Proposals contained in this component of the draft strategy represent a very positive contribution to the marine environment on the part of the harvesting groups. The nature of the contribution is shown in Figure 3 where the extent of inner fiord habitats is shown.

[6] For example, over the past 5-6 years the CRA8 Management Committee has taken a proactive approach to resolving rock lobster sustainability issues within CRA8. The TACC is decided on the basis of a decision rule that guarantees a rebuild of the fishery. This has resulted in quota holders taking large cuts to their quota and the unavailablity of quota has, in turn resulted in fewer boats in the fishery. However rock lobster stocks along the outer coast are now rebuilding and the current proposal not to pot for rock lobster inside the habitat lines is a further gain for both the stocks and habitat within those areas.

4.0 Values of Special Significance

Key Objective

- **Ensure the ongoing integrity of areas, habitats and communities of special significance within Fiordland's marine environment.**[7]

4.1 Information gathering by fiord

The information presented in this section of the strategy is from a variety of sources. Information already available about areas and values of special significance in Fiordland's marine environment from the 1990's onwards was combined with the Guardians' knowledge and that of their wider groups. Valuable input has been made by researchers who have carried out extensive studies in Fiordland, including Ken Grange (NIWA), Chris Paulin (Te Papa), and Steve Wing (Marine Sciences, University of Otago). Where values needed to be clarified, site visits were made by group members or researchers.

It should be noted that commercial fishers advocated marine reserve status for two areas identified in the 1990s exercise. The Fiordland Commercial Fishermen's Association applied for what have since become the Piopiotahi (Milford Sound) and Te Awaatu (Doubtful Sound) marine reserves.

4.2 Identifying values of special significance

The Guardians adopted two distinctly different types of values to ensure the ongoing integrity of areas, habitats and communities of special significance within Fiordland's marine environment. Criteria were defined to guide the identification of the two following sets of values:

4.2.1 *"China shops"*

China shops are small discrete areas that are outstanding for the abundance and/or diversity of animal communities, the abundance and/or diversity of mixed animal and plant communities or the abundance of particular animal species. Such communities are often, but not exclusively located where the current is strong, such as where fiords change direction sharply or the channels narrow around islands. Communities

[7] **Marine mammals**
The Guardians and DoC discussed whether serious issues currently affect marine mammals in Fiordland. No outstanding issues were identified that could not be adequately addressed by existing legislative provisions contained in the Marine Mammals Act and Conservation Act. Both Acts provide safeguards for marine mammals that are subject to frequent interaction with humans. The group supports the marine mammal research effort and also the work to ensure that commercial activities such as marine mammal watching and diving with dolphins do not adversely impact the animals.

associated with a wide variety of different habitats that occur in a confined area may also qualify for china shop status.

Likely areas were initially identified on the basis of earlier work documented by Ken Grange and the Marine Sciences Society, and independently on the basis of the Guardians' knowledge. A workshop was held with Ken Grange and Chris Paulin to better define the values within these sensitive areas. Steve Wing identified a number of additional areas on the basis of his knowledge and this completed the current list. A summary of available information about each area is presented below. We anticipate additional information will become available as results of current and future studies are delivered.

China shops support a range of special values including biodiversity. Whether these areas should be identified at all was debated. However the Guardians decided that if the areas were identified appropriate measures could be applied to minimise the risks. Therefore the identification of possible risks became fundamental to a consideration of how best each china shop could be looked after.

4.2.2 *Representative areas/fiords*

Initially, parts of fiords and entire fiords with special features were identified. For instance, Sutherland Sound was identified as a unique estuarine area confined by an emergent sill and Long Sound was considered to be one of the most pristine fiords in Fiordland.

However, as the exercise progressed, it became clear that a set of criteria on which to consider the values of each fiord required better definition. Rather than attempting to define something as generic as "special values", the group decided that "representative areas" could be more easily defined and would provide a more useful basis for advancing the Guardians' objective. Fiordland's marine habitats and biodiversity can be encompassed by a selection of representative areas. Such an approach is advocated in the New Zealand Biodiversity Strategy released in 2000. One of the government's desired outcomes stated in the strategy is the protection of a range of marine habitats and ecosystems that are representative of New Zealand's indigenous marine biodiversity. The Guardians recognised the relevance of such an approach for Fiordland's marine environment.

The following habitat framework and criteria for identifying representative areas were adopted:

1. **Inside Fiord (sheltered)**

   - Vertical rock wall
   - Broken rocky reefs
   - Soft bottom

2. **Fiord Entrances**

- Semi sheltered
- Sheltered

3. **Outer Coast**

- Exposed[8]
- Semi sheltered
- Shallow sandy

A number of fiords and parts of fiords representing estuarine, inside fiord and fiord entrance habitats have been identified according to these criteria and the information summarised below. As indicated above, a number of areas classed as representative exhibit very special values as well.

Note:*The term "representative areas" does not imply that areas must be in the same proportion as occurs geographically.*

4.3 Identification and description of china shops

The location of the china shops is shown in Figure 4. The position of each china shop within individual fiords is shown in Figures 6-18. Suggested management measures have been tailored to an assessment of possible risks to the special values of each china shop. In addition to the targeted management measures for each site, a code of practice covering all the china shops is supported.

- **Bligh Sound**

  - ***Turn Point***

    Values: Spectacular black coral colonies and an abundance of sponges on the Turn Point rock wall are outstanding values. Biodiversity is high. The site has excellent underwater visibility.

    Threats: Confined area with definite threat from divers.

    Measures: Permit for divers, guide divers, code of practice for the site.

    Clio Rock (White Rocks)

    Values: Unique habitat feature. Rocks rise from 120 to 1 fathom in the middle of the sound. A diverse and abundant community of red, pink and black corals are found here. The lack of sedimentation means the water is very clear and the corals are clean.

[8] The fiord entrances and outer coast are regularly exposed to extreme weather that batters the bull kelp and shifts the bouldery and rocky bottom substrates. Unstable exposed habitats are the logical consequence of such rigorous conditions.

Threats: Increased visitor numbers and anchoring on the rocks.

Measures: Boats should anchor at Kelly's on the eastern side using stern lines.

- **George Sound**

  - ***South side of Cinch Cove***

    Values: The site is north facing, sunny and relatively light to a depth of 45 m. The cliff face descends and gives way to a sandy slope at 25-30 m. Both fiord and open coast communities are represented on the cliff face where seaweeds grow adjacent to black corals and feather stars. At the base of the wall there is a spectacular field of large sea pens and tube anemones that extends beyond diving depths. This is one of the few sea pen localities in the northern fiords. There are no apparent threats to these values.

- **Caswell Sound**

  - ***Hansard Point***

    Values: Ecklonia forest descending to black coral. A mix of open coast and inner fiord habitats. Sheer rock walls supporting abundant corals and starfish. There are no apparent threats to these values.

- **Charles Sound**

  - ***Gold Arm***

    Values: Everything is together in one place - river mouths, estuarine areas, islands (Fanny Islands), and rocks that emerge at low tide. There is an abundance of spectacular red and black corals, some of which grow so close to the surface they can be viewed from a boat. An abundance of fish and some rock lobster together with good light, adds to an impressive range of values.

    Threats: Increased visitor numbers and anchoring.

    Measures: The main anchorage for the sound is just a few minutes away. Boats should anchor on the inside of the site on mud and there should be a code of practice developed for the site.

  - ***Emelius Arm***

    Values: Diversity and abundance of colourful sponges on a boulder substrate. There are no apparent threats to these values.

- **Bradshaw Sound**

  - ***Precipice Cove***

    Values: A sill at the entrance makes Precipice Cove a fiord within a fiord. The diverse wall community associated with the sill is of special significance.

    Threats: Anchoring on the sill is a threat. However anchoring within the cove is not considered to be a threat. Precipice Cove is one of the better known anchorages and subject to high use. Fishing with existing methods does not represent a threat to the wall community.

    Measures: There is sheltered anchorage behind Macdonell Island where anchoring can take place away from the sill. A code of practice could be the most effective approach for looking after the wall community.

  - ***Gaer Arm***

    Values: Groper, tarakihi, other finfish and rock lobster are found up in the estuarine habitat at the head of the sound. Rock lobsters have been observed in coral trees.

    Threats: Groper is harvested from syndicate boats in this area and an increase in fishing pressure is predicted. Commercial rock lobster potting also takes place here.

    Measures: The Guardians' agreed that this area warranted a no-fishing status. There is an all weather anchorage in nearby Precipice Cove.

- **Doubtful Sound**

  - ***Common Head***

    Values: Abundant coralline algae and bryozoans - high biodiversity. An area of high currents and associated growth rates. This area is more representative than outstanding. There is a rock identified by a South Cardinal Mark 100 m off shore that is a navigational hazard but otherwise there are no apparent threats.

  - ***South wall between First and Crooked Arms***

    Values: Steep rock walls support high densities of brachiopods and black coral. This is the centre of the productive zone in Doubtful Sound and densities of animals in the wall community reflect this. Best suspension-feeding communities in Doubtful Sound. There are no apparent threats to these values.

- ***Tricky Cove***

  Values: Tricky Cove is a tiny cove opposite Crooked Arm where all the early research on black coral and inner fiord habitat communities took place. Diverse wall communities are a feature of the cove and the walls of Doubtful Sound 100 m either side of the cove. The cove has both historic value as well as providing important baseline monitoring opportunities.

  Threats: The cove provides safe anchorage and attracts visitors and divers who are interested in its historic and other values. Accordingly, anchoring, visitor numbers and divers are all threats to the values of Tricky Cove.

  Measures: Anchoring and diving within the cove needs to be managed. If these activities are managed visitor numbers may not be an issue.

- ***Area south of Elizabeth Island (5 china shops)***

  Values:

  - South end of Elizabeth Island - outstanding example of red coral on black sand.
  - Unique assemblage of bright yellow glass sponges at 30-35m depth opposite Hall Arm. Apparently the only other place these sponges have ever been seen is in caves in Jamaica.
  - Rock wall community and red coral under a large overhang south of Lady Alice Falls.
  - Red coral community inside Rolla Island, Tarawera Rock.

- ***White coral community in the trench off Brigg Point***

  Although these features are located within close proximity, each is found in an otherwise barren environment.

  Threats: Being sheltered and easily accessible from Deep Cove, visitor numbers, diver damage, anchoring and dredging represent real threats to these values.

  Measures: The area bounding the five sites warrants special significance status. Risks to the china shop values including visitor numbers, diving and dredging must be able to be controlled by whatever management tool is selected. Olphert Cove could provide an appropriate anchorage site. The area could also provide opportunities to study marine biology for schools using the Deep Cove Hostel. A marine reserve may be an appropriate tool as is outlined in Section 4.5 - management considerations.

- **Breaksea Sound**

  - ***The wall before First Cove***

    Values: The best suspension feeding communities in Breaksea Sound. The only place in Fiordland where particular sea stars are found. There are no apparent threats to these values.

  - ***Vancouver Arm***

    Values: Brachiopods are a distinctive feature of the diverse rock wall communities along the north wall. There are no apparent threats to these values.

- **Acheron Passage**

  - ***Reef off Wet Jacket Arm***

    Values: Spectacular rock wall habitat occurs in a high current. The most important part of the habitat is the sill, or rock reef located just off the entrance to Wet Jacket Arm. Being remote from the land, silt does not affect the communities that feature large black corals and bryozoans.

    Threats: The impact of increasing numbers of cruise trips was discussed. Environment Southland's agreement with the cruise ship industry limits the number of ships to two at any one place and time. Currently the total number of visits is 30 and this is expected to increase to 50 over the next few years. Issues of speed and noise underwater were canvassed but other than collisions and sinking, cruise ships were thought not to represent a threat to the underwater sill community. However, this site is popular with divers and both increased visitor numbers and anchoring were seen as threats.

    Measures: The possibility of marking the site was discussed but damage to the marker and anchoring at the site could be resultant problems.

- **Dusky Sound**

  - ***Cook Channel, Long Island***

    Values: Where the passage narrows, high currents foster dense colonies of particularly large bryozoans, black corals and red corals. There are no apparent threats to these values.

- ***Nine Fathom Passage, Cooper Island***

  Values: More spectacular scenery than the Cook Channel china shop. Where the passage narrows, high currents foster dense colonies of particularly large bryozoans, black corals and red corals.

  Threats: Anchoring.

  Measures: Anchoring can take place at the end of Cooper Island or Fanny Bay.

- **Chalky Inlet**

  - ***Edwardson Sound***

    Values: A forest of huge black coral trees with abundant gorgonians and other species typical of the southern sounds is located opposite Divide Head along the west wall at the entrance of Edwardson Sound. The water is very clear due to a lack of freshwater. The sloping rocky reef substrate ends in a drop off.

    Threats: There is nowhere to anchor but visitor numbers are a threat.

    Measures: A code of practice needs to be developed for the site.

- **Preservation Inlet**

  - ***The Narrows***

    Values: An outstanding abundance of sea pens occurs on the sand with scallops located among them. Holothurians (strawberry fields), red coral and white brachiopods are also outstanding features of the Narrows.

    Threats: Scallop dredging, diver damage, divers disturbing the sediment that settles on the sea pens with long term detrimental effects, increased visitor use and rock lobster pot storage are all threats.

    Measures: Ban scallop dredging. Introduce a no take area for scallops to stop divers gathering amongst the sea pens. Create a no anchoring zone. Ban the storage of rock lobster pots and the use of recreational rock lobster pots from the area. Develop a code of practice for this site.

4.4 Identification and consideration of representative areas

The location of representative areas is shown on Figure 5. For individual fiords, areas are shown in Figures 6-18. Primarily, representative area status is to ensure that community structure and biodiversity are not unduly compromised by human influence.

Although there are a variety of measures in legislation that could be used to achieve the type of protection envisaged (Government's Marine Protected Area initiative), the Guardians' support the use of the marine reserves tool for the representative areas identified below conditional on:

- the final form of the revised marine reserves legislation;
- Kaitiakitanga being appropriately expressed in Fiordland, as customary fishing rights will possibly be extinguished with the permanent removal of harvesting from these areas;
- anchoring provisions in some very extensive waterways under marine reserve status, as there are safety issues associated with the exposed and isolated nature of much of Fiordland's marine environment.

Representative areas shown in Figure 5 include inner fiord (vertical rock wall, broken rocky reef and soft bottom habitats) and entrance (semi sheltered and sheltered habitats) that support significant values from both a national and international perspective.

Unlike the inner fiords, the outer Fiordland coast habitat does not support special values of an equivalent nature - indeed this exposed habitat has been described as having similar characteristics as the rest of the southern coastline. Rather than using the marine reserve statute, a combination of marine protected area management tools provides an appropriate management choice for outer coast habitats.

- **Sutherland Sound**

  - ***Entire Sound*** (inside fiord - soft substrate)

    The sill that defines Sutherland Sound is very shallow, emerging at low tide. Behind the sill lies a unique muddy estuarine area where leaf material has accumulated due to a lack of flushing. Spiky dogfish, stargazers, flounder and red decorative crabs are all common in this pristine habitat.

- **Bligh Sound**

  - ***Turn Point to Clio Rocks*** (inside fiord - vertical rock wall)

    Linking Turn Point and Clio Rocks by including the rock walls between the two china shops to create an area representing inside fiord, vertical rock wall habitat.

    Divers would no longer be able to harvest rock lobster in the area and would need to move to alternative areas.

- **Charles Sound**

  - ***Gold Arm*** (inside fiord - vertical rock walls, broken rocky reefs, soft substrate)

    In addition to the extraordinary set of values exhibited within the Gold Arm china shop, diverse rock wall communities throughout the rest of the arm provide an excellent representative area of rock wall habitat.

    Depending on the management measures adopted, the storage of rock lobster and coff pots needs to be accommodated within Gold Arm. These are not associated with the rock wall habitat. Commercial, recreational and customary fishing would be removed.

- **Bradshaw Sound**

  - ***Gaer Arm*** (inside fiord - vertical rock walls, soft substrate)

    The influence of freshwater from the power scheme is at a minimum in Gaer Arm. The Sound still supports cockle beds as well as highly diverse rock wall communities including opal fish, seapens and soft coral. Special features of the china shop at the head of the fiord include the presence of groper, tarakihi, other finfish and rock lobsters, some of which have been observed in coral trees.

    Customary fishing and a popular area for recreational fishing would be removed.

- **Doubtful Sound**

  - ***Te Awaatu Channel*** (inside fiord)

    Currently, Te Awaatu (The Gut) Marine Reserve extends along the Te Awaatu Channel from the inner end of Bauza Island to the narrowest part of the channel. The wall community is the special feature of this area where currents and depth provide ideal habitat. Diver damage has occurred here because of the confined nature of the special features. To relieve diver pressure within the marine reserve an extension of the boundary was considered. Limited information about the type of habitat seaward of the marine reserve revealed a bouldery substrate, large kelp beds and rock lobster stocks. These features are not sort after by divers within Te Awaatu and for this reason an extension of the marine reserve boundary would be unlikely to spread diver pressure. Accordingly a seaward extension of the marine reserve to the habitat line requires further investigation of both the habitat features and management measures.

    Recreational, customary and commercial fishing would be removed from this area should the marine reserve be extended.

- **Acheron Passage**

  - ***Wet Jacket Arm*** (inside fiord - vertical rock walls, broken rocky reefs, soft substrates)

    As a representative area, Wet Jacket Arm encompasses all inside fiord habitats within a single fiord entity. Ken Grange reports the highest densities of black coral from all his Fiordland studies are in Wet Jacket Arm. Steve Wing has study sites in the Arm and reports that the best brachiopod beds and suspension feeding communities are around Oke Island. Recreational, commercial and customary fishing would be removed.

- **Dusky Sound**

  - ***Inside Five Fingers Peninsula*** (fiord entrance, outer coast habitats)

    The area suggested inside Five Fingers Peninsula, takes in Cormorant Cove, Facile Harbour and Pigeon and Parrot Islands and includes rocky reef, sandy bottom, estuarine and kelp habitats. The type and diversity of habitats makes this area very suitable for representative status.

    Recreational, commercial and customary fishing would be removed from this area that is particularly valued for shelter.

- **Preservation Inlet**

  - ***Long Sound*** (inside fiord - vertical rock walls, broken rocky reefs, soft substrate)

    The area includes Long Sound and the Narrows to a line across the entrance from Revolver Bay. Long Sound is regarded as one of the most pristine sounds. Poor stocks of recreational fish species have meant that fishing pressure has never been high. The Sound is very important for splendid perch, an emergent fish species (normally only found at depth in the ocean). Wall communities are representative. Long Sound is used to transport hunters, fishers and charter boat clients into and out of the fiords via Cascade Basin. Anchoring takes place in Cascade Basin, however this operation does not appear to adversely impact the underwater habitat of Long Sound.

    Recreational and customary fishing would be removed.

4.5 Management considerations

The location and distribution of representative areas and china shops highlights the national and international importance of inside fiord habitat, communities and biodiversity.

Based on local knowledge, available information and scientific advice, seven representative areas have been identified, including one entire fiord system and four entire fiord arms. In addition to being classed as representative, Sutherland Sound, Wet Jacket Arm and Long Sound have been regarded as distinctive in their own right since the early 1990s. Collectively, these seven areas support a range of habitats, communities and marine biodiversity.

Of the tools in the Marine Protected Areas basket that might be used to look after these eight areas, the Guardians considered the marine reserve tool could be appropriate, contingent on the final form of the revised Marine Reserves Act. Marine reserve status was also considered to be appropriate for the area bounding the five china shops south of Elizabeth Island in Doubtful Sound, as long as the threats to the special values could be adequately controlled. The use of marine reserve provisions is also contingent on kaitiakitanga being appropriately expressed.

Altogether 23 china shops have been identified for consideration. Collectively these areas support a wide range of outstanding features and values. Suggested management measures are based on particular values and whether these are under threat from existing or future activities.

Eleven china shops are located within identified representative areas and therefore management may well be by the marine reserve mechanism. Threats were identified for every one of these china shops, including increased visitor numbers, diving, anchoring, dredging and fishing. Proposals for dealing with these threats have been developed and need to be able to be implemented under the provisions of the revised marine reserves legislation. However, one principle of the draft Bill - promoting marine reserves as places for public use and enjoyment - would seem to be at odds with the need to restrict visitor use and recreation. Increased numbers of divers, visitors and anchoring are the very activities that threaten the special values identified. Thought needs to be given to whether a marine reserve is the most appropriate tool for looking after special values and biodiversity that are vulnerable to non-fishing recreational activities such as increased visitor numbers, anchoring and diving.

No apparent threats were identified for nine of the remaining 12 china shops located outside representative areas. Anchoring or increased numbers of visitors were identified as threats to three china shops and the Guardians proposed alternative anchoring sites to protect these values. There are potential opportunities to manage issues within these areas and associated threats by way of Historic Heritage mechanisms under the Resource Management Act and/or the Southland Coastal Plan.

Finally, Tricky Cove, a china shop with historic scientific values may also be able to be protected as a Historic Heritage Scientific site under provisions in the Resource Management Act. It is important that what is to be achieved drives the selection of the most appropriate management tool or combination of tools. The boundaries of both china shops and representative areas will be clearly marked and publicised.