

A review of the objectives of New Zealand marine reserves

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Summary

No-take marine reserves are widely considered the most effective type of marine protected area (MPA) for conservation purposes, and they have been employed as conservation tool globally. In New Zealand, the Marine Reserves Act 1971 has been the statutory instrument for establishing and managing marine reserves for half a century. The Marine Reserves Act 1971 had the original purpose of protecting marine organisms and the environment to allow their scientific study. However, conservation science has evolved significantly since the implementation of this Act and many existing marine reserves were established with other objectives in mind. International agreements like the Convention on Biological Diversity (CBD) have been adopted with the goal of conserving natural resources by: protecting ecosystem functions and services, endangered species, and habitats; ensuring the resilience of ecosystems to the negative effects of climate change; and equitably integrating the public and stakeholders in the governance of marine resources.

New Zealand is currently undertaking reform to improve the framework for establishing marine protection. Furthermore, 2020 marks the end of the CBD's Strategic Plan for Biodiversity 2011-2020, which has guided many conservation efforts globally over the last decade, and new conservation goals will need to be defined. In this critical moment, it will be useful to identify the original objectives of the 44 implemented marine reserves in New Zealand. Defining clear conservation objectives is important for ensuring the success of conservation initiatives, including the establishment of protected areas, and for measuring their success over time.

While the Marine Reserves Act 1971 was geared towards the scientific study of marine ecosystems, marine protection has often been motivated by a number of other ecological and socioeconomic objectives. We reviewed the application documents of the 44 marine reserves created in New Zealand until April 2020, and compiled a list of the original objectives of each marine reserve as specified by the applicants.

We found that all marine reserves in New Zealand had the objective to protect natural features for their scientific value, consistent with the Act. Other common objectives of marine protection were: the protection of specific habitats (40.1% of marine reserves) and organisms (38.7%); improvement of recreational values (38.7%); the promotion

of the educational value of marine ecosystems (25%); the satisfaction of a number of stakeholders (22.7%); the integration of marine areas in protected or otherwise valuable terrestrial landscapes (20%); the recovery of depleted resources (15.9%); the improvement of fisheries value (13.6%); and the protection of sites of cultural heritage (4.5%).

The objectives of individual applications depended on local-scale natural and socioeconomic features pertinent to the site proposed for the reserve. For example, the objectives of remote marine reserves like those around the Kermadec and Subantarctic Islands or those in Fiordland included preserving specific organisms (such as marine mammals, seabirds, and endemic species) or unique habitats, but did not aim to protect recreational and educational values of the sites. Conversely, the objectives of marine reserves located around mainland New Zealand, in areas that are accessible to the public, included preserving marine ecosystems as providers of opportunities for public engagement in non-destructive activities. Less common objectives of New Zealand marine reserves involved fisheries and commercial uses of the sea.

We found that establishing marine reserves in New Zealand to date has primarily been driven by the purpose of scientific study of marine ecosystems, consistent with the Act. However, a number of other ecological and socioeconomic objectives have driven marine reserve planning, demonstrating that conservation targets are contextual and nuanced.

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1. Introduction

New Zealand pioneered marine conservation by establishing some of the first fully-protected marine reserves in the world. As one of the first steps in marine conservation in New Zealand, the government introduced the Marine Reserves Act 1971 (hereafter referred to as the Act; New Zealand Government 1971), with the purpose of establishing no-take marine reserves for the scientific study of marine life in New Zealand's territorial sea¹ (within 12 nautical miles from the coastline and the islands). The drive to develop the Act arose from the need to protect the organisms and environment studied by marine scientists at Auckland University's Leigh Marine Laboratory (Ballantine 2014). For this reason, the Act originally had the objective of protecting marine areas through no-take reserves for the purpose of scientific study. After the approval of the Act, the New Zealand Government established the first no-take marine reserve in 1975, between Cape Rodney and Okakari Point, near the Leigh Marine Laboratory. As of April 2020, the New Zealand Government has created 44 no-take marine reserves (Fig. 1, see Table A1 in Appendix 1) around its coastline and around islands in the far North (the Kermadec Islands) and South (Auckland, Campbell, Antipodes, and Bounty Islands) of New Zealand. Marine reserves currently cover 9.8% of New Zealand's territorial sea (Davies et al. 2018), but only 0.4% of New Zealand's total marine estate (EEZ and territorial sea). In addition, marine reserve coverage is largely located around remote islands in the north (Kermadec Islands) and south (Subantarctic Islands) of New Zealand's marine area. In the remaining New Zealand marine biogeographic regions (which are 14 in total, defined by Ministry of Fisheries and Department of Conservation 2008), marine reserve coverage is between 0% and a maximum of around 1% (Department of Conservation and Ministry of Fisheries 2011).

¹ Section 3(1) of the Marine Reserves Act 1971 states: "It is hereby declared that the provisions of this Act shall have effect for the purpose of preserving, as marine reserves for the scientific study of marine life, areas of New Zealand that contain underwater scenery, natural features, or marine life, of such distinctive quality, or so typical, or beautiful, or unique, that their continued preservation is in the national interest". <http://www.legislation.govt.nz/act/public/1971/0015/latest/DLM397838.html>

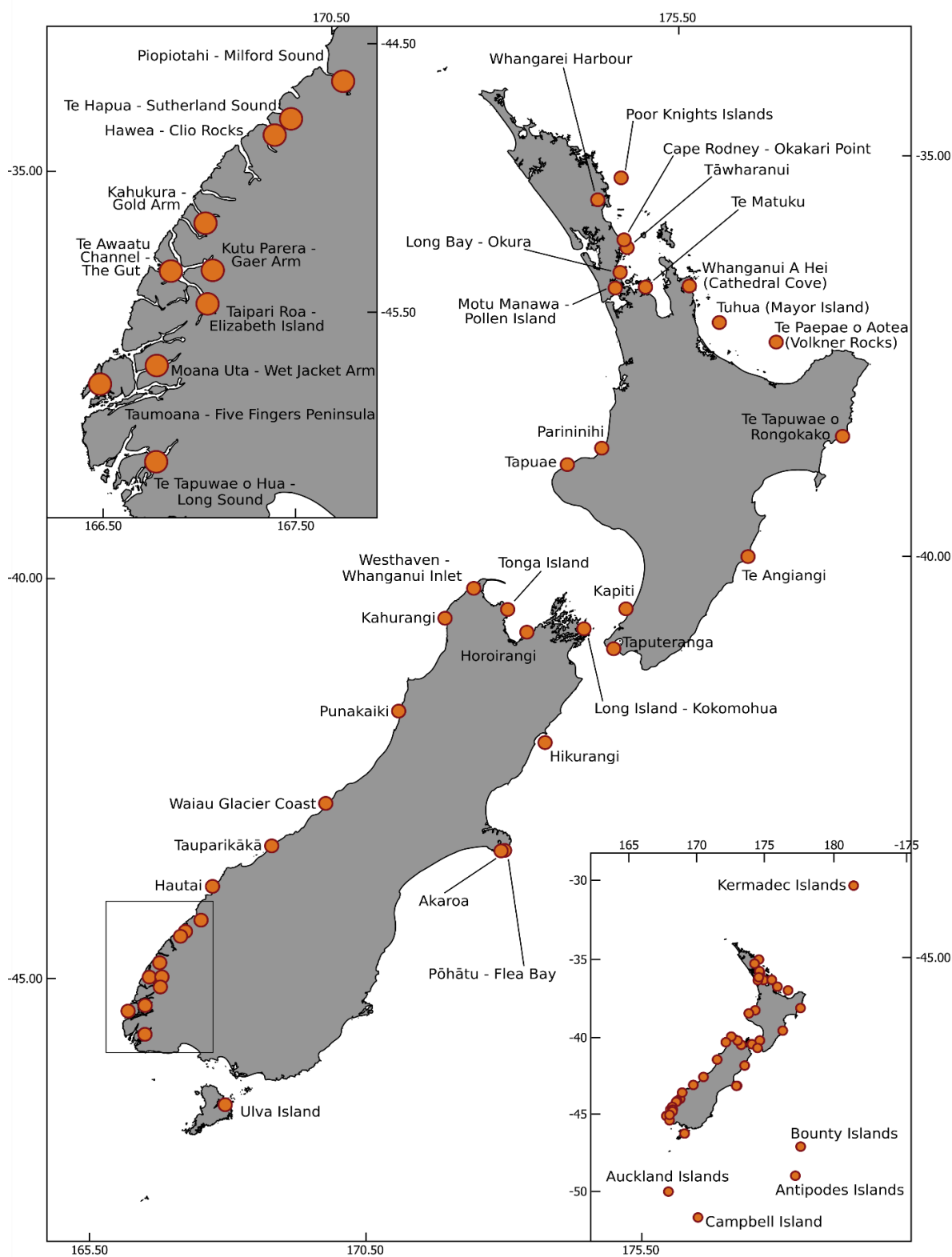


Figure 1. New Zealand's 44 implemented no-take marine reserves (Type 1 MPAs) as of April 2020. Contains data sourced from the [LINZ Data Service](#) licensed for reuse under [CC BY 4.0](#); marine reserve position calculated as the centroid of MPA polygons retrieved from the [World Database on Protected Areas](#) (protectedplanet.net).

1.1. Marine reserve planning in New Zealand: an overview

The process of marine reserve planning in New Zealand has been the subject of previous reviews (Scott 2016, Davies et al. 2018). In brief, under the Act, anyone who meets the criteria to be an applicant may submit an application for the establishment of a marine reserve through a process of public consultation. Through this process, the applicant may collect information on the area to be protected by consulting scientific studies and public documents, and then build a case for a marine reserve in the area. After the application is submitted, other members of the public may move objections (or expressions of support, Davies et al. 2018) to the application. The applicant may then choose to revise the application to address such objections. When the consultation process is complete, the Minister of Conservation, together with the concurrence of the Ministers of Primary Industries and Transport, makes the decision of whether the proposed reserve shall be established.

Since 1971, a number of international agreements for the conservation of nature have been adopted, and in 1992, New Zealand became a Party to the Convention on Biological Diversity (CBD - www.cbd.int). The CBD is a legally-binding, multilateral international agreement with the purpose of guiding nations through effective conservation strategies, with the goal of halting the loss of biodiversity. To meet CBD-mandated conservation objectives, New Zealand adopted the New Zealand's Biodiversity Strategy (NZBS, Department of Conservation and Ministry for the Environment 2000) in 2000, which was updated in 2016 by The New Zealand Biodiversity Action Plan 2016-2020 (Department of Conservation 2016). The NZBS is currently under review².

The NZBS included objectives specific to the conservation of the sea through the implementation of a network of marine protected areas (MPAs), “*that is comprehensive and representative of New Zealand's marine habitats and ecosystems*”. The NZBS was followed by the introduction of the New Zealand Marine Protected Areas Policy and Implementation Plan (the Policy) in 2005 (Department of Conservation and Ministry of Fisheries 2005), and a set of specific guidelines for the establishment of an MPA network in 2008 (the Guidelines, Ministry of Fishery and

² <https://www.doc.govt.nz/get-involved/have-your-say/all-consultations/2019/proposal-for-new-zealands-next-biodiversity-strategy/>

Department of Conservation 2008). These documents complement the Act by guiding MPA planning within New Zealand's Exclusive Economic Zone (EEZ), and by providing guidelines for forum-based MPA implementation processes. Marine Protection Planning Forums (MPPFs) are groups of stakeholders, Treaty partners and experts that should include (as appropriate for each specific case): marine scientists, commercial fishers, aquaculture and mineral industries, recreational users, tourism, and conservation groups (Davies et al. 2018). The Policy and the associated Guidelines identified three marine protection types in New Zealand: (1) Type 1 MPAs, which are no-take areas that include marine reserves established under the Act; (2) Type 2 MPAs, which are MPAs established under other legislations (like the Fishery Act, the Natural Resources Act, and the Marine Mammal Act) and may allow some extractive activities while meeting standards of protection; and (3) other areas that afford some level of protection, but do not satisfy the minimum requirements of protection to qualify as MPAs. Type 1 MPAs in New Zealand are reported as Category Ia MPAs under the International Union for the Conservation of Nature (IUCN) categories, which identifies the highest standard of protection (Day et al. 2012).

After the adoption of the Policy in 2005, the public consultation process previously defined in the Act remained in effect for new marine reserve applications. However, an increasing number of reserves were implemented through MPPF consultations (reviewed in Davies et al. 2018) or other collaborative processes. These are: eight marine reserves in Fiordland established as part of the Fiordland Marine Management Act 2005; one marine reserve in Kaikōura, established under the Kaikōura Marine Management Act 2014; three marine reserves around Antipodes Island, Campbell Island, and Bounty Islands, established under the Subantarctic Islands Marine Reserves Act 2014; and five marine reserves in the West Coast South Island Coastal Biogeographic Region (Department of Conservation 2012), established under the Act.

1.2. Objectives of marine protection in New Zealand

The different avenues for marine reserve planning in New Zealand have corresponded, in part, to different objectives for the establishment of marine reserves. The Act states that marine reserves have the "*purpose of preserving, [...] for the scientific study of marine life, areas of New Zealand that contain underwater scenery, natural features, or marine life, of such distinctive quality, or so typical, or beautiful, or*

unique, that their continued preservation is in the national interest". Forty years later, in 2010, the CBD held its 10th conference in Nagoya, Japan. One of the main outcomes of this meeting was the adoption of 20 Targets for the conservation of nature and management of natural resources to be met by 2020, named Aichi Targets. The Aichi Targets included the (reiterated) need to protect 10% of marine and coastal areas within MPAs and other effective area-based conservation measures (Aichi Target 11, CBD 2010).

As the CBD Parties agreed to create a comprehensive and representative MPA network and NZ incorporated this commitment in the NZBS, the limitations of the Act became apparent (Ministry for the Environment 2016, Scott 2016, Davies et al. 2018). In this context, the Act has three main limitations:

1. The Act only allows the establishment of marine reserves in New Zealand's territorial sea (4% of the country's marine estate), and is therefore inadequate to meet the 10% target.
2. Creating MPA networks must be driven by clear conservation objectives, among which the protection of biodiversity is the most important (CBD 2010). Therefore, the Act, which focuses on establishing marine reserves for the purpose of the scientific study of the sea, is limited in its ability to achieve conservation goals as outlined by the CBD and within the NZBS.
3. The Act has no consideration of how an established reserve will fit in, and be connected to, a wider MPA network.

While the Policy filled some of the gaps in the Act (for example, by applying to the entire New Zealand marine environment), there are some recognised issues with the framework for MPA planning in New Zealand. For example, the Policy and the Guidelines contain best practices for MPA planning and implementation, but there is no legal obligation to apply them to MPA planning processes. In addition, the involvement of scientists, stakeholders and Treaty partners has often been limited (Scott 2016). As a consequence of these shortfalls, New Zealand's MPA system has been demonstrated to suffer from representation gaps (Department of Conservation and Ministry of Fisheries, 2011), and to have made little use of science-based systematic planning (Leathwick et al. 2006, 2008, Geange et al. 2017).

Acknowledging the shortfalls of the Act, in 2016 the New Zealand Government advanced a proposal for a New Marine Protected Areas Act to reform New Zealand's approach to MPA planning (Ministry for the Environment 2016). The consultation document for the new Act (Ministry for the Environment 2016) included a list of objectives of the proposed MPA policy, which can be summarised as:

- To create a representative and adaptable network of MPAs with different levels of protection to enhance, protect and restore marine biodiversity.
- To base MPA planning on a science-based, integrated process.
- To recognise customary rights and cultural heritage values in creating MPAs by engaging with local communities, iwi and the wider public.
- To meet New Zealand's international obligations.

The objectives proposed for the new Act, which was proposed to only apply to New Zealand's territorial sea (<12 nautical miles from the shoreline) in the 2016 consultation, constituted a departure from the 1971 Act, the main objective of which is to protect the sea for the purpose of scientific study. The New Zealand Government is currently progressing a new marine protection reform, incorporating the knowledge from the 2016 proposal. However, past marine reserve application documents and marine management acts have included objectives other than ones relating to scientific study, which are in line with evolving marine conservation paradigms.

Conservation strategies, which include the design and implementation of protected areas, benefit from defining explicit objectives to be achieved in the proposed protected area; for example, objectives to protect a certain extent of a specific habitat or a certain number of occurrences of a given species (Margules and Pressey 2000). Applying this principle to MPA planning, it is important to identify which ecological, social, and economic features need to be protected, optimized, or augmented by the proposed MPA. Previous studies have identified a number of objectives for marine protection (see reviews from O'Leary et al. 2016; Svancara et al. 2005; also see Rovellini and Shaffer 2020). These objectives are not limited to scientific study of marine ecosystems (as mandated by the Act), and include the preservation of biodiversity, endangered species and specific habitats, ecosystem services, cultural, educational, and recreational values, fisheries resources, and others.

Here, we reviewed the original objectives of the 44 marine reserves in New Zealand. The specific purpose of this report was to identify the marine reserve objectives in New Zealand as proposed in the application processes. This was in order to gain an understanding of what objectives (in addition to the objectives stated in the Act) New Zealand marine reserves have been designed or implemented to achieve. Identification of these objectives can also allow further investigation into whether objectives in New Zealand have aligned with evolving international conservation goals and best practice.

2. Methods

We collated the application documents for all 44 New Zealand marine reserves. For the marine reserves established through a single application followed by public consultation, we identified the application documents and, when relevant, associated consultation documents, objections, and scientific studies used in support of the application. For marine reserves, or groups of reserves, planned with a forum-style process and / or under specific legislations, we examined relevant consultation documents and marine management strategies. The latter included the marine reserves established in Fiordland in 2005, in the Subantarctic Islands in 2014, and in Kaikōura in 2014. We will use the term ‘application document’ henceforth to refer to all documents we consulted.

We read each application document and identified the objectives of the proposed marine reserves as presented by the applicants. We defined 12 categories to summarise the objectives of New Zealand’s marine reserves, and scored each marine reserve against all the categories that matched the reserve’s objectives, because all application processes include more than one objective. The categories were:

1. *Preservation*. To preserve the natural state of marine ecosystems (flora, fauna and environment). The Act states that the purpose of marine reserves is: “*preserving, as marine reserves for the scientific study of marine life, areas of NZ that contain underwater scenery, natural features, or marine life, of such distinctive quality, or so typical, or beautiful, or unique, that their continued preservation is in the national interest.*” While under the Act the *main* purpose of marine reserves is scientific, this category broadly includes all applications aiming at protecting natural resources.

2. *Scientific*. To facilitate the scientific study of the marine environment. Because the Act states that reserves are established “*for the scientific study of marine life*”, all applications contain this objective implicitly, and most list it explicitly as one of the main goals for implementing reserves (see Table A2 in Appendix 2). The need of prohibiting extractive activities in marine areas that were the subject of scientific studies, particularly around University of Auckland’s Leigh Marine Laboratory, was one of the main rationales for conceiving the Act (Ballantine 2014).
3. *Recreational*. To preserve and improve the recreational value of marine ecosystems. Recreational values include non-destructive outdoor activities like boating, diving, snorkelling, swimming, walking, and photography. The recreational value of marine ecosystems is difficult to quantify, but it is a recognised ecosystem service with an important socio-economic footprint (Ghermandi and Nunes 2013).
4. *Educational*. To raise public awareness of the marine environment and life, and of offering educational opportunities to the public including, but not limited to, schools. Accessible marine reserves have an important societal value because they offer the opportunity to observe healthier marine environment and more abundant and diverse marine life associated with them.
5. *Cultural*. To protect sites of cultural value (including Māori cultural sites), as well as sites of historical and archaeological value.
6. *Specific organisms*. To protect specific organisms, including endangered species, delicate sessile invertebrates, seabird species nesting at the site, species with cultural significance, iconic or charismatic species, etc. Protection of species of interest because of their role in the ecosystem or because of their threatened conservation status has been one of the main drivers of marine conservation worldwide (e.g. Davidson and Dulvy 2017, Daly et al. 2018, Zhang and Vincent 2019).
7. *Specific habitats*. To protect specific and unique habitats or natural features. These may include mangroves, estuaries, wetlands, seagrass beds, rhodoliths, geological features such as sea caves, etc. While international conservation guidelines prescribe to protect a given proportion (typically 10%, CBD 2010) of marine and coastal areas that include a representative range of marine habitats and species, some unique habitats may be of particular interest and require

- higher protection because of their rarity, or because they support specific ecological processes or particularly high biodiversity.
8. *Fishery values.* To prevent overfishing at the site, and / or to improve fisheries in nearby areas. Some marine reserves can have positive effects on fisheries (e.g. Alcala and Russ 1990, Goñi et al. 2010, Kelly et al. 2010, Harrison et al. 2012, Costello 2014, Williamson et al. 2016, Le Port et al. 2017), because they help protect a viable spawning stock and can provide spill-over of fish biomass to neighbouring areas, if they are sized, designed and managed to do so (e.g. Gell and Roberts 2003, Costello 2014).
 9. *Recovery.* To allow the recovery of overfished stocks and depleted natural resources after prolonged extraction. Beneficial effects of marine reserves on the biomass of many marine species depend in part on physical and ecological features of the protected area, including its habitat quality (Jack and Wing 2010), and its potential to receive larval input (Freeman et al. 2012). However, fully-protected marine reserves can often have positive effects of fish biomass and density (e.g. Lester et al. 2009, Stewart et al. 2009, Sala and Giakoumi 2017), and closing off areas to extractive activities helps rebuild fish stocks.
 10. *Multiple stakeholders.* To give effect to the request of a marine reserve advanced by multiple stakeholders with an interest in the area. Stakeholders include industries, recreational users, conservation groups, and the public at large. Satisfaction of multiple stakeholders has been identified as one common objective of marine conservation (reviewed in O’Leary et al. 2016).
 11. *Matching land protection.* To match protection on the coastline, or the value of the land associated with the marine area to protect. The text of Aichi Target 11 calls for the implementation of MPA networks that are “*integrated into the wider landscapes and seascapes*”.
 12. *Other.* Objectives that do not occur often because they are specific to some reserves. These include, for example, protection from boating and anchor damage, and reduction of the negative impacts of cruise ships (some Fiordland reserves).

It is important to note that the documents that were available (and consulted) for each marine reserve were not the same for all marine reserves (i.e. some reserves had full applications available, while others had only discussion papers or responses to

objections; see Appendix 2). Furthermore, not all application documents consulted in this report included a list of specific objectives for establishing the marine reserve. Lastly, the application process has changed through time (i.e. apparent when comparing the first reserve of Cape Rodney to Okakari Point in 1975 to later reserves; see Section 1.1 of the present Report). Because of these reasons, it was difficult to apply a systematic way of extracting and categorizing objectives, and therefore we applied the following methods in order to minimize the amount of subjectivity:

1. Scenario 1: For those marine reserves that had full applications with clearly listed marine reserve objectives, we extracted objectives and categorized them as one (or more) of the twelve categories above (see Appendix 2 for marine reserves that had applications). These marine reserves applications either implicitly or explicitly mentioned the Act (see Table 1 and Appendix 2). In addition, these applications generally contained a wealth of information relating to different amenity values and to the significance of the proposed reserve; however, these were not (in many cases) reflected in the objectives. As an example, the Te Tapuwea o Rongokako Marine Reserve, had the following objective: *“The objective of this application is to preserve in their natural state for the scientific study of marine life a range of marine habitats that are so typical of those found on the east coast of North Island between Mahia Peninsula and East Cape that their preservation is in the national interest”* (pg 7). The application also discussed natural, cultural, and amenity values, and highlighted community support; however, none of these values were reflected in the original application objective. In these circumstances, we did not score any of these additional values as objectives. This was because in most cases, the information contained with the application materials could be scored as implicit objectives for most (if not all) categories. Consequently, the results became no longer informative as to what the main objectives of the marine reserves originally were.
2. Scenario 2: For those marine reserves that had full applications, but with no clearly listed objectives (i.e. Whanganui A Hei – Cathedral Cove, Piopiotahi Milford Sound, Te Awaatu Channel – The Gut), we read the entire document and identified objectives that were implicitly discussed, for example by building a case for establishing the reserve on a set of particular biodiversity features

(noting the limitations when comparing objectives from these reserves to those objectives from reserves belonging to Scenario 1). For instance, for Piopiotahi Milford Sound, the general purpose of New Zealand marine reserves was listed (defining the Act), but no explicit objectives for that specific marine reserve were listed. Therefore, we scored this as *Preservation* and *Scientific*, implicit (see Appendix 2), and we also extracted text that supported the case for creation of a marine reserve in this area, which allowed scoring of other categories implicitly (see Appendix 2).

3. Scenario 3: For those marine reserves for which the full applications were not available, but referred to explicit objectives in the supporting documents (i.e. Motu Manawa-Pollen Island, Parininihi, Poor Knights, Tapuae), we scored the objectives in the same manner as Scenario 1 (noting the limitations when comparing objectives from these reserves to those objectives from reserves belonging to Scenario 1 and 2).
4. Scenario 4: For those marine reserves for which the full applications were not available and did not mention explicit objectives (i.e. Cape Rodney to Okakari Point, Kermadec Islands, Tāwharanui), we selected text with implicit objectives as described in Scenario 2 (noting the limitations when comparing objectives from these reserves to those objectives from reserves belonging to Scenarios 1-3).
5. Scenario 5: For those marine reserves that were established under special legislation (Fiordland in 2005, Subantarctic Islands in 2014, Kaikōura in 2014), we referred to the associated conservation strategies (Fiordland, Kaikōura), regulatory impact statements (Subantarctic Islands, Kaikōura), and consultation documents (Subantarctic Islands). Because these reserves were deemed marine reserves under the Act, they all implicitly had the objectives relating to the Act (*Preservation, Scientific*). The Fiordland marine reserves had descriptions of for each proposed marine reserve area, and these were used to identify implicit objectives. For instance, Taipari Roa – Elizabeth Island had an “*outstanding example or red coral on blank sand,*” and a “*unique assemblage of bright yellow glass sponges,*” and so was scored as *Specific organisms*. For the Subantarctic Islands and Kaikōura reserves, objectives of the strategy regulatory impact statements (Fiordland, Kaikōura) and marine strategy (Kaikōura) were considered the same as those for the marine reserves.

Additionally, for the Subantarctic Islands, the consultation document allowed the identification of further implicit objectives. It is important again to note here that comparing objectives from these reserves to those objectives from reserves belonging to Scenario 1-4 has limitations, due to the different nature of the reserve planning processes and of the documents that were consulted.

3. Results and discussion

We identified, and scored against the 12 categories, 190 objectives for the 44 marine reserves implemented in New Zealand as of April 2020 (Table 1). All application documents referenced the need of protecting biodiversity, and the scientific value of the proposed reserve (Fig. 2). This is consistent with the Act, which mandates that marine reserves must safeguard marine life for the purpose of scientific study. The next most common objectives of New Zealand marine reserves were: protection of specific habitats, protection of specific organisms, and improvement of recreational values (40.1%, 38.7%, and 38.7%, respectively). Less commonly, New Zealand marine reserves had the objectives of providing opportunities for education (25%), satisfying multiple stakeholders (22.7%), matching land protection (20%), allowing recovery of depleted resources (15.9%), improving fishery value (13.6%), other objectives (11.4%), and protecting sites of cultural heritage (4.5%).

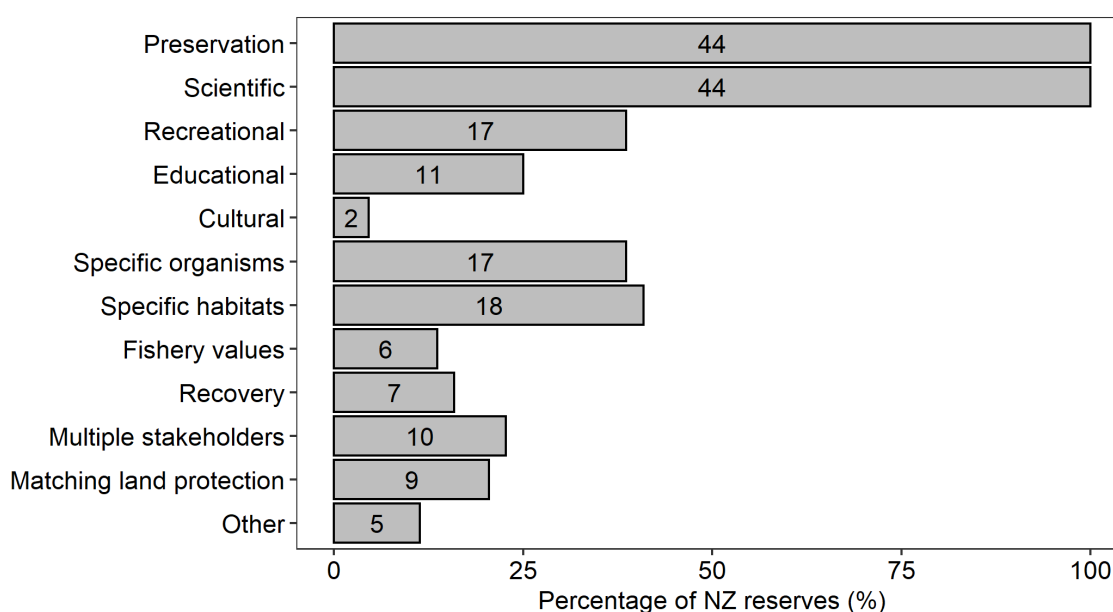


Figure 2. Objectives of the 44 implemented marine reserves (type 1 MPAs) in New Zealand, as found in application documents, consultation documents, and management strategies. Percentages indicate how many of New Zealand's marine reserves contained each objective. Numbers in the bars represent the number of reserves with that objective.

Early marine reserve applications, including the one for the first marine reserve at Cape Rodney to Okakari Point in 1975 (The University of Auckland, 1973), had the objective of protecting biodiversity, allowing scientific study of marine ecosystems, improving educational and recreational value, and allowing the recovery of spent fishery resources (Fig. 3). However, other objectives like satisfying multiple stakeholders, matching protection of land, and protecting sites of cultural heritage did not get explicit mention in application documents until later (1992, 1995, and 2008, respectively). The requirement of establishing marine reserves for the purpose of studying marine life, rather than for protecting biodiversity *per se*, is apparent in some early applications. For example, background scientific information for the establishment of a marine reserve around the Kermadec Islands called for protection of the spotted black grouper *Epinephelus daemeli* (IUCN Red List Status of “Near Threatened” as of 2016) because “*the Kermadec population is particularly valuable scientifically*” (Department of Lands and Survey 1986), with no mention of the need to protect it because it was rare or threatened.

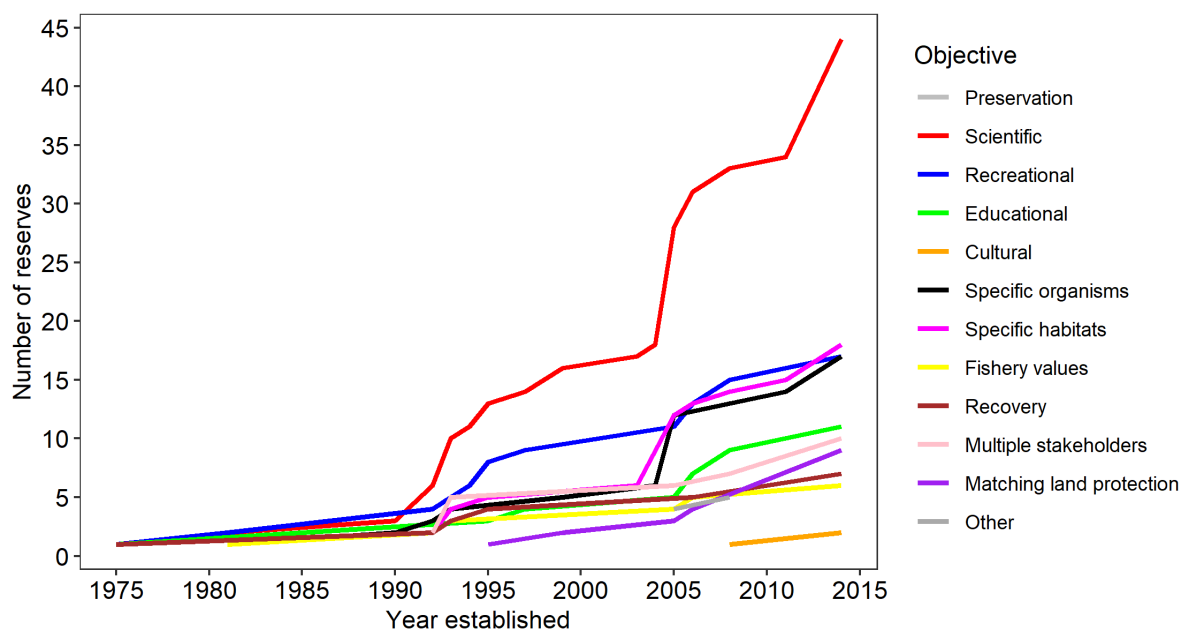


Figure 3. Cumulative occurrence over time of the 12 objectives of establishing marine reserves (Type 1 MPAs) in New Zealand. Note that the objectives of “Preservation” and “Scientific” overlap identically, as they were found in the applications for all 44 marine reserves.

While all marine reserves had the objectives of protecting biodiversity and facilitating the study of marine ecosystems, the objectives of more recent marine reserve proposals have increasingly reflected local-scale ecological features and human uses

of the sites where the reserves were to be established (Fig.3). Safeguarding and improving the recreational, educational, and cultural values of marine ecosystems was among the objectives of a number of marine reserves around mainland New Zealand, which are easily accessible to the public (Table 1). None of the remote marine reserves, including the Kermadec Islands, Fiordland, and the Subantarctic Islands had the objective of improving social values in their application, as these reserves are largely inaccessible to the public and these values were therefore of limited relevance. Accessibility of marine reserves is often considered a desirable feature of candidate reserve sites (e.g. Department of Conservation 1993), and easily accessible reserves like Cape Rodney to Okakari Point have played an important role in educating the public on marine life and in promoting local recreational businesses (Costello 2014).

On the other hand, most application documents for remote marine reserves mentioned the importance of protecting specific organisms and habitats, as in these three examples: (1) the application process for the Antipodes, Bounty, and Campbell Islands aimed at protecting several species of seabirds and marine mammals (Subantarctic Marine Protection Planning Forum 2009); (2) the background study in support of the application for the Kermadec Islands Marine Reserve in 1990 highlighted the importance of a number of endemic species (Department of Lands and Survey 1986); and (3) a case for protecting Wet Jacket Arm (Fiordland) was made because of a unique rocky reef characterised by strong currents and inhabited by large black corals and bryozoans (Guardians of Fiordland's Fisheries & Marine Environment Inc. 2003). Importantly, a number of accessible marine reserves around mainland New Zealand also had the objective of protecting selected habitats or species. For example, the Motu Manawa – Pollen Island Marine Reserve in Auckland harbour was proposed also to protect wetlands of national importance (Royal Forest and Bird Protection Society of New Zealand Inc. 1989), and the Pōhātū – Flea Bay Marine Reserve on the Banks Peninsula had the objective to protect yellow-eyed and white-flipped penguins, and other seabird species (Canterbury Recreational Marine Fishers Association and Akaroa Harbour Recreational Fishing Club 1996).

Extensive research has shown that no-take marine reserves (and MPAs in general, Gaines et al. 2010) can have beneficial effects on fisheries by supporting higher fish biomass than open-access areas (e.g. Lester et al. 2009, Sala and Giakoumi 2018), which ensures the persistence of a viable and effectively protected spawning stock

that can contribute to spill-over effects (Gell and Roberts 2003, Le Port et al. 2017). Marine reserves in New Zealand are not established under fishery management tools. However, while fishery values were not among the most common objectives of marine reserves in New Zealand, some applications mentioned the importance of protecting the sea to ensure fishery resources for present and future generations (Kaikōura, Te Korowai o Te Tai o Marokura 2012), and of the potential benefits of marine reserves for fisheries in nearby waters (Department of Conservation 1993). Cases of recovery of fished stocks after the establishment of marine reserves in New Zealand are well-documented (e.g. Cole et al. 1990, Denny et al. 2004, Pande et al. 2008, Freeman et al. 2012), but only a few applications explicitly aimed at allowing the recovery of fished stocks (e.g. black-foot pāua *Haliotis iris* and New Zealand spiny rock lobster *Jasus edwardsii* in Akaroa; and stocks of edible species in Milford Sound).

A number of marine reserves applications recognised the importance of ecological and social values of the area to protect, but did not explicitly include these values in the objectives for establishing a reserve. For example, the application document for five marine reserves along the West Coast of the South Island (Department of Conservation 2012) only listed the objective of giving effect to the Act. However, this application highlighted that, while the purpose of establishing these reserves was mainly scientific in accordance with the Act, important recreational and educational values would also have been enhanced by the proposed reserves. If the explicit objectives for establishing a reserve are limited to the protection of biodiversity for scientific study in order to comply with the Act, and do not encompass ecological and socioeconomic values, evaluating the effectiveness of marine reserves in meeting conservation objectives may be difficult.

Table 1. Objectives of the 44 marine reserves (Type 1 MPAs) in New Zealand, as found in the application documents (and relevant consultation documents and marine strategies for forum-based marine reserve applications). Objective marked with white background means an explicit objective, while grey background means an implicit objective. Scenario (e.g. 1-5) refers to which method/scenario was used for extracting and categorizing objectives (see methods for more information).

Name	Scenario	Preservation	Scientific	Recreational	Educational	Cultural	Specific organisms	Specific habitats	Fishery value	Recovery	Multiple stakeholders	Matching land protection	Other
Akaroa	1	X	X	X	X					X		X	
Antipodes Island	5	X	X				X	X			X	X	
Auckland Islands	1	X	X					X					
Bounty Islands	5	X	X				X	X			X	X	
Campbell Island	5	X	X				X	X			X	X	
Cape Rodney - Okakari Point	4	X	X	X	X					X			
Hautai	1	X	X										
Hawea - Clio Rocks	5	X	X				X	X					X
Hikurangi	5	X	X	X	X	X			X	X		X	
Horoirangi	1	X	X	X	X						X		
Kahukura - Gold Arm	5	X	X				X	X					X
Kahurangi	1	X	X										
Kapiti Island	1	X	X				X	X			X		
Kermadec	4	X	X				X						
Kutu Parera - Gaer Arm	5	X	X				X		X				
Long Bay - Okura	1	X	X	X	X					X		X	
Long Island - Kokomohua	1	X	X					X			X		

Name	Scenario	Preservation	Scientific	Recreational	Educational	Cultural	Specific organisms	Specific habitats	Fishery value	Recovery	Multiple stakeholders	Matching land protection	Other
Moana Uta - Wet Jacket Arm	5	X	X				X	X					X
Motu Manawa - Pollen Island	3	X	X	X	X			X					
Parininihi	3	X	X	X	X				X	X			
Piopiotaahi - Milford Sound	2	X	X						X	X	X		
Pōhātu – Flea Bay	1	X	X				X					X	
Poor Knights	3	X	X	X			X	X	X				
Punakaiki	1	X	X										
Taipari Roa - Elizabeth Island	5	X	X				X						
Tapuae	3	X	X	X	X	X		X					
Taputeranga	1	X	X	X	X		X				X		X
Taumoana - Five Fingers Peninsula	5	X	X					X					X
Tauparikākā	1	X	X										
Tāwharanui	4	X	X				X	X					
Te Angiangi	1	X	X	X	X								
Te Awaatu Channel - The Gut	2	X	X				X	X					
Te Hapua - Sutherland Sound	5	X	X					X					
Te Matuku	1	X	X	X				X				X	

Name	Scenario	Preservation	Scientific	Recreational	Educational	Cultural	Specific organisms	Specific habitats	Fishery value	Recovery	Multiple stakeholders	Matching land protection	Other
Te Paepae o Aotea (Volkner Rocks)	1	X	X										
Te Tapuwae o Hua - Long Sound	5	X	X				X						
Te Tapuwae o Rongokako	1	X	X										
Tonga Island	1	X	X	X							X		
Tuhua - Mayor Island	1	X	X	X							X		
Uiva Island	1	X	X				X						
Waiiau Glacier Coast	1	X	X										
Westhaven - Whanganui Inlet	1	X	X	X									
Whanganui A Hei - Cathedral Cove	2	X	X	X					X	X			
Whangarei Harbour	1	X	X	X	X			X				X	

4. Conclusions

We showed that marine reserve application processes have been based on a variety of objectives aiming to protect or improve: (1) the local features of the targeted ecosystems (like particular species or habitats) and (2) the human activities that will be displaced or modified (like fisheries and recreation). However, the focus of the Marine Reserves Act 1971 on the scientific value of marine reserves has often caused marine reserve planning in New Zealand to aim at protecting marine biodiversity for scientific purposes. This paradigm does not reflect recent developments in conservation science, which calls for the identification of clear conservation objectives for MPA planning. In addition, society's values have evolved over the past decades, and some reasons for establishing marine reserves, like the importance of protecting cultural heritage and biodiversity for its intrinsic value, have become increasingly recognised in New Zealand. The definition of clear conservation objectives is important to design effective marine protection tools, and the extent and configuration of single MPAs and networks of MPAs largely depends on the objectives that these MPAs need to achieve (see Rovellini and Shaffer 2020). For this reason, future marine reserve planning in New Zealand may benefit from a legal framework that recognises other objectives than the scientific study of marine life (as mandated by the Act), and that encourages to include such objectives in individual applications.

The global call to protect biodiversity and ensure the persistence of ecosystem functions and services (CBD 2010), coupled with the increasingly recognised need to incorporate climate change mitigation goals with conservation objectives (e.g. Dinerstein et al. 2019, Roberts et al. 2020) warrant the need for new legislation geared around a wider range of objectives to establish marine reserves.

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Appendix 1. Marine reserves in New Zealand

Table A1. List of the 44 marine reserves (type 1 MPAs) in New Zealand as of April 2020. For each marine reserve, year of establishment and area are reported. Year established was reported as listed for each reserve on the Atlas of Marine Protection (mpatlas.org, curated by the Marine Conservation Institute). Area (in hectares) was obtained from Land Information New Zealand (linz.govt.nz). Biogeographic regions are defined in Ministry of Fishery and Department of Conservation (2008).

Marine reserve	Biogeographic region	Year established	Area (ha)
Akaroa	East Coast South Island	2014	512.15
Antipodes Island	Subantarctic Islands	2014	217,300
Auckland Islands	Subantarctic Islands	2003	484,000
Bounty Islands	Subantarctic Islands	2014	104,625
Campbell Island	Subantarctic Islands	2014	290,000
Cape Rodney - Okakari Point	North Eastern	1975	547
Hautai	West Coast South Island	2014	853.3
Hawea - Clio Rocks (Bligh Sound)	Fiordland	2005	411
Hikurangi	East Coast South Island	2014	10,416
Horoirangi	South Cook Strait	2005	904
Kahukura - Gold Arm (Charles Sound)	Fiordland	2005	464
Kahurangi	West Coast South Island	2014	8,419
Kapiti Island	North Cook Strait	1992	2,167
Kermadec	Kermadec Islands	1990	748,000
Kutu Parera - Gaer Arm (Bradshaw Sound)	Fiordland	2005	433
Long Bay - Okura	North Eastern	1995	980
Long Island - Kokomohua	South Cook Strait	1993	619
Moana Uta - Wet Jacket Arm	Fiordland	2005	2,007
Motu Manawa - Pollen Island	North Eastern	1995	501
Parininihi	West Coast North Island	2006	1,844
Piopiotaahi - Milford Sound	Fiordland	1993	690
Pohatu	East Coast South Island	1999	215
Poor Knights	North Eastern	1981	1,890
Punakaiki	West Coast South Island	2014	3,520
Taipari Roa - Elizabeth Island (Doubtful Sound)	Fiordland	2005	613
Tapuae	West Coast North Island	2008	1,404
Taputeranga	North Cook Strait	2008	855
Taumoana - Five Fingers Peninsula (Dusky Sound)	Fiordland	2005	1,466
Tauparikākā	West Coast South Island	2014	17
Tāwharanui	North Eastern	2011	400
Te Angiangi	East Coast North Island	1997	446
Te Awaatu Channel - The Gut (Doubtful Sound)	Fiordland	1993	93

Te Hapua - Sutherland Sound	Fiordland	2005	449
Te Matuku	North Eastern	2005	689.6
Te Paepae o Aotea (Volkner Rocks)	North Eastern	2006	1,267.24
Te Tapuwae o Hua - Long Sound	Fiordland	2005	3,672
Te Tapuwae o Rongokako	East Coast North Island	1999	2,452
Tonga Island	South Cook Strait	1993	1,835
Tuhua - Mayor Island	North Eastern	1992	1,060
Ulva Island	Southern South Island	2004	1,075
Waiiau Glacier Coast	West Coast South Island	2014	4557
Westhaven - Whanganui Inlet	South Cook Strait	1994	535.7
Whanganui A Hei - Cathedral Cove	North Eastern	1992	840
Whangarei Harbour	North Eastern	2006	236.5

Appendix 2. Objectives of New Zealand marine reserves

Table A2. List of 190 categorized objectives extracted from all New Zealand marine reserves from 1975-2014, with the associated document or documents that was/were consulted (with references). Bolded text in the objectives are information that was used to categorize the objective, and these were marked either as implicit or explicit objectives. Note that the number of objectives (i.e., achieved by tallying of the categories) exceeds 190 because some marine reserves contained multiple documents that duplicated categories.

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
Akaroa	Application	Akaroa Marine Reserve Banks Peninsula: Application by The Akaroa Harbour Marine Protection Society Incorporated. PO Box 56, Duvauchelle, Banks Peninsula (1996) 41p.	<p>[Cites Marine Reserves Act 1971 on pg 1]</p> <p>The proposed objectives of this marine reserve are:</p> <ol style="list-style-type: none"> To provide educational and recreational opportunities on Banks Peninsula in a natural environment, particularly in Akaroa Harbour. To preserve a portion of the inshore marine environment of Banks Peninsula for future generation to enjoy. To protect a representative area of the marine environment of the outer harbour To allow populations of extensively sought after species such as rock lobster and paua, and the communities of which they are part, to rehabilitate to a more natural state. <p>To give recognition by protection to the unique combination of highly ranked terrestrial coastal reserves situated adjacent to an interesting marine environment. (pg 11)</p>	<p>Scientific</p> <p>Educational Recreational Preservation Recovery Matching land protection</p>	X	X
Antipodes, Bounty, and Campbell Islands ³	Regulatory Impact Statement	Regulatory Impact Statement Subantarctic Islands Marine Protected Areas: Subantarctic Islands Marine Reserves Bill and accompanying Fisheries Act measures. DOC and Ministry of Fisheries (2011) 14p.	<p>The objectives for this exercise are to:</p> <ol style="list-style-type: none"> Meet New Zealand's World Heritage obligations within the territorial seas of the Subantarctic Islands for ensuring the protection and conservation of the world heritage area including the obligation to take such measures as are appropriate under New Zealand law to protect and conserve natural heritage. Implement preferred options for marine protection for New Zealand's Subantarctic Islands arising from a stakeholder run planning process (pg 5) 	<p>Preservation Multiple stakeholders</p>		X

³ The three marine reserves around Antipodes, Bounty, and Campbell Islands (ABCI) are aggregated in this table because they were established under the same process. Note that for the purpose of the analysis presented in Section 3, the objectives were counted for each of these reserves separately (that is, 18 objectives from ABCI reserves contributed to the 190 total objectives).

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
	Consultation document	Implementation of the Marine Protected Areas Policy in the Territorial Seas of the Subantarctic Biogeographic Region of New Zealand. Consultation Document. Subantarctic Marine Protection Planning Forum (2009) 45p.	<p>In 1998 UNESCO listed the Subantarctic islands and their territorial seas (12 nautical miles around the islands), as World Heritage sites. The listing conveys the highest possible international conservation status for these islands, recognising that they have outstanding conservation and scientific significance. The 1997 nomination for World Heritage listing identified the following natural features of “outstanding universal value” that had direct links to the marine environments surrounding the islands:</p> <p>(a) the most diverse community of seabirds in the world;</p> <p>(b) ten seabird taxa endemic to the region, including six species (three shags, two albatrosses, one penguin) restricted to single island groups; [continues with a list of species to protect] (pg 11)</p> <p>The Terms of Reference direct the Forum to be mindful of the special qualities of the adjacent terrestrial areas when considering protection in the marine environment. The islands themselves have National Nature Reserve status, the highest protection status available in New Zealand. The Forum was advised that the unique, rare and threatened biota of these islands has a strong relationship with coast and seas. (pg 17)</p> <p>Geology – the only granite islands within the NZ subantarctic bioregion. Unique combination of habitats through oceanographic (subantarctic water), geological (rocks and their age) and physiographic (shape, size, and depth contours around the islands) setting (example for Bounty Islands, pg. 37).</p>	<p>Preservation Scientific Specific organisms</p> <p>Matching land protection</p> <p>Specific habitats</p>	X	X
Auckland Islands	Application	Auckland Islands Marine Reserve Application. An application by the Director-General of Conservation. DOC (2002) 59p.	The objective of this application is to give effect to the purposes and principles of the Marine Reserve Act 197, namely to preserve in their natural state for the scientific study of marine life a range of unique habitats of immense international and national interest for reasons of biological diversity, ecology, taxonomy and biogeography, and that their preservation is of natural interest (pg 5)	Preservation Scientific Specific habitats		X
Cape Rodney - Okakari Point	Response to objections	Application for a marine reserve at Cape Rodney – Goat Island Bay. In reply to the Objections received. (1973) The University of Auckland. 10p.	The present application - written in terms of the Act - is for a reserve which: <ul style="list-style-type: none"> i) is not merely open to the public by law but is easily accessible in practice, providing good beach walks and a graded series of good diving areas, ii) is fully-protected from all forms of exploitation so that the public and scientists will be able to observe the richly diverse natural communities for the foreseeable futures iii) contains sufficient area of the various habitats that are at present relatively unexploited to allow reasonable regeneration in the centre and continued viability of the whole. (pg 2) 	Recreational Educational Scientific Preservation Recovery	X	

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
Hawea - Clio Rocks	Fiordland Marine Conservation Strategy	Guardians of Fiordland's Fisheries & Marine Environment Inc. Fiordland Marine Conservation Strategy. (2003) 138p.	[Cites Marine Reserves Act 1971 on pg 123] 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. (pg 51) Threats: Increased visitor numbers and anchoring on the rocks. (pg 51)	Preservation Scientific Specific habitats Specific organisms Other (mitigate damage from use of area)	X X	
Hikurangi	Regulatory Impact Statement	Implementing key components of the Kaikōura Marine Strategy Regulatory Impact Statement. MPI and DOC (2012) 74p.	[Deemed marine reserve under the Marine Reserves Act 1971] Te Korowai's four key objectives are: 1. That traditional fishing areas of special significant to Ngāti Kurī are restored and maintained and traditional knowledge (matauranga) and customs (tikanga) of Ngāti Kurī are utilised to protect the fisheries of Te Tai o Marokura. 2. That our marine treasures are protected and future generations can continue to experience the wonders that we have today. 3. Abundant fish for present and future generations. (pg 16)	Preservation Scientific Recovery Cultural Recreational Fishery values	X	X
	Marine strategy	Kaikōura marine strategy. Sustaining our sea. Kaikōura coastal marine guardians (2012) 136p.	- Sustaining customary practices : The objectives are that traditional fishing areas of special significance to Ngati Kuri are restored and maintained and traditional knowledge (matauranga) and customs (tikanga) of Ngati Kuri are utilised to protect the fisheries of Te Tai o Marokura. (pg 23) - Protecting our treasures : The objective is that our marine treasures are protected and future generations can continue to experience the wonders that we have today. (pg 41) - Fishing for abundance : The objective is abundant fish for present and future generations. (pg 70) - Living sustainably: The objective is to sustain and enhance the quality of the Kaikōura coastal and marine environment . (pg 101) - Engaging and understanding : The objective is that the whole community consciously cares for Te Tai o Marokura. (pg 117)	Cultural Preserving biodiversity Fishery value Matching land protection Education		X
Horoirangi	Application	Forest and Bird Protection Society. Glenduan to Ataata Point (North Nelson) Marine Reserve	The principal objectives of seeking to create a marine reserve on the north Nelson coast between Glenduan and Ataata Point are: - To meet the general purposes and criteria of the Marine Reserves Act 1971; - To increase the area of protection currently afforded to New Zealand's marine environment;	Preservation Scientific Multiple stakeholders Educational Recreational		X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
		Application, Nelson (1999) 33p.	<ul style="list-style-type: none"> - To set aside at least one area of eastern Tasman Bay where marine ecosystems can regenerate and function largely free from human interference and impacts; - To provide an area which marine scientists can use as a baseline against which to assess the impacts of human activities in other parts of Tasman Bay; - To recognize and give expression to the widespread public support for the creation of a marine reserve along the coastline northeast of Nelson City; - To provide a protected marine area for education and scientific research which is easily accessible to schools, scientists and the general public; - To establish a representative system of marine reserves at the northern end of the South Island, as part of a wider network of marine protected areas throughout New Zealand; and - To assist the Department of Conservation in its mandate to conserve and protect in perpetuity the natural resources of New Zealand for their intrinsic, scientific and educational worth, and for the benefit and enjoyment of the public (including future generations). (pg 7) 			
Kahukura - Gold Arm	Fiordland Marine Conservation Strategy	Guardians of Fiordland's Fisheries & Marine Environment Inc. Fiordland Marine Conservation Strategy. (2003) 138p.	<p>[Cites Marine Reserves Act 1971 on pg 123]</p> <p><u>Values:</u> 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. (pg 52)</p> <p><u>Threats:</u> Increased visitor numbers and anchoring. (pg 52)</p>	Preservation Scientific Specific habitats Specific organisms Other (mitigate damage from use of area)	X X X	
Kapiti Island	Application	Kapiti Island Marine Reserve Application. DOC (1990) 23p.	<p>[Cites Marine Reserves Act 1971 on pg 15 in the legal basis for the application]</p> <p>The proposal aimed to achieve the following:</p> <ol style="list-style-type: none"> 1. Protection of parts of the four major Kapiti habitat types identified by Baxter [1] and shown on Figure 2. 2. Inclusion of special natural features such as the drowned river delta, the outstanding scenic area between Arapawaiti Point and Tokahaki Reef and black coral off Tokahaki Reef (identified 	Preservation Scientific Specific habitats Specific organisms Multiple stakeholders	X	X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
			<p>by public submissions to the first discussion paper and questionnaire).</p> <p>3. Exclusion from reserve of the most important kaimoana gathering areas for Maoris especially waters adjoining Maori land.</p> <p>4. Least possible interference with recreational and commercial fishers.</p> <p>5. Inclusion of most popular areas for protection (identified by public submissions to the first discussion paper and questionnaire). (pg 9)</p>			
Kermadec	Background paper for application	Background paper to application for marine reserve round Kermadec Islands. Department of Lands and Survey (1986) 83p.	<p>The case for establishing a marine reserve about the Kermadec Island Nature Reserve rests primarily with the fact that the marine flora and fauna together with their ecosystems are of outstanding scientific value. The inshore marine communities occurring off the Kermadec Islands are unique nationally and may be so internationally. [...] As the primary purpose of the marine Reserves Act 1971 is to declare significant areas for the scientific study of marine life, secondary values are not discussed. (pg 3)</p> <p>The notable scientific characteristics of the marine communities have been identified in Francis (1985) and are discussed under three headings set out below: A fish species of particular scientific and aesthetic interest is the spotted black grouper (<i>Epinephelus daemeli</i>). [continues with other species] (pg 3)</p> <p>The Kermadec Islands offer a unique opportunity to add representative marine habitat to a national protected marine reserve system. It is unique because the outstanding transitional habitat types which occur at the Kermadecs do not occur elsewhere in New Zealand. One of the objectives of marine reserve policy is to preserve representative marine habitat. Hence establishing a reserve is justified in terms of existing policy (Marine Reserves Act 1971). (pg 5)</p>	<p>Scientific</p> <p>Specific organisms</p> <p>Preservation</p>	<p>X</p> <p>X</p> <p>X</p>	
Kutu Parera - Gaer Arm	Fiordland Marine Conservation Strategy	Guardians of Fiordland's Fisheries & Marine Environment Inc. Fiordland Marine Conservation Strategy (2003) 138p.	<p>[Cites Marine Reserves Act 1971 on pg 123]</p> <p><u>Values:</u> 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.[...] 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. (pg 59)</p>	<p>Preservation Scientific</p> <p>Specific organisms</p>	<p>X</p> <p>X</p>	

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
			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.(pg 59)	Fishery value	X	
Long Bay - Okura	Application	Application for a marine reserve. The East Coast Bays Coastal Protection Society Incorporated (1993) 82p.	<p>9A.2 General Objectives and Policies</p> <ol style="list-style-type: none"> To protect water and foreshore areas as widely used public assets, for the benefit of present and future generations. To protect the integrity of water and foreshore areas as sensitively balanced physical and biological environments with high habitat values, where the effects of development cannot always be predicted, may be irreversible, and may impact on water and or land areas distant from the development itself. To protect and enhance the landscape's water and foreshore areas, by minimising man-made change and mitigating its adverse effects as far as practical. To minimise any adverse impacts of any private uses which are permitted on public ownership and use of foreshores and water areas. To manage land and water areas so that their use and development is compatible and consistent one with the other, and to protect habitat and landscape values. (pg 11-12) <p>9A 3. Environmental objectives and policies</p> <ol style="list-style-type: none"> To maintain, enhance and where opportunities arise to restore healthy ecological environments in all the water and foreshore areas in recognition of their importance for recreational and resource uses and for scientific and educational purposes. (pg 11-12) 	<p>Preservation Matching land protection</p> <p>Recreational Recovery Scientific Educational</p>		X
Long Island - Kokomohua	Application	Long Island marine reserve application. Marlborough Combined Dive Clubs Marine Reserves Committee (1991) 408p.	<p>The proposal aims to achieve the following:</p> <ol style="list-style-type: none"> Protection of the habitats identified by Duffy and shown on Figure 4. Inclusion of special natural features such as the unique shingle bank (dive site 92 shown on Figure 5) and the submarine pinnacle to the north of Kokomohua Island. (Dive site 105). Exclusion from reserve of the most important kaimoana gathering areas for Maori, especially waters adjoining Maori land. Least possible interference with recreational and commercial fishers. Inclusion of most popular areas for protection (as identified after discussions with user groups during initial consultation phase). Provide 'control' area for important scientific research. (pg 7) 	<p>Preservation Specific habitats Multiple stakeholders Scientific</p>		X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
Moana Uta - Wet Jacket Arm	Fiordland Marine Conservation Strategy	Guardians of Fiordland's Fisheries & Marine Environment Inc. Fiordland Marine Conservation Strategy (2003) 138p.	<p>[Cites Marine Reserves Act 1971 on pg 123]</p> <p><u>Values:</u> 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. [...] 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. (pg 55, pg 60)</p> <p><u>Threats:</u> 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. (pg. 55)</p>	<p>Preservation Scientific</p> <p>Specific habitats Specific organisms</p> <p>Other (mitigate damage from use of area)</p>	X	X
Motu Manawa - Pollen Island	Report	A report on the Royal Forest and Bird Protection Society nomination of the Motu Manawa (Pollen Island) marine reserve. Forest and Bird (1989) 83p.	<p>Key policies in respect of this marine reserve proposal, a recognised estuarine wetland, are:</p> <p>1. Preservation and Protection</p> <p>1.2 To protect wetlands of national importance,...</p> <p>1.3 To gain adequate permanent protection of representative examples of all types of wetlands in private and public ownership. Priority will be given to preservation of the least modified and most ecologically viable example of each kind.</p> <p>1.4 To protect, enhance, or re-establish wetlands and their access ways which are important for fish. (pg 4)</p> <p>3. Public Awareness</p> <p>3.2 To preserve and enhance the opportunities afforded by wetlands for education, scientific study and recreation. (pg 4)</p>	<p>Specific habitats Preservation</p> <p>Education Scientific Recreation</p>		X
Parininihi	Discussion document	North Taranaki. An area worthy of protection. Marine reserve proposal. DOC (1993) 40p.	<p>Protection of the marine environment is needed to:</p> <ul style="list-style-type: none"> - Protect high quality marine areas from being degraded or destroyed. - Protect representative or unique areas of the New Zealand's coast in their natural state. 	<p>Preservation Recovery Scientific Recreational Educational Fishery values</p>		X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
			<ul style="list-style-type: none"> - Give degraded areas of the marine environment a chance to recover from past abuse. - Provide opportunities for scientific study of natural marine environments, marine reserves provide a baseline against which the effects of our activities in the remainder of the sea can be measured. - Create opportunities for non-extractive recreational and educational activities and tourism. A marine reserve is a place where people can enjoy and experience the full variety and richness of the natural marine world. - Create a safe haven which marine life can shelter and breed. - Recognise the intrinsic value of natural ecosystems so that they can be enjoyed not only by the present, but also by future generations. - The availability of an undisturbed breeding site may improve fishing in nearby waters. (pg 4) 			
Piopirotahi - Milford Sound	Application	Fiordland. An application for two marine reserves. NZ Federation of Commercial Fishermen. Fiordland Fishermen Assn. Fiordland Lobster Company (1991) 180p.	<p>2.1 Purpose of a Marine Reserve: In terms of the long title of the Marine Reserves Act 1971, marine reserves are established "to provide for the setting up and management of areas of the sea and foreshore as marine reserves for the purpose of preserving them in their natural state as the habitat of marine life for scientific study." (pg 1)</p> <p>ii) One entire face of Milford Sound. This should allow stocks of edible species to recolonise as well as providing a reserve in an accessible locality without compromising amateur fishing. It would also provide a unique comparative experiment and an opportunity to follow the effects of total preservation versus amateur fishing / collecting on an area. This information is desperately needed by managers all over New Zealand. (pg 52-53 from Grange Report in application)</p>	<p>Preservation Scientific</p> <p>Recovery Fishery values Multiple stakeholders</p>	X	X
Pōhātū – Flea Bay	Application	Canterbury Recreational Marine Fishers Association and Akaroa Harbour Recreational Fishing Club. Flea Bay Marine Reserve Application (1996) 28p.	<p>1. The proposed marine reserve in Flea Bay satisfies the purpose specified at the beginning of this application: "To preserve a typical example of the natural features and marine life of the Banks Peninsula coastline for scientific study and for the use and enjoyment of all present and future New Zealanders."</p> <p>2. The reserve will protect examples of a wide range of Banks Peninsula habitats and underwater scenery both typical and representative of the Banks Peninsula marine environment. It will also assist in the protection of the white flippered penguin and the more threatened yellow-eyed penguin. Both species are known to nest in the bay. Fairy prions nest</p>	<p>Preservation Scientific Matching land protection Specific organisms</p>		X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
			within the proposed reserve area, notably on top of the vegetation covered Flea Bay Island which would be included in the reserve. Spotted shags also nest in the bay, and a wide range of other birds including black backed and red billed gulls and white fronted terns are commonly observed. (pg 3)			
Poor Knights	Discussion paper	Poor Knights Islands Marine Reserve – Recreational fishing review. Discussion paper. DOC (1995) 18p.	The primary aim in creating a marine reserve at the Poor Knights Islands was to preserve the underwater fauna and flora and enhance the recreational opportunities of the area. The establishment of a marine reserve was intended to ensure that populations of fish associated [fishing discussed in previous paragraphs as concern with: “the level of commercial fishing for schooling fish, such as trevally ”] with the subtidal reefs at the islands would be protected. (pg 1) The underlying purpose of the Poor Knights Island Marine Reserve is to protect the reserve’s unique marine ecosystem and this stems from the principles laid out in the Marine Reserves Act. (pg 7)	Fishery values Specific organisms Preservation Recreational Specific habitats Scientific		X X
Taipari Roa - Elizabeth Island	Fiordland Marine Conservation Strategy	Guardians of Fiordland’s Fisheries & Marine Environment Inc. Fiordland Marine Conservation Strategy (2003) 138p.	[Cites Marine Reserves Act 1971 on pg 123] <u>Values:</u> 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. (pg 54)	Preservation Scientific Specific organisms	X X	
Tapuae	Proposal draft	Proposal to create a marine reserve in the area of Ngā Motu, Taranaki. Draft document for discussion. Ngā Motu Marine Reserve Society Inc (2001) 36p.	The objectives of this application: <ul style="list-style-type: none"> - a. to preserve in their natural states a range of marine habitats that are of distinctive quality, and also so typical of the exposed West Coast\Taranaki Bight area of New Zealand that their preservation is in the national interest. - b. to provide an area for education, scientific research and recreation that is easily accessible for schools, scientists and the public. - c. to give greater protection to an area that has great cultural and recreational significance to the tangata whenua and communities of Taranaki. (pg 9) 	Preservation Specific habitats Educational Scientific Recreational Cultural		X
Taputeranga	Application	Taputeranga Marine Reserve: marine reserve application. South Coast Marine	The principle objective of the application is to give effect to the purposes and principles of the Marine Reserves Act 1971 , through: <ul style="list-style-type: none"> - Preserving, for scientific study of marine life, an area of Wellington’s south coast that is representative of the area, and that 	Preservation Scientific Specific organisms		X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
		Reserve Coalition & Royal Forest and Bird Protection Society of NZ (2000) 84p.	<p>contains marine life of distinctive duality and uniqueness, and has natural features and beauty worthy of continued preservation in the national interest. (pg 11)</p> <p>Secondary objectives of the application are:</p> <ul style="list-style-type: none"> - To give effect to public support for the creation of a marine reserve on Wellington's south coast. - To enable Wellingtonians, New Zealanders and overseas visitors to benefit from the enhanced recreational, commercial and educational opportunities that will be generated by a marine reserve located on the coastline of the capital city. (pg 11) 	Multiple stakeholders Recreational Other (commercial) Educational		X
Taumoana - Five Fingers Peninsula	Fiordland Marine Conservation Strategy	Guardians of Fiordland's Fisheries & Marine Environment Inc. Fiordland Marine Conservation Strategy (2003) 138p.	<p>[Cites Marine Reserves Act 1971 on pg 123]</p> <p>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. (pg 60)</p>	Preservation Scientific Specific habitats	X X	
Tāwharanui	Update to proposal	Vervoort L, Roche S. Tawharanui Marine Reserve proposal. Update on work relating to a resolution on the Tawharanui Marine Reserve proposal (2005) 8p.	<p>The reasons for applying for marine reserve status: Marine reserves are established under the Marine Reserves Act 1971. This Act establishes the purpose of the marine reserves: <i>"...preserving, as marine reserves for the scientific study of marine life, areas of New Zealand that contain underway scenery, natural features, or marine life, of such distinctive quality, or so typical, or beautiful, or unique, that their continued preservation is in the national interest"</i>.</p> <p>Marine reserves provide the strongest and most widely recognised 'preservation/protection' mechanism with respect to the coastal marine area. The marine reserve status would preserve the values of the marine park area (covered in the section above [which include, paraphrased: geology with greywacke bedrock, rocky outcrops, dunes colonised with pingao, nesting site for dotterel, oystercatcher, pipits; populations of tuatua and scallops, rock pools; forty species of fish, crayfish, dolphins and whales]) for the scientific study of marine life. The Department of Conservation (DOC), which manages all marine reserves, would primarily undertake the management of the reserve. That organisation has considerable experience in managing marine reserves, and importantly has dedicated marine reserve personnel. (pg 2)</p>	Preservation Scientific Specific habitats Specific organisms		X
Te Angiangi	Application	Marine Reserve application: Te Angiangi Central Hawke's Bay. Marine	<p>The principal objective of the application presented in this report are as follows:</p> <ul style="list-style-type: none"> - (i) to give effect to the purposes and principles of the Marine Reserves Act 1971. 	Preservation Scientific Educational Recreational		X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
		reserve application. Director-General of Conservation (1994) 449p.	<ul style="list-style-type: none"> (ii) to contribute to the Department of Conservation's function to conserve and protect the natural character and quality of New Zealand's coastal and marine environments, and the establishment of a nationwide network of marine reserves that is representative of these. (iii) to provide educational and recreational opportunities for non-extractive users of the Hawke's Bay coast. (pg 27; pg 4 of Annex 1) 			
Te Awaatu Channel - The Gut	Application	Fiordland. An application for two marine reserves. NZ Federation of Commercial Fishermen. Fiordland Fishermen Assn. Fiordland Lobster Company (1991)	<p>2.1 Purpose of a Marine Reserve: In terms of the long title of the Marine Reserves Act 1971, marine reserves are established "to provide for the setting up and management of areas of the sea and foreshore as marine reserves for the purpose of preserving them in their natural state as the habitat of marine life for scientific study." (pg 1)</p> <p>The Gut Te Awaatu Channel, Doubtful Sound. This is the most diverse deep reef system yet discovered in the fiords. Almost every species found throughout the fiords occur here, including rare deepwater fish (yellow weaver, southern splendid perch), all species of brachiopods, sea pens, hydrocorals. gorgonians. zoanthid anemones, feather stars. and dense bryozoan lace corals. (pg 52-54 from Grange Report)</p>	<p>Preservation Scientific</p> <p>Specific habitats Specific organisms</p>	X	X
Te Hapua - Sutherland Sound	Fiordland Marine Conservation Strategy	Guardians of Fiordland's Fisheries & Marine Environment Inc. Fiordland Marine Conservation Strategy (2003) 138p.	<p>[Cites Marine Reserves Act 1971 on pg 123]</p> <p>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. (pg 58)</p>	<p>Preservation Scientific</p> <p>Specific habitats</p>	X	X
Te Matuku	Application	Te Matuku Marine Reserve Waiheke Island. Royal Forest and Bird Protection Society of NZ Inc (1998) 69p.	<p>The objectives of this application are:</p> <ul style="list-style-type: none"> To protect the marine part of a sequence of natural habitats, where the main terrestrial parts are already in reserve status; To ensure that a range of marine habitats involving Te Matuku Bay, Passage Rock and the immediate marine environs, from salt meadow out to deeper water, are protected from human impacts; and To protect an estuary and coastal waters in as natural a state as possible for scientific study and community benefit. (pg 3) 	<p>Scientific Preservation</p> <p>Matching land protection Specific habitats Scientific</p>		X
Te Paepae o Aotea	Application	Te Paepae Aotea (Volkner Rocks) Marine Reserve	The objective of the application is to give effect to the purposes and principles of the Marine Reserves Act of 1971 , namely to preserve in their natural state for the scientific study of marine life , a unique range of	Preservation Scientific		X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
(Volkner Rocks)		application, Eastern Bay of Plenty. DOC. Director-General & Whakaari Marine Protection Steering Committee (2002) 41p.	marine habitats that are found at this offshore location and that their preservation is in the national interest. (pg 10)			
Te Tapuwae o Hua - Long Sound	Fiordland Marine Conservation Strategy	Guardians of Fiordland's Fisheries & Marine Environment Inc. Fiordland Marine Conservation Strategy. (2003) 138p.	[Cites Marine Reserves Act 1971 on pg 123] 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. (pg 60)	Preservation Scientific Specific organisms	X X	
Te Tapuwae o Rongokako	Application	Te Tapuwae o Rongokako Marine Reserve application. Published by the Department of Conservation. Ngati Konohi & Director-General of Conservation (1998) 70p.	The objective of this application is to preserve in their natural state for the scientific study of marine life a range of marine habitats that are so typical of those found on the east coast of North Island between Mahia Peninsula and East Cape that their preservation is in the national interest. (pg 7)	Preservation Scientific		X
Tonga Island	Application	Marine reserve application: Tonga (Abel Tasman National Park). DOC. Director-General of Conservation (1993) 158p.	The principal aims of the marine reserve application are: <ul style="list-style-type: none"> - to meet the general purpose and criteria of the Marine Reserves Act 1971 (which partly or wholly underlie aims (ii) and (iii) below); - to contribute towards the Department of Conservation's mandate to conserve and protect the natural resources of New Zealand for the benefit and enjoyment of the public, and the establishment of a nationwide network of marine reserves; 	Preservation Scientific Recreational Multiple stakeholders		X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
			<ul style="list-style-type: none"> (iii) to recognise the high degree of public support for marine reserve protection along the Abel Tasman coast. (pg 22; 2 of Annex 1) 			
Tuhua - Mayor Island	Application	Marine reserve application: Mayor Island. Published by the Department of Conservation. Director-General of Conservation (1991) 516p.	<p>The principal objectives of the application presented in this report for a marine reserve at Mayor Island are as follows:</p> <ul style="list-style-type: none"> To meet the purposes and criteria of the Marine Reserves Act 1971 including those relating to the preservation of typical, unique and distinctive features whose continued preservation is in the national interest and for the purpose of scientific study (which partly or wholly underlie objectives (ii) to (iv) below); To contribute towards the Department of Conservation's mandate to conserve and protect the natural resources of New Zealand for the benefit and enjoyment of the public, and more particularly, towards the establishment of a nationwide network of marine reserves; to meet, in part, the aspirations of the Mayor Island Board of Trustees with respect to protection of marine resources at Mayor Islands; (iv) to meet the aspirations of a number of user groups and other sectors of the public(pg 26; 4 of Annex 1) 	Preservation Scientific Recreational Multiple stakeholders		X
Ulva Island	Application	Paterson Inlet Marine Reserve Stewart Island Application. DOC (1994) 30p.	<p>[Cites Marine Reserves Act 1971 on pg 9]</p> <p>The Objective of PIMPC in recommending this area for the marine reserve is to protect a representative section of the different marine assemblages in Paterson Inlet, especially the unusual brachiopod communities. (pg 11; Marine Reserves Act 1971 mentioned on pg 9)</p>	Preservation Scientific Specific organisms	X	X
West Coast South Island (Hautai, Kahurangi, Punakaiki, Tauparikākā, Waiau)	Application	Marine Reserves Application for five sites in the West Coast Tai Poutini Conservancy, in the localities of Kahurangi, Punakaiki, Ōkārito, Ship Creek and Gorge. Te Papa Atawhai, Hokitika, New Zealand. DOC (2012) 56p.	<p>The objective of the application is to give effect to the purpose of the Marine Reserves Act 1971, namely to provide for the setting up and management of areas of the sea and foreshore as marine reserves for the purpose of preserving them in their natural state as the habitat of marine life for scientific study. (pg 10)</p>	Preservation Scientific		X

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
Glacier Coast) ⁴						
Westhaven - Whanganui Inlet	Application	Marine reserve application: Westhaven (Whanganui Inlet) North-West Nelson. DOC. Director-General of Conservation (1993) 240p.	The principal purposes of this application are (Marine Reserve Application): <ul style="list-style-type: none"> - to meet the policy and objective of the Marine Reserves Act (1971); and - (ii) to contribute towards the Department of Conservation's mandate to conserve and protect natural resources of New Zealand for the benefit and enjoyment of the public and establishment of a network of marine reserves. (pg 29, 6 of Annex 1) 	Preservation Scientific Recreational		X
Whanganui A Hei - Cathedral Cove	Application	Cathedral Cove Marine Reserve proposal: an application for a marine reserve. Published by the Department of Conservation. DOC (1990) 135p.	The purpose of such reserves is to preserve areas of the sea and foreshore in their natural state as the habitat of marine life for scientific study (pg preface) With the creation of a marine reserve on the Coromandel Peninsula we can expect to gain some of the same opportunities [which listed in the previous paragraph, reads: people have a unique opportunity to visit and see for themselves the full variety and richness of a natural marine world] and benefits [which listed in the previous paragraph, reads: people who catch fish can rest in the knowledge that there exists a safe haven for marine life to shelter and breed, and their offspring drifting out of the reserve to help replenish the nearby coast]. For these reasons the Department of Conservation has been pursuing the creation of marine reserves on the Peninsula. (preface pg) The marine environment around the Coromandel Peninsula is unique to NZ. The coastal waters around the peninsula are heavily used for a wide range of activities including, among others, water based recreation, boating, marine farming and commercial fishing. As a result, detrimental impacts are occurring within this sensitive and unique environment . This has led the Ministry of Agriculture and Fisheries, conservationists, scientists, dive clubs, local interest groups and tangata whenua all to suggest that some form of protection for the area is needed. (pg 37)	Preservation Scientific Recreational Fishery value Recovery	X X X	
Whangarei Harbour	Application	Whangarei Harbour Marine application Te	The Whangarei Harbour Marine Reserve's main objectives are:	Preservation Recreational		X

⁴ Similarly to the Antipodes, Bounty, and Campbell Islands marine reserves, the five marine reserves on the West Coast of the South Island (WCSI) are aggregated in this table because they were established under the same process. However, for the purpose of the analysis presented in Section 3, the objectives were counted for each of these reserves separately (that is, 10 objectives from WCSI reserves contributed to the 190 total objectives).

Marine reserve	Document type	Document reference	Objectives listed	Category	Implicit	Explicit
		Wahapu O Whangarei Terenga Paraoa. Kamo High School (2002) 62p.	<ul style="list-style-type: none"> - 1. To protect and maintain the marine ecosystem at the highest possible level, so marine life can flourish. - 2. To conserve, protect and enhance the greatest possible variety of marine life, ranging from the rare to the typical or representative. - 3. To establish a marine reserve of high recreational value. - 4. To form a link in a national network of marine reserves. - 5. To raise public awareness of our relationship to and responsibility for our coast and marine life. - 6. To establish suitable areas for scientific study. - 7. To establish marine reserve areas that represent the values of the inner and outer harbour habitats. - 8. To raise the public's awareness and understanding of marine biodiversity conservation. - 9. To develop reserve areas which complement and are contiguous with land reserves already in place, thus creating a connected sequence of protection from land to marine habitats. - 10. Protect a sequence of mangrove and mudflat habits and channel areas. - 11. Protect a unique rocky reef habitat near the harbour entrance. (pg 12) 	Educational Scientific Matching land protection Specific habitats		

