Summary of Science Submissions

A review of submissions received by the
South-East Marine Protection Forum (SEMPF)

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FINAL REPORT

Produced for:
Department of Conservation

Produced by:
Brian Paavo
Benthic Science Limited
8A Drake Place
Lake Hawea, Wanaka 9382

Email paavo@benthicscience.com
Mobile +64-021-086-92754
Web www.benthicscience.com

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Executive Summary

The SEMPF provided 102 submissions identified as containing marine science content, specific expertise, or submitted by individuals self-identifying as marine scientists or having relevant technical marine science experience. An objective extraction of the major concepts relevant to each proposal has been presented in semantically-aware word clouds which were then synthesised by a marine scientist analyst previously uninvolved in the consultation process. De-identified statements were also extracted into a database for collation and subjected to repeated thematic analysis to distil central issues and additional submitter input across the sites verifying and unifying the evidence presented in a fashion that allows later attribution if desired.

The emergent themes and expert analyses have collapsed to a few key consensus points, namely that submitters with extant but limited marine science *bona fides* support the proposals and mirror the consultation documents as their primary reference and evidence while more experienced marine scientists as individuals or professional collectives reluctantly support the proposals in the noted absence of a systematic, data-driven process of providing alternative sustainable networks for subsequent public consultation. Both groups recognise the Forum's efforts and thanks them for what was broadly seen as formidable initial effort, but since the net areal result is less than the national MPA policy statement, biodiversity strategy, and international best practices and obligations, then the existing MPA proposals are inadequate and not demonstrably likely to be effective even if all are enacted as proposed. Submitters largely used evidence to request simplified boundaries endorsing greater viability and improved matching of existing habitat use (human and marine communities) with MPA boundaries. Principally, the proposals extend them to the 12 nm limit, 50m isobath, or 100 m isobath and maintaining shelf processes intact to support a viable latitudinal network of sites each comprising a functional protected corridor from inland waters (estuaries, inlets, and coastlines) to the open sea. Groundtruthed data supporting the habitat proxies is lacking (e.g. outside well-researched areas like the Otago Peninsula). The emergent consultation request is almost uniformly a request for expansion and alternatives with some site-specific non-boundary concerns, and greater bulk extraction restrictions within the MPA network.

- **Site A** - submissions made a case for increased size and additional fishing restrictions to remain viable habitat for conservation of particular species of interest and to provide for adequate representation in a network of MPAs.
- **Sites B & C -** submissions requested consideration of a single MPA proposal of simplified alongshore boundaries (B reaching the northern boundary of C) including the river mouth and extending to the 12 nm limit with the outer portion restricting commercial take, especially ground-impact methods and set nets bounding a larger core no-take area.
- **Site D** - submissions argued that an ecologically cohesive network was unlikely were D not only accepted, but expanded to include more of the deeper heterogeneous reef, gravel, and rhodolith environments which may contain bryozoan populations as a small replication for Otago beds.
- **Sites E, F, G, and H -** submissions typically addressed these areas with integrated responses seeing them not as alternatives, but facets to form a new proposal with several distinct features 1) type 1 protection of Saunders Canyon and also, preferably, Papanui canyon as the sole replication in the Forum area, 2) with commercial and bottom impacting restrictions on the plateau, 3) extension to the coastline, at least of Type 2, to more accurately reflect known marine community use including bird and mammal foraging and occupation, and 4) inclusion of inlets (e.g. Hoopers) for a cohesive corridor supporting multiple life-history stages.
- **Sites I, J, and K**- were similarly frequently treated as a viable block, but unlikely to be effective without one or more components. Proposals sought unified boundaries expanded to keep Tow Rock well inside edge-effects with a primary concern being that the economic and public value of these accessible areas to tourism, education, recreational take (in part), and research outweighed the relatively low value of impacts to existing commercial fishery.
- **Sites L, M, and N** - proposals for these individual sites to be treated as a single effective block repeated the issues mentioned above and cohesively supported the proposal of all three by the forum, but requested simplified, unified boundaries from the estuary waters to the territorial limit. Citing practical larval and propagule transport limits, the inclusion of an ecologically meaningful and diverse MPA in this

location is likely necessary to connect northern and southern MPAs in the Forum region.

- **Sites O, P, and Q** - were similarly proposed as a single effective block rather than alternatives in the area with any of individual components less likely to be an effective MPA within the context of conserving biodiversity and supporting adjacent waters, especially if an inshore fishing exception (P) were maintained or the northern boundary of site O were not moved further north.
- **Site R** - submissions supported the inclusion of this site in an MPA proposal as providing valuable and under represented flatfish and shorebird habitat, but supported Type 1 status.
- **Site S** - Submissions supported including of this site in an MPA proposal as a replicate representation of a southern estuary.
- **Kelp** - Support of this habitat type through special legislation was widespread, and a ban on commercial cutting of attached kelp was proposed, but there was a general request for more research on the historical extent of kelp beds, the magnitude of their roles in a modern, modified coastal communities, and effective management strategies based on more information on the goods and services they provide and the impacts of displaced commercial and recreational fishers under different management approaches.
- **MPA Network Composition -** In general, the submitters characterise the consultation documents as proposing a single, minimally effective network if all sites were included with some expansion of core Type 1 areas surrounded by locally managed or Type 2 MPAs. The proposed network does not meet the government mandate for the Forum and did not demonstrate adequate use of network composition research nor application, in the absence of detailed habitat and species information, best practices for creating effective MPAs.

The consultation documents appeared to have a large influence on the substance of the submissions, but the large number of options and alternatives presented without specific comment on MPA structures should some of the sites not be approved appeared confusing and of concern to submitters. Additionally, the consultation design and data collection methods did not support efficient summation and may not be representative of the marine

science information on biodiversity support available to the Forum due to survey design, survey fatigue, and ambiguous prompts in a variety of formats with inconsistent collection quality.

Introduction

Public consultation on several marine protected areas (MPA) on the south-east New Zealand coast from Timaru to Waipapa Point (Southland)[1][1] resulted in about 2,800 individual submissions[2][2] to the South East Marine Protection Forum (SEMPF or the Forum) prior to the 20 December 2016 deadline. A subset of of those submissions was presented to Benthic Science Limited for analysis and summation. This subset comprises submissions identified by the Forum as specifically containing scientific input, having arisen from a scientific authority, or produced by an author self-identifying as a scientist or person with marine science experience during the submission process. This subset of 102 entries is simply identified as 'submissions' throughout this report. Other documents provided by the Forum will summarise the full body of submissions as a whole.

Submissions were numerous, broad ranging in themes and technical evidence across twenty distinct MPA proposals, several adjacent, associated with, or presented with different options. A limited amount of time was available to generate this summary, but an attempt was made to reduce 1,192 submission pages into a brief, robust, representative, and expediently produced summation of topics and key features of technical evidence provided by submitters.

The purpose of this report is not to advise the Forum, but summarise the advice provided by submitters with special attention given to marine science statements.

Submission Methods

Submissions were received via an online form, emails, hard copies, and text submitted on organisational letterheads. Due to these differences, database entry (1,670 individual site statements) was not identical for all submissions. Although scanned document submissions appeared to be highly reliable, it is possible that some individual words were not properly converted to clear text, but review indicated this was rare. The 66 submissions received via the online form were readily subjected to uniform analysis, but email submitters will not have responded to the exact same prompts. Similarly, printed form prompts did not directly correspond with online form submissions. In such cases it is particularly important to consider the difference between null data (all information is missing) as compared to 'no-

response' data (where the submitter chose to not respond). For example, the online form provided a clear prompt for submitters to respond on each site and option, but an email submission may support or oppose a particular site or sites without mentioning others. We cannot know if the email submitter is ambivalent toward unmentioned sites or options, unaware of them, or holds some other position. Therefore a distinction must be made between submissions from those who CHOSE not to respond compared to those for whom no information is known. In general, only positive declarative statements could be uniformly assessed. A related confounding factor may be that submissions from different portals could represent different submitter populations (e.g. professional organisations may be more likely to submit a position on letterhead document or via email than submit an online form).

Some submissions clearly were duplicates, and several near duplicates. Within the Forum, the incorrect term *pro forma* submission seems to have become the reference term most commonly used. *Pro forma* represents a procedure or submission filed for forms' sake, merely to follow along with an accepted protocol. Perhaps a more appropriate phrasing would be 'collective submission.' Several such submissions differ only slightly for example, General Comments often differed, but site specific input remained constant. From the analytical side of the consultation process they appear as one comment, but as distinct submissions they represent the considered view of the individual submitter. In many submissions, verbatim phrases from the public consultation document stood out from the rest of the submission's syntax indicating that the composition of the consultation documents had a strong influence on the submissions themselves and may be considered a form of collective submission by providing a template. Finally, the marine science subgroup examined in this study itself represents a block for consideration by the Forum. Collective submissions recognized by duplication may be represented more fairly by statistical analyses than individual review. In a contrary fashion, submissions by organisations are also collective responses, but they are poorly represented in numeric analyses. Organisational submission memberships ranged from a few individuals to hundreds of specialists with formal training and expert knowledge of marine processes, but are typically represented by a single collective submission. Where possible, these differences were considered in each response synthesis.

Process

Data Analysis

Basic descriptive statistics and graphs were calculated using LibreOffice Calc and R version 3.3.3 operated within an R studio environment. Responses and metadata were entered in an object-oriented SQL database to aid organisation, querying, and reporting.

Word Clouds

Word clouds were created using a computing product[3, 4, 5], [3][4][5] which graphically sized words (excluding common words such as 'the,' 'and,' etc.) according to the frequency with which they appeared in a block of text as modified by semantically-aware algorithms. The algorithms altered colour and placement such that words which occurred together in sentence structure as well as location more closely and more often in the text could be placed in a compact arrangement which aims to provide a quick overview of the text block. Algorithm variables were chosen once and uniformly applied to all entries (100 words, 'Star Forest' visualization boundary conditions, Cosine coefficient similarity, and lexical centrality ranking). Numbers were also automatically removed from the text and similar words were combined (e.g. fishing, fished, fisher, etc.) and the shortest allowable word was three letters long. This presented a problem as 'net' and 'ban' were such common three-letter words so they were uniformly changed to 'nett' and 'bann.' Given their neutral value some words (Table 1) were removed from the computation. Essentially these word clouds provide a 100-word summary of the submission texts on a specific site or network. While such analyses are helpful, they are probably most representative when viewed in context of the submissions. Word frequency will not be the same as concept frequency, e.g. 'prohibit,' 'remove,' 'eliminate,' 'prevent,' 'not allow,' and 'ban' all have similar meanings and are pertinent to the analysis on this topic. Therefore word clouds are intended to be examined in conjunction with thematic analysis.

Table 1. Word changes applied to text prior to Word Cloud computation.

Removed - Protect, protected, protection, protects, protecting

Removed - Propose, proposed, proposals, proposal

Removed - Area, areas

Removed - Marine

Removed - Reserve, reserves

Removed - MPA,

Removed - Species

Changed - Ban -> bann

Changed - Net -> nett

Thematic Analysis

Theme analysis (TA) and reporting was done by a marine scientist with relevant coastal experience, but who was not involved with the submission process prior to summation (overseas for preceding 3 years). Submissions were de-identified by DoC staff prior to analysis to help mitigate *ad hominem* biases. Submitter identities and aggregating information (e.g. submitter identifies as a fisher, scientist, etc.) were added to the database only after this report was drafted.

The approach used to produce this summary was loosely based on the TA process described by Braun and Clarke[6][6] directed, in this specific study, by Draft Terms provided by SEMPF (Appendix 1). Three site-specific themes of interest were identified by SEMPF in advance of analysis for **deductive** summation of each entry on site comments:

1. Habitats and Ecosystems
2. Social and Economic Effects
3. Viability (inclusive of size, boundaries, adjacent uses, protection standard)

In addition, SEMPF identified themes for development of a viable network of MPAs which considers marine habitat or ecosystem:

1. Representativeness
2. Replication
3. Connectivity
4. Latitudinal variation
5. Data/knowledge gaps or limitations

Inductive analysis identified and prioritised emerging submission themes. The development of these additional themes was captured in a process and reflection journal established before primary contact with the submissions. Journal excerpts form a substantial portion of this report[1]. During the first phase of summation, the submissions were read on a site by site manner to establish initial tagging information related to:

- **Semantic meaning** - the content of what the authors said
- **Latent meaning** - using the submissions as data to expose underlying concepts as interpreted by the analyst
- **Metadata -** information about the submissions that help summarise it and the source of relevant information for further consideration. Metadata include information such as site relevancy, presence of additional evidence, etc.

The submissions were repeatedly reviewed and formally assigned semantic, latent, and various metadata codes to help organise and reduce the raw submission text and imagery (some submitters included diagrams) data into useable "shorthand" information (Figure 1). This activity was repeated as codes were refined in an effort to be inclusive and effective. The coding structure was then used to create a hierarchical framework used to identify themes, usually representing more than one code in each theme.

Ideally, multiple analysts independently developing codes would, at this stage, have reviewed and solidified a relevant theme coding scheme with unified definitions, but time and resource constraints only allowed for a single analyst to conduct this summation and this report is intended to be an effective starting point for the Forum to prioritise issues and to facilitate further investigation into submissions as desired. The database constructed is also available to the Forum, but may not be released publicly unless confidential data (e.g. submitter contact details) are removed.

1 All submission quotes are identified by a specific *typeface*. To avoid repetition, the [sic] notation has not been used.

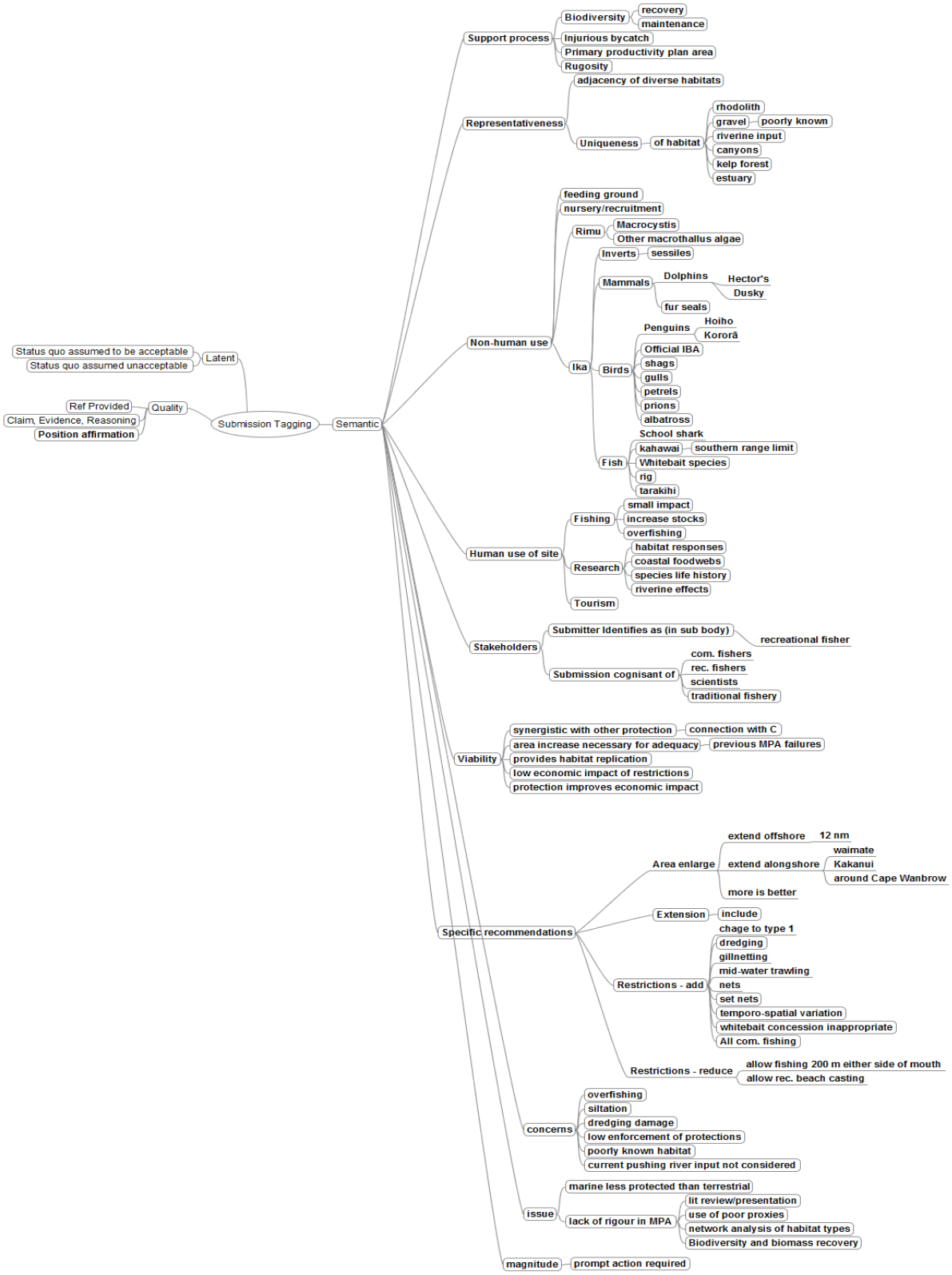

Figure 1. Initial theme structure of imposed themes (by SEMPF) and emerging from TA of site A submissions presented as an example.

Results

Overview

Broadly, submissions assumed there that there is dichotomy between fishing interests (though several submitters identified themselves as recreational or customary fishers) which oppose MPAs and MPA proponents who are concerned with maintaining long term viability of fished and unfished marine communities. A second underlying assumption appears to be that the burden of providing evidence for localised, exceptional scientific and public value lies with MPA proponents because personal and commercial extraction is an individual right. These underlying assumptions appeared to deeply affect the public consultation responses.

Top Tags by Popularity

Thirty-eight distinct 'tags' resulted from the preliminary theme analysis (Table 2) and were used to code each submission's site statement (Figure 2). These tags were used to iteratively collate, prioritise, and summarise submission advice.

The value of habitats proposed as MPAs by the Forum was largely affirmed by submitters for each site and specific organisms of value were the most frequently mentioned (Table 3). Broadly, these comments primarily reiterated the information in the consultation documents and stated a basic position of 'support, 'change,' or 'oppose.' The widespread coherent references to specific and relevant marine physical, biological, and ecological processes indicated a largely scientifically informed submission pool. A total of 347 requests made specific additions or recommended reconfigurations to the MPAs proposed. These requests most commonly asked for additional MPAs in the south, that proposed estuarine boundaries be extended to encompass the remainder of the estuary to the coast, or that offshore MPA boundaries be extended to the shoreline in order to aid clarity, compliance, enforcement, and marine community cohesion as detailed habitat, biodiversity, and usage information has not been presented to support complex boundaries. All proposed MPA extensions were supported and requests to extend proposed boundaries offshore, specifically to the 12 nm limit, and alongshore to site-specific landing points were among the top ten advice themes. Submissions considered the role of stakeholders including commercial fishers, recreational fishers, customary fishers, scientists, and educators in addition to specific issues of concern like access, local economic impact through tourism and residents

alike, and non-take use rather than evaluating demonstrable effectiveness, representation, connectivity, replication, and long-term viability of the proposed MPAs with the exception of the expert subgroup described below.

Table 2. Submission database 'tags'

0, Endorse proposed extension, where no extension is proposed, extend to boundary (i.e. estuary mouth)
2, Submitter provided reference, see citation table
3, Submission used Claim Evidence Reasoning (CER) approach
4, Submission principally reaffirms position
5, Request enlarge MPA area
6, Request reduce MPA area
7, Requested adding proposed MPA use restrictions
8, Requested reducing proposed MPA use restrictions
9, MPA viable as proposed mentioned or implied in text
10, MPA viable only with requested changes as mentioned or implied in text
11, Recognition of role of commercial fishers stakeholders
12, Recognition of role of recreational fishers stakeholders
13, Recognition of role of scientist as stakeholders or advisors
14, Recognition of role of educator stakeholders
15, Specific Organisms of value mentioned
16, Specific physical or biological processes of value mentioned
17, Specific representation of habitat value mentioned
18, Submission concerned about bycatch issues
19, Submission concerned about lack of research about site characteristics or MPA proposal
20, Requested extend site to 12 nm limit, frequently the 100 m isobath is offered as a practical alternative
21, Recognition of role of customary fisher/user stakeholders
22, Request to extend MPA alongshore
23, Request to extend MPA offshore
25, No comment present
26, Oppose proposed extension
27, Presents evidence of relevant expertise
28, Submission addresses access (typically from land) as a value or viability challenge , typically affecting non-take use
30, Specific anecdotal observations provided
31, Specific MPA or reconfiguration requested in addition to existing proposals
32, Proposal's net economic impacts considered positive
33, Submission phrasing sums up multiple submissions succinctly
34, Submitter responds proposal will positively affect use (a paper submisison prompt)
35, Submitter responds proposal will negatively affect use (a paper submission prompt)
36, Saunders canyon protection preferred
37, Papanui canyon protection preferred
38, Sedimentation concerns
39, Proposal doesn't meet government mandates of coverage and/or effective protection
40, Submitter presents safety concerns with proposal
41, Submitter has concerns about whitebaiting

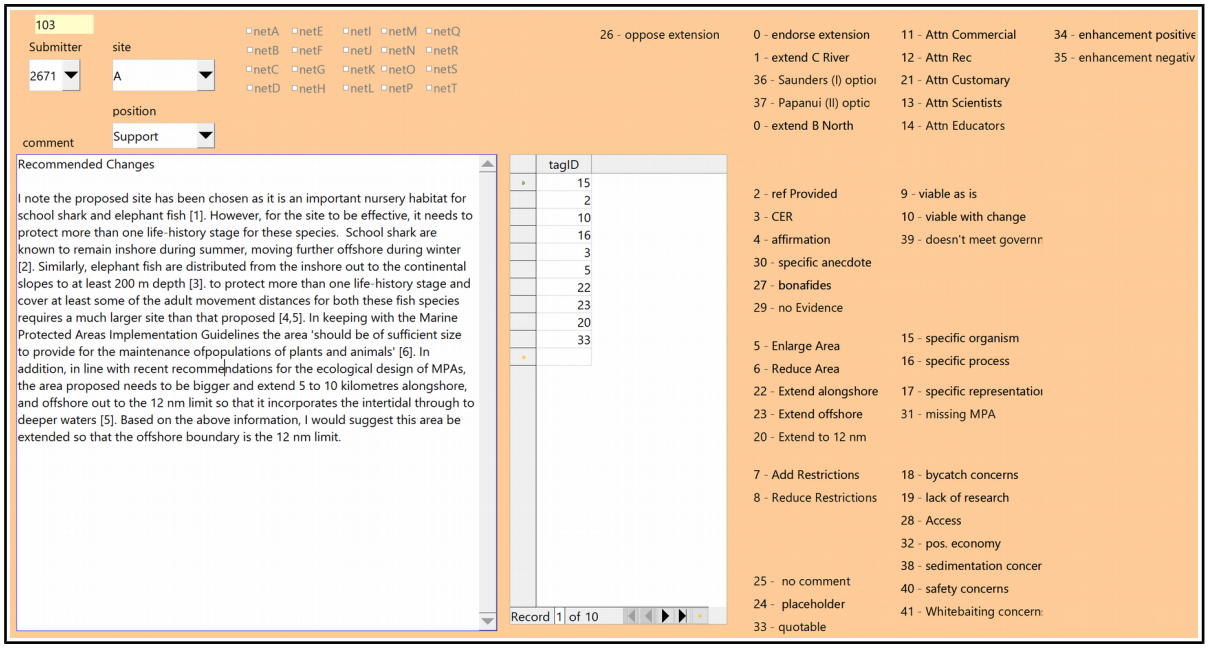

Figure 2. Screenshot of submission database statement coding.

Table 3. Occurrence of tags among statements (*n*=1,670)

Tag Description	Count
Specific representation of habitat value mentioned	558
Specific Organisms of value mentioned	518
Specific physical or biological processes of value mentioned	371
Requested adding proposed MPA use restrictions	347
Submission used Claim Evidence Reasoning approach	326
Endorse proposed extension, where no extension is proposed, extension to coast	324
Specific MPA or reconfiguration requested in addition to existing proposals	323
Request to extend MPA offshore	278
Request enlarge MPA area	247
Request to extend MPA alongshore	235
No comment present	235
Submission principally reaffirms position	206
Recognition of role of commercial fishers stakeholders	201
Requested extend site to 12 nm limit, frequently the 100 m isobath	168
Recognition of role of scientist as stakeholders or advisors	154
MPA viable only with requested changes as mentioned or implied in text	149
Recognition of role of recreational fishers stakeholders	131
Submission addresses access (typically from land) as a value or viability	130
Proposal doesn't meet government mandates of coverage and/or effective protection	107
Recognition of role of educator stakeholders	99
Saunders canyon protection preferred	87
Specific anecdotal observations provided	86
Submitter provided reference, see citation table	66
Proposal's net economic impacts considered positive	61
Recognition of role of customary fisher/user stakeholders	55
Presents evidence of relevant expertise	54
Submission concerned about bycatch issues	49
MPA viable as proposed mentioned or implied in text	48
Submission phrasing sums up multiple submissions succinctly	38
Submission concerned about lack of research about site characteristics or MPA proposal	35
Submitter responds proposal will positively affect use	33
Submitter presents safety concerns with proposal	29
Submitter has concerns about whitebaiting	15
Sedimentation concerns	15
Requested reducing proposed MPA use restrictions	10
Request reduce MPA area	6
Submitter responds proposal will negatively affect use	4
Papanui canyon protection preferred	2
Oppose proposed extension	2

Expert subgroup

The Forum requested that summation identify technical information and expert analysis evidence among the submissions which related to forming recommendations for effective MPAs. A total of 31 individual submitters provided marine scientist or observer *bona fides* within the text of their submission (Table 4) with 23 providing documentary, usually peer-reviewed, evidence supporting their statements. While this subgroup provided additional site-specific comments, their general and network-construction comments most specifically addressed those issues the Forum required.

Table 4. Submissions containing technical or expert marine science information.

Marine Science Submitters (bolded items also contain citations)	65, 84, **95**, 186, 355, 367, 378, **427**, 576, **622**, **642**, 708, 710, 712, **758**, 759, 776, 1751, **1894**, 1976, **2472**, **2473**, **2484**, 2507, **2509**, **2671**, 2673, 2675, **2679**, **2681**, 2683
Submissions containing literature citations (see Appendix 2)	95, 121, 145, 375, 401, 427, 622, 642, 657, 722, 729, 733, 735, 758, 1894, 2472, 2473, 2484, 2509, 2671, 2679, 2681, 2729

Despite the wide ranging background of expert submitters (marine scientists, project planners, customary management partners, etc.) they collectively supported a few clear points.

- The proposed MPA boundaries do not meet New Zealand's MPA Policy objectives to 2472: "*...protect marine biodiversity by establishing a network of MPAs that is comprehensive and representative of New Zealand's marine habitats and ecosystems...*" Although evaluations differ on the adequacy of the habitat proxies presented, the proposed MPA boundaries do not present evidence that they make use of best-available practices for systematically identifying habitats most representative of the Forum region nor construction of a viable network of MPAs. Without such information, meaningful replication, representation (with the exception of the canyon habitat type), and ecological connectivity is not demonstrably likely in the proposed MPA network and some habitats are notably insufficiently represented or lacking (including, but not limited to estuaries, rocky shores, and seagrass areas).
- Where habitat distribution data and usage information (human or marine communities) is presented, it is not clear that it has been used to make data-driven decisions on MPA boundaries (e.g. penguin foraging ranges, commercial fishing effort, pinniped coastal range, etc.).
- The proposed MPAs do not support New Zealand's Biodiversity Strategy of protecting 10% of the marine environment and establishing a network based on a core of no-take marine reserves in the Forum region. The proposed individual MPAs (individual viability) are too small and the proposed network as a whole is too small.

- The Biodiversity Strategy goal of 10% in areal extent is itself outdated (area does not have a linear relationship with efficacy) with international assessments indicating MPA coverage approaching 30% is a more practical guideline for long-term efficacy and is typically site-specific.
- MPA boundaries (including the ratio of shore-parallel and shore-normal extent in addition to depth range) and the network as a whole does not follow guidelines established by effective national and international MPAs.
- Methods to increase MPA effectiveness including ecological viability (e.g. supporting more than one life stage of key species) and management (e.g. compliance, monitoring, and enforcement) are to simplify boundaries (two landward points to the 12 nm limit) with least dimensions of 5-20 km and separation of no greater than about 100 km in coastal waters.
- Edge effects reduce the biologically effective area of no-take reserves so distinct habitat features (e.g. Tow Rock, Canyon heads) should be well within boundaries when possible. A supplementary or alternative strategy offered by several subgroup submitters include bounding no-take areas with site-specific limited take management areas (including type 2 MPAs, mātaitai, taiāpure, etc.)
- Given the lack of alternative network configurations, habitat connectivity through processes including recruitment, foraging, and common range movements is poorly known and questionable if any portion of the current proposed network is not put in place based on typical international findings.
- Biodiversity within and between biogeographic areas is measurable or estimateable. A process should be put in place by the Forum whereby a variety of data-driven MPA boundaries are modeled under various assumptions (where groundtruthed data are not available) using established, best-evidence practices. The resulting network alternatives should then be put to public consultation building on the work the Forum has done.

The importance of these consensus points is central to the submission summary as site-by-site requests and suggestions from a majority of the submitters either implicitly support these points or explicitly offer support to the current proposals only if they are the only options available to them. Of those offering suggestions, 149 submissions considered the proposal

MPAs not viable without the recommended changes compared to 48 which explicitly considered a proposal viable.

Site Specific Results

Some results particular to each site such as submission counts, position tallies, and formal text analyses were produced by automated and repeatable computations. Other results such as quote selection, thematic tagging, and quality indicators were provided by the analyst attempting to fairly represent submissions and are therefore idiosyncratic and iterative. Submissions received by online form were asked to support, oppose, or recommend changes to each proposed area. Submitters frequently made recommendations regardless of whether they chose 'Support,' 'Oppose,' or 'Change,' but -by a large margin- context indicated that submitters' requests were extensions of boundaries or added restrictions to area use (particularly fishing practices) resulting in 'change' being synonymous with 'support at a minimum.'

Basic Position Popularity

Online forms explicitly requested a single position of 'support,' 'oppose,' or 'change' on each MPA site proposal. The proposals were widely supported with the least support provided to the Site G and H proposals (Figure 3). Paper form prompts encouraged submitters to check any that applied (e.g. support and change were possible). Submissions collected through other means also used this terminology though in most cases the submitter was ambiguous about the 'change' condition, it appears that the default assumption when a submitter indicated the change state was 'support with changes recommended' as recommendations largely supported boundary extensions, further study, or increased restrictions on use. Because of this, no firm MPA viability conclusions can be drawn from whether or not 'change' means 'support' or 'oppose' with or without the individual recommendation on several submissions, opposition to the proposal was clear more often (121, Site F, Oppose "*Too small*.").

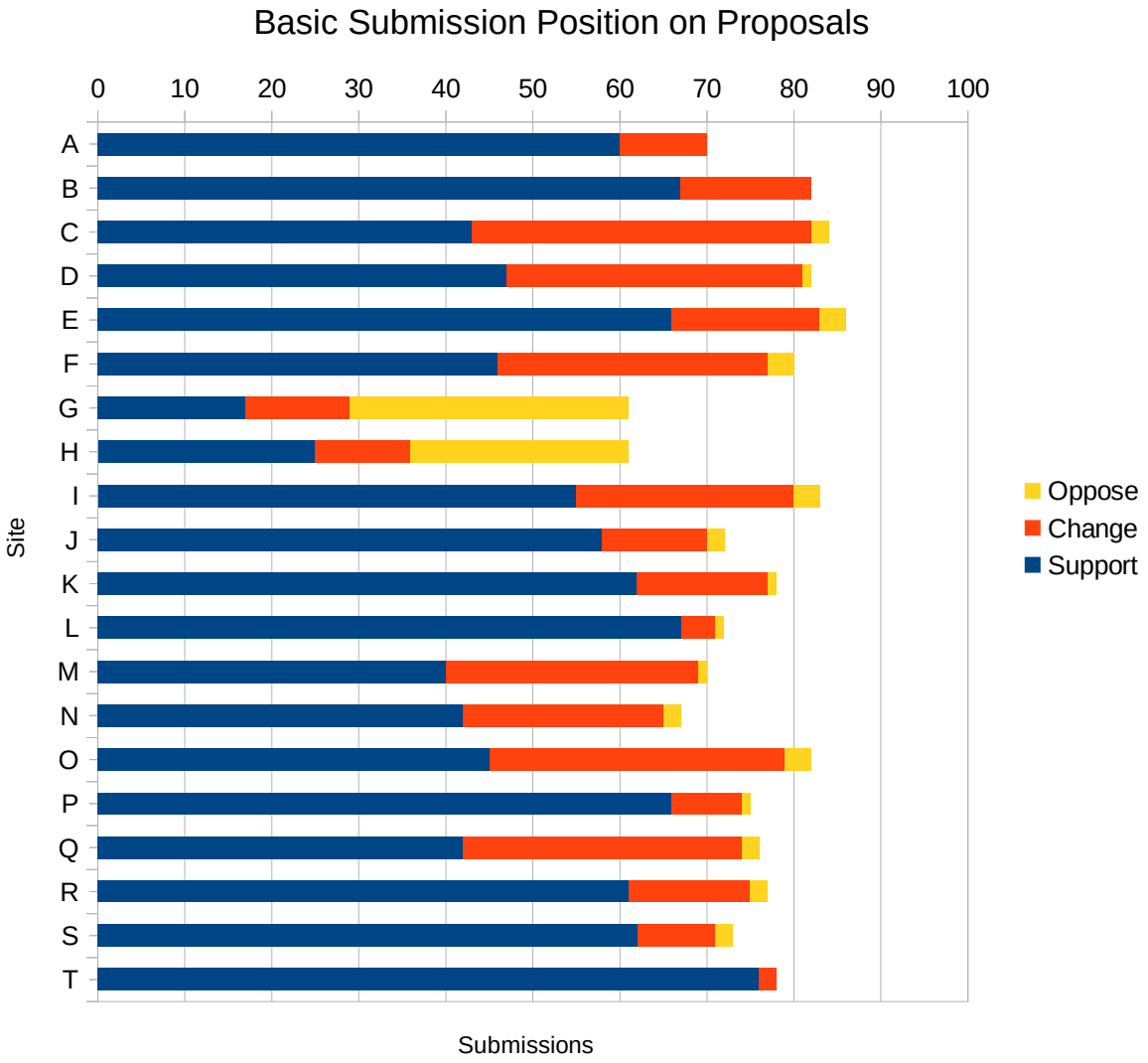

Figure 3. Basic position selected by submitter (*n = 102*) on MPA proposal as presented and understood.

Site A – Tuhawaiki to Pareora (Type 2)

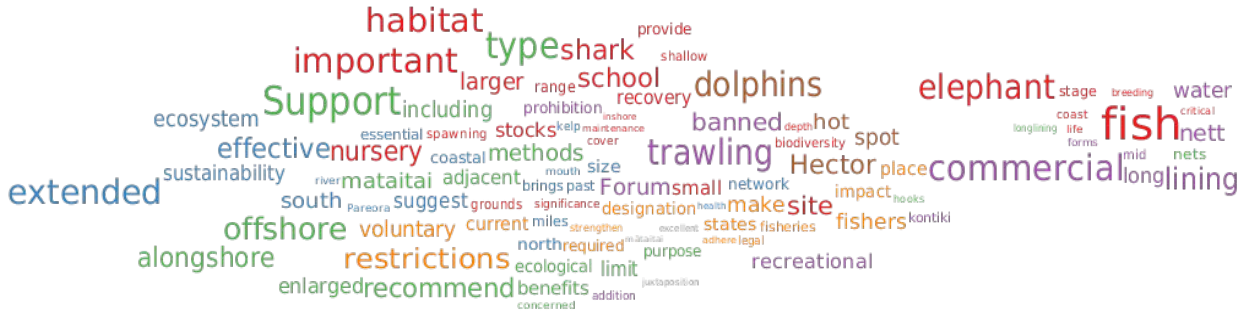

Figure 4. Site A word cloud.

A total of 67 submissions addressed this site specifically (Figure 4), all supporting establishment. The specifically recommended changes focused on extending boundaries alongshore and offshore given the small size of the proposed MPA relative to known habitat use by coastal species and adding extraction restrictions, including conversion to a Type 1 MPA. Six specifically recommended extension to 12 nm limit based on predator movements (specifically elephant fish, Hector's dolphins, and school shark each utilising different shelf bands) and use of the area for different purposes (foraging and recruitment addressing both nursery and growth). The proposal prohibited all bottom trawling and dredging, but explicitly invited submissions on restrictions for all net fishing, commercial long lining, and mid-water trawling. Such restrictions were supported by the submissions. In addition, 'kontiki' rigs and lines with 'multiple' or 'more than 5' hooks were specifically recommended be banned from the area by several submissions. There was broad approval of connection with existing Tuhawaiki Mātaitai protections and some proposing management merger or rule simplification through unification with the mātaitai.

2672: " However, for the site to be effective, it needs to protect more than one life-history stage for these species. School shark are known to remain inshore during summer, moving further offshore during winter [2]. Similarly, elephant fish are distributed from the inshore out to the continental slopes to at least 200 m depth [3]. To protect more than one life-history stage and cover at least some of the adult movement distances for both these fish species requires a much larger site than that proposed [4,5]. In keeping with the MPAs Implementation Guidelines the MPA 'should be of sufficient size to provide for the maintenance of populations of plants and animals' [6]. In addition, in line with recent recommendations for the ecological design of MPAs, the MPA proposed needs to be bigger

and extend 5 to 10 kilometres alongshore, and offshore out to the 12 nm limit so that it incorporates the intertidal through to deeper waters [5]. Based on the above information, I would suggest this be extended so that the offshore boundary is the 12 nm limit."

758: "*...any changes to recreational fishing should be consistent with any restrictions used in the adjacent mātaitai. i.e. if restricting the use of kontiki lines in the MPA then the mātaitai should have this restriction as well and vice versa*"

The most relevant thematic tags (from Table 2) present were (percent of entries):

- Organisms of concern or interest (54%) were mentioned.
  - Kelp, Hector's dolphins, school shark, elephant fish, fish (general), invertebrates (general), and penguins (general)
- Specific recommendation area should be enlarged (34%) or area should be reduced (0%).
- Restrictions should be increased on permissible fishing methods (commercial and/or recreational) (25%) or restrictions should be reduced (0%).
- Specific ecological processes of concern/interest (25%) are mentioned.
  - Pupping, egg-laying, migration, foraging, life-history niche partitioning, habitat heterogeneity, recovery and recruitment source to adjacent coast, increase area to reduce edge effects, extend to include riverine influences in representation, enlarge for large predator home ranges,
- Area will be viable IF changes are made (21%). Area MAY be viable as is (4%).
- Specific habitat representation mentioned (4%).
  - shallow reef known to respond well to protection, maintain cohesive protection across connected depth ranges, four habitat types recognised in one MPA,
- Specific consideration of commercial fishers (13%), recreational fishers (6%), scientists (6%), educators (0%) are mentioned.

Submissions specifically addressing Site A: 30, 43, 56, 110, 121, 136, 218, 286, 355, 365, 369, 373, 375, 395, 401, 576, 595, 625, 642, 647, 657, 678, 703, 710, 722, 735, 737, 753, 756, 758, 770, 776, 1062, 1491, 1696, 1700, 1751, 1811, 1894, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2683, 2697, 2698, 2707, 2708, 2710, 2729

Site B – Waitaki Coastal (Type 1)

Figure 5. Site B word cloud.

Seventy-eight submitters provided specific input on the Site B proposal, 67 supporting and 11 supporting with changes. The option to extend this site to the north was specifically presented in the consultation documents with 74 submissions providing input, 65 specifically requested extension, 1 requested no extension, and 8 offered no specific statement about extension. International recognition of this coast as an Important Bird Area and its resident penguin populations (of both intrinsic value and as indicator species of adjacent coastal shelf habitat quality) and reports of penguin bycatch were widely cited as valued reasons for establishing the reserve. Boundary extension were cited to support to encompass the foraging range of these birds (known to be larger than the reserve) across heterogeneous benthic habitats with high primary productivity due, in part, to river inputs not replicated in other proposed MPAs. MPA literature validates submitter recommendations that complex boundaries reduce practical MPA efficacy and therefore support the submitter requests to include the Waitaki River mouth and join the alongshore boundaries of proposal C into one MPA. Generic advice to enlarge the reserve was made by 16 submitters with 27 explicitly requesting seaward extension (type 2 or set-net prohibition) of the combined areas to the territorial limit in order to reduce habitat fragmentation and provide a more realistic foraging area and to encompass protection for other species including shags, gulls, petrels, prions, gannets, albatross, mammals, and the probable southern range limit of kahawai.

693: "*...be part of the MPA network. But it needs to be extended and complemented with a marine protected area with various fisheries restrictions out to 12nm and further up north for a meaningful protection of key species of seabirds, including the Yellow-eyed penguin...Even though the exclusion of the river mouth from the reserve proposals is*

intended to ensure that traditional fishery can continue unaffected, there might be options to improve practices or modify fishing gears to minimize mortality of seabirds during operations in the area located between the coast and the proposed MPA. For example an option is to implement a temporal and/or spatial zoning scheme to improve fisheries management. To do so, there should also be further studies to assess the magnitude and nature of fisheries interaction with wildlife. Given that there is already a ban on set netting out to 4nm and that this proposed areas extend up to 1.5nm offshore, the proposed area should be extended further offshore, ideally up to 12 nm, which lies within the Forum´s jurisdiction. Past experiences with MPAs, and with seabirds in particular showed that the MPAs failed to meet their goals because the size was inappropriate or insufficient to be able to protect the resources adequately."

2509: "*A concession for whitebait fishing is inappropriate. The native fish species that collectively make up whitebait are severely depleted and urgently need to recover.*"

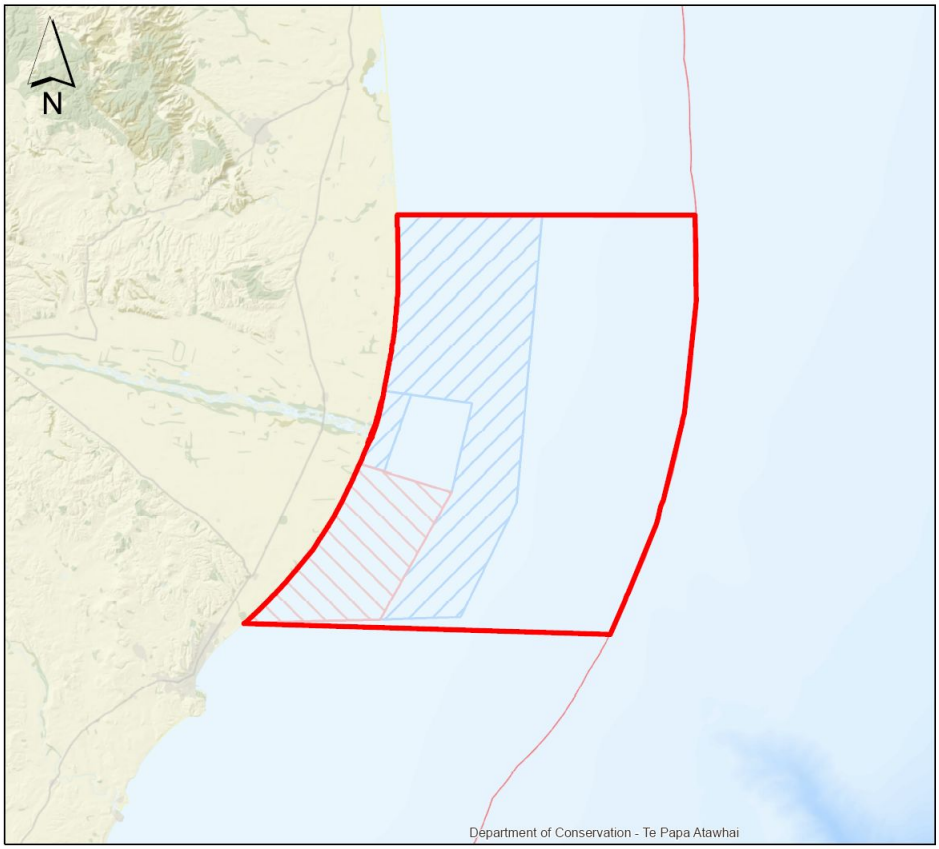

Figure 6. Proposed boundary alteration demonstrating simplified boundaries of a cohesive MPA corridor. (Submitted by 426)

Submissions specifically addressing Site B: 30, 56, 95, 110, 121, 186, 218, 286, 355, 365, 367, 369, 373, 375, 378, 394, 395, 401, 427, 559, 576, 583, 595, 625, 642, 647, 657, 678, 693, 703, 707, 710, 718, 720, 722, 729, 733, 735, 737, 743, 753, 756, 758, 770, 776, 1062, 1491, 1696, 1700, 1751, 1811, 1894, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site C – Waitaki (Type 2)

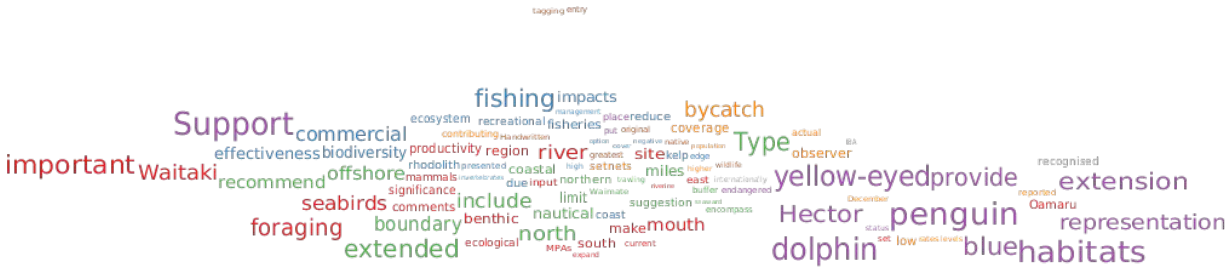

Figure 7. Site C word cloud.

The option to extend the MPA over the river mouth was specifically presented and there was some confusion among submitters who seemed to believe that Site C was an offshore extension of Site B so some interpretation was required. The interpretation was that submitters frequently believed that an extended C implied an extension of B and automatic inclusion of the Waitaki River mouth, e.g. "*Otherwise you will be creating a donut shaped MPA with fishing in the middle. I cannot think of a worse possible design for meeting the objectives of MPAs in this context.*" Overall, 34 explicitly requested river mouth extension, with 42 requesting deeper, offshore habitat inclusion, 39 of which specified the 12 nm limit as a seaward boundary for type 2 protection (or at least net and mid- and bottom trawling). Submitter concerns were otherwise similar to those expressed for the site B proposal. Consultation documents explicitly proposed ban of all trawling, dredging, and set netting as well as Danish seining fishing methods while expressly permitting whitebaiting and line fishing. Only one submitter addressed whitebaiting at site C (requested prohibition), but comments were predominantly opposed to whitebaiting exceptions in otherwise no-take areas, citing threats to endemic adult populations. Submitters were concerned with the ambiguity of protection should Site C be enacted without Site B. Only one commenter opposed the site (requesting further extension to the northern boundary.)

2484: "• *Support the reserve but suggest that it be extended to 12 nautical miles and further north to Wai mate. It also needs clarity on what happens if one or the other (Site B and Site C) does not go ahead.* • *This site is productive site due to river outputs that bring nutrients to the coastal environment.* • *This site is an important area for foraging by seabirds (shags, penguins, gulls, petrels, prions, albatrosses, gannets) and marine mammals (fur seals and Hector's dolphins).* • *This site is a significant area for penguin bycatch, particularly offshore (-8 nautical miles) to the north of the Waitaki River.* • *Support a set-net ban in this area.*"

Submissions specifically addressing Site C: 30, 56, 95, 110, 121, 136, 218, 355, 365, 367, 369, 375, 395, 401, 427, 559, 576, 583, 595, 625, 642, 647, 657, 678, 693, 703, 707, 710, 720, 722, 729, 737, 743, 752, 753, 756, 758, 759, 770, 1062, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2507, 2509, 2671, 2672, 2673, 2675, 2679, 2697, 2698, 2707, 2708, 2710, 2729

Site D – Pleasant River to Stony Creek (Type 1)

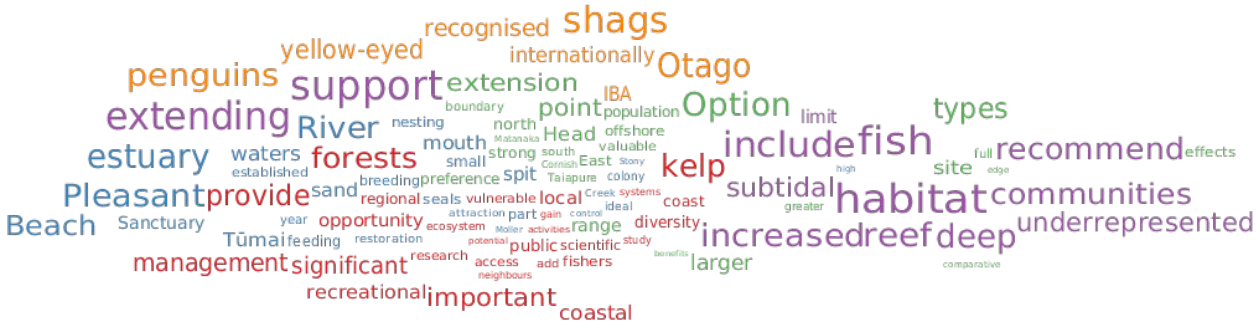

Figure 8. Site D word cloud.

The option to extend or not extend this site offshore was specifically presented in the consultation documents. Thirty-six explicitly requested extension, 0 requested no extension, and the remaining 46 offered no specific statement about the proposed extension, but may have considered it implicit in comments about enlarging it in general (9 submissions) as 23 requested offshore extension (beyond the proposed boundary), eight of which specified the 12 nm limit to encompass deeper habitats. Protection of the deep reef soft sediments and inshore attached kelp were the most frequently cited values along with internationally recognised bird areas. There are also indications of possible biogenic reefs (including bryozoans) as valuable potential replication for Otago Peninsula sites. Accordingly, fewer submitters requested alongshore extension, 12, (compared to sites A-C). The research value of this accessible site with respect to fundamental estuary-to-shelf processes and as an area along the latitudinal gradient of the network for baseline comparisons featured in submissions at a frequency equivalent with comments about this site being a substitution for a previously proposed MPA including Shag Point. The viability of an ecologically contiguous network between the northern and southern half of the Forum region was questioned if Site D were not adopted, as recruitment and often adult movements (for species with high site fidelity) rarely approached 100 km along transport pathways (i.e. current patterns or benthic habitats are not necessarily straight line distances).

1894: "*The Option 2 is supported since it includes more of the deep sub-tidal reef habitat, as well as increasing the protection of the fish communities associated with the kelp 'forests' here. The Pleasant River estuary is perhaps the most extensive and intact example within the entire area under consideration, with a range of habitats, so its inclusion, together with the smaller estuary at the mouth of Stony Creek to the north, from the mean high water springs in both estuaries, outward to the maximum distance; 10 km off-shore, is proposed...As stated in the consultation document, the Pleasant River estuary has been formally recognised as 'an area of significant conservation value' in the DCC's District Plan and also as a 'regionally significant wetland' in the ORC's Regional Plan: Water. The formally protected marginal strip and the Pleasant River Sand Spit Conservation Area should continue to be recognised. The recognised 'research potential' of the area (item #197; p.58) is accepted but the suggestion of 'development as a tourist attraction' (also item # 197) could be in conflict, particularly on the vulnerable salt marsh component.*"

Submissions specifically addressing Site D: 30, 56, 95, 110, 121, 186, 218, 286, 355, 365, 369, 375, 394, 395, 401, 427, 559, 576, 595, 622, 625, 642, 647, 657, 678, 703, 707, 710, 717, 718, 720, 722, 737, 738, 752, 753, 754, 756, 758, 759, 770, 776, 1062, 1491, 1696, 1700, 1751, 1811, 1894, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Sites E, F, G, H − Otago Peninsula Proposals

It appeared that presentation of the options (Consultation Document, Vol 1, page 68) and subsequent 'alternatives' word usage and layout in the consultation document was confusing to many submitters. For example, does 'Alternative 1 (site F, type 1, site E type 2)' support mean opposition to site H implementation? Consequently some interpretation and interpolation was required to resolve each submitter's preference. Submission wording seemed to support the precautionary approach, for example, support for a larger area implied support for a smaller area if the larger were not enacted, but support for a smaller area did not necessarily imply preference over a larger one. Broadly, the noted opposition to sites G and H can be interpreted as a rejection of Alternative 2.

Proposal Site E and F as Alternative 1 − Bryozoan Bed (Type 2, option 1) Saunders Canyon (Type 1, option 1)

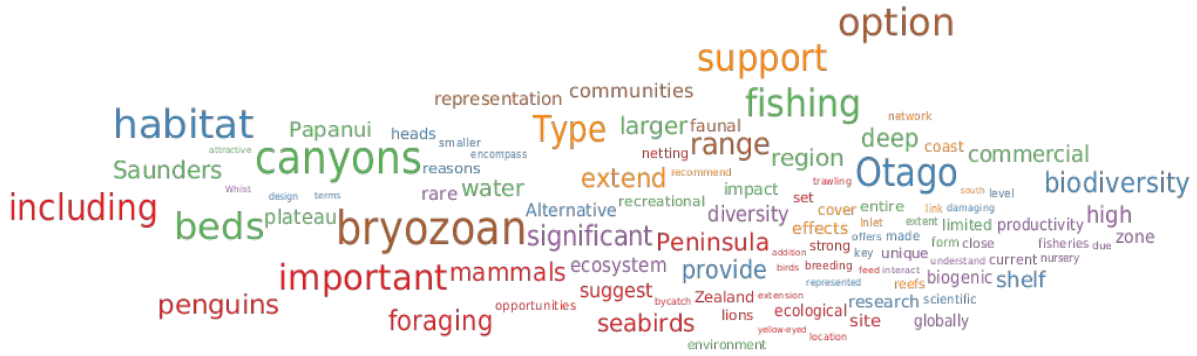

Figure 9. Responses to Site E proposal.

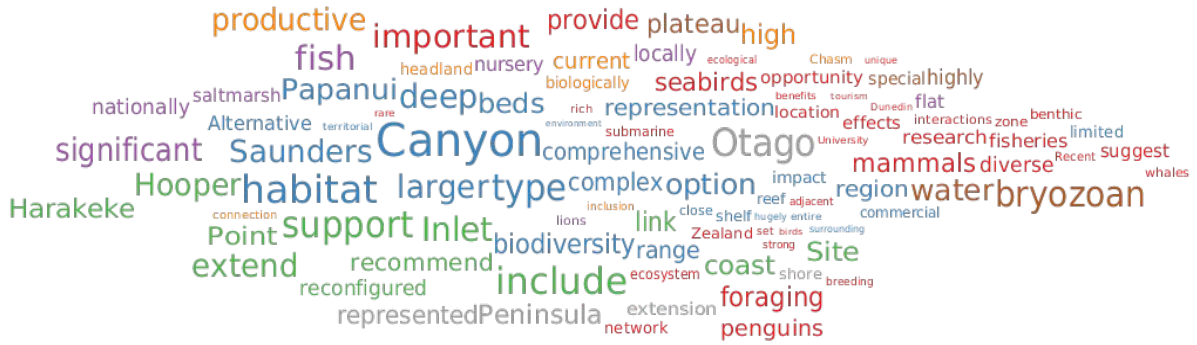

Figure 10. Responses to Site F proposal.

A high intrinsic value was placed on the bryozoan communities (53 statements in E and 29 in F response areas) and a high value on the research and education opportunities presented by enacting an MPA. The importance of the area to marine mammals and birds with public, no-take, access for enjoyment was also prominent among submitter concerns. By and large, recreational selective fishing methods with low bycatch potential and low bottom disturbance risks (i.e. hook and line, potting) were supported, but increasing restrictions on bulk methods and commercial take was the norm (26 submissions requesting more restrictions than proposed). Type 1 protection of Saunders Canyon (29 statements in E area and 34 in F area) was requested over Papanui canyon for reasons citing greater area, habitat heterogeneity, more complex bathymetry and blending of protection areas (Alternative 1) to increase network value.

More than other areas, submitters used existing evidence and reasoning to support a claim and (CER, 25) to support their requests for biodiversity-based increases to restrictions. Citing the Forum's desire to replicate habitats within the SEMPF region, 18 submitters proposed alternative configurations - including increased Papanui Canyon protection (preferring linking F to H, but at least type 2, e.g. Alternative 1) for replication and viability and also proposed alongshore extension (46 combined statements). Alongshore protection proposals (Harakeke Point being most often stated) included saltmarsh and high-current headland coastal structures as poorly represented elsewhere in the proposed network. Thirty five reconfigurations specifically endorsed extending at least type 2 protection to the adjacent Otago Peninsula shoreline to include deeper gravel habitats and reflect feeding and known movements of mammals and known declining penguin populations as well as protecting contiguous habitat types (e.g. including Hoopers Inlet and beaches out to the type 2 MPA boundary or connection to Otago Harbour mātaitai).

84: "The Otago Peninsula bryozoan beds represent a site of global scientific significance, and are a rare example of a temperate marine environment ecologically and sedimentologically dominated by stenolaemate bryozoans, an ancient group of bryozoans that has been largely displaced in modern seas...From 1999 to 2000 I mapped the Otago Peninsula bryozoans for the basis of my MSc project at University of Otago's Dept. of Marine Science. The proposed borders will encompass the core of the bryozoan beds off Otago Peninsula as I understand them..." [Reference Figure 11.]

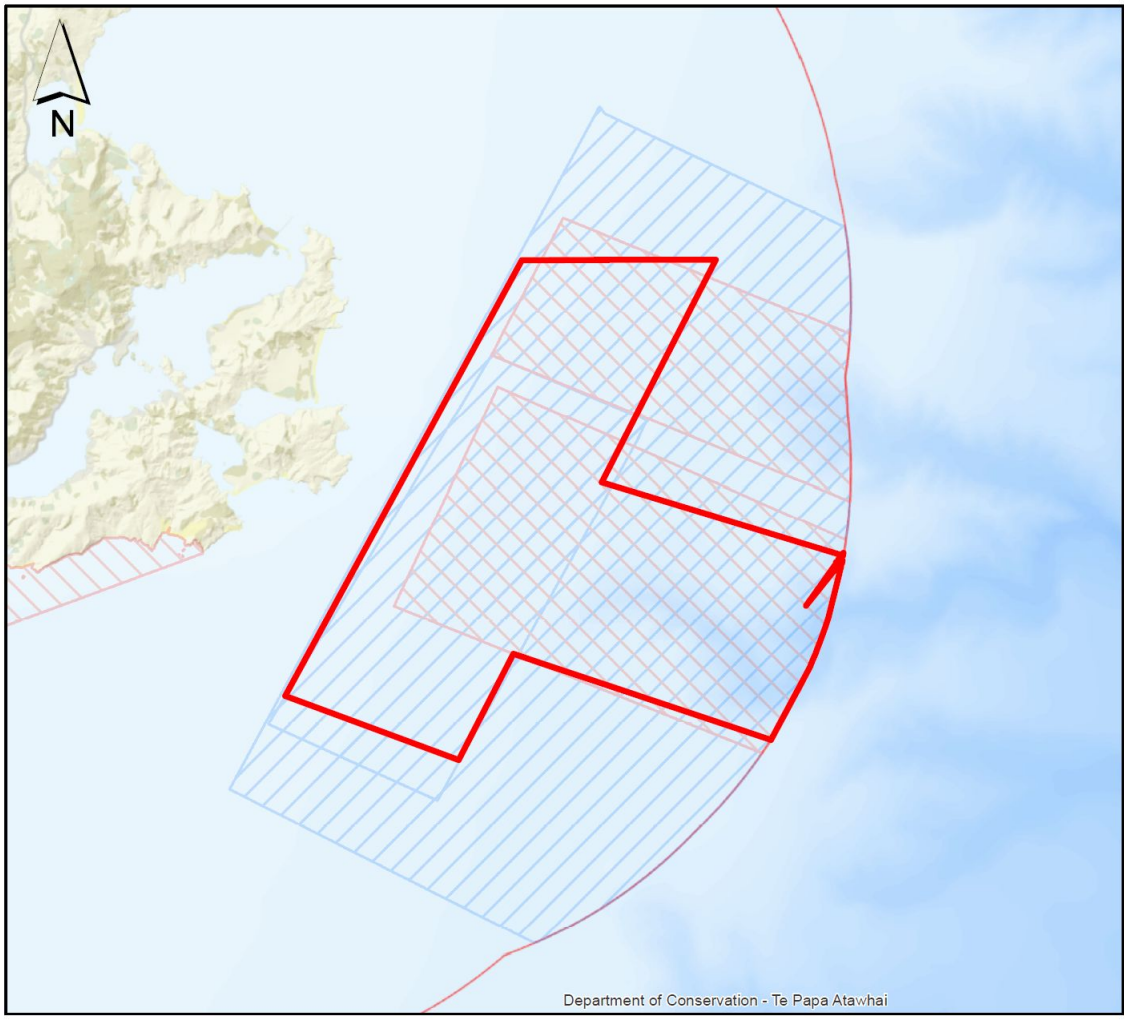

Figure 11. Submitted Sea Sketch proposal identifying groundtruthed core of bryozoan beds. (Submitter 84)

657: "Hooper's inlet and Allan's Beach are an important breeding and haul out area for NZ sea lions of all ages...extending the Type 1 MPA to include these areas through to Harakeke Point would provide better protection for NZ sea lions and include a nationally and locally significant saltmarsh and nursery area for flat fish and a high current headland and biologically productive area, examples of which have been poorly represented or not included in any of the proposed areas."

Submissions specifically addressing Site E: 30, 56, 84, 95, 121, 144, 186, 218, 355, 365, 367, 369, 375, 378, 394, 395, 401, 420, 427, 559, 583, 595, 625, 642, 647, 657, 678, 693, 703, 710, 718, 720, 722, 729, 733, 735, 737, 752, 754, 756, 757, 759, 770, 1062, 1491, 1696, 1700, 1751, 1811, 1894, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2473, 2484, 2507, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Submissions specifically addressing Site F: 30, 56, 84, 95, 110, 121, 144, 145, 186, 218, 355, 365, 367, 369, 375, 378, 394, 395, 401, 420, 427, 559, 576, 595, 625, 642, 647, 657, 678, 693, 703, 710, 718, 720, 722, 729, 733, 735, 737, 752, 754, 757, 758, 770, 1062, 1491, 1696, 1700, 1751, 1811, 1894, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2473, 2484, 2507, 2671, 2675, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Proposal Site G & H as alternative 2 − Bryozoan Bed (Type 2, option 2)

Figure 12. Responses to site G proposal.

Figure 13. Responses to site H proposal.

The central processes, species, valued habitats, and usage concerns of Sites E and F were similar for the proposed sites G and H, but opposition and proposed changes were more numerous and express that they are too small and do not represent the habitat diversity of alternative 1.

145: "*Saunders Canyon is the cumulative point for important masses of water, which support a wide range of marine biodiversity. The subtropical Southland current runs parallel to the Otago coast (Sutton 2003) bringing nutrient rich water from the Clutha River (Haywood 2004) and the combined influence of subtropical waters subantarctic waters (Sutton 2003). At Saunders Canyon, these waters intersect with localised upwelling (25m per hour; the depth of the canyon), effectively replacing the water column with nutrient rich waters every hour (Russell and Vennell 2009). This highly productive area is a hot spot for marine mammals and birds, and there is a long-term data set being collected on marine mammal sightings in the area which began in 2014 (Otago Uni MARI401). We have recorded sightings of a range of marine birds (shags and tubenoses) feeding in the area. We also have reported large groups of marine mammals such as Hector's dolphins, Dusky dolphins and*

fur seals in the waters surrounding the canyon. This location also hosts a significant bryozoan bed which supports a wide range of other marine species through the creation of biogenic habitat (Wood and Probert 2013). This area is an obvious selection to protect in the MPA, and suggest this area could be widened to also include Papanui Canyon as outlined in Alternative 2."

375: "*At the beginning of the document the Forum professed to include two representative regions of each habitat within zones for protection. Submarine canyon habitats should be included in this classification as being a far more biologically relevant type than the substratum based categories. I recommend that this small patch of canyon head be included in the zone with F to have redundancy in habitat representation in the network. G and H are not a suitable alternative for E and F as edge effects and extent of habitat under protection are not adequate to meet the goals of the forum.*"

710: "*...bryozoan beds on the Otago shelf are unique - in New Zealand and globally. The main species (*Cinctipora elegans*) is endemic to New Zealand and found only south of Cook Strait - other areas where it once made significant habitat - such as Foveaux - have already been heavily fished and now provide very poor, if any, habitat. In contrast, the Otago shelf beds are in good condition and comprise a number of other habitat-forming bryozoans (e.g.* Celleporaria agglutinans*,* Hippomenella vellicata*) as well as sponges, hydroids, and horse mussels. The species that provide and use the habitat vary with depth across the shelf and with latitude - so the extent of the area is vital to the biodiversity that can be protected here...there is a direct correlation between habitat created by living bryozoans and biodiversity. In other words, these are essential habitats and more than worthy of protection from bottom fishing. Very simply, the greater the area that can be protected, the more species will occur in this area...In my view Options G&H provide too little protection and should not be considered - they are not "reasonable" alternatives...There are many canyons on the Otago shelf and this proposal only protects the heads of two of them - this really is a minimum and must not be made smaller - these are highly unusual habitats that offer great possibilities in terms of scientific research - one of the key reasons for designating MPA status.*"

Submissions specifically addressing Site G: 30, 43, 56, 110, 121, 218, 286, 355, 365, 367, 375, 378, 394, 395, 401, 559, 576, 583, 595, 625, 642, 647, 657, 678, 693, 703, 710, 729, 733, 735, 737, 738, 752, 770, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2671, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Submissions specifically addressing Site H: 30, 43, 56, 110, 121, 144, 218, 286, 355, 365, 375, 378, 394, 395, 401, 559, 576, 595, 625, 642, 647, 657, 678, 693, 703, 710, 718, 733, 735, 737, 752, 759, 770, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2484, 2671, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site I − Harakeke Point to White Island (Type 1)

Figure 14. Word cloud of responses to site I proposal.

The option to extend or not extend this site to Tow Rock was specifically presented in the consultation documents. Fifty four statements explicitly requested extension and none opposed. The phrasing in the consultation document makes Option 1 the default condition of support statements with Option 2 interpreted by submitters as the extension. MPA planning literature was used to support the Tow rock inclusion as it is a significant habitat feature within the MPA area, though further enlargement (to maximise diversity of habitat value of Tow Rock inclusion) was specifically requested by 16 submitters. The availability of public access (32 statements), especially to educators (31 statements), was highly valued by submissions. This publicly accessible no-take or recreational-only take proposal strategy for education and tourism economic value was combined with sites J and K by several submitters who described a vision of a set of MPAs to distinguish the Dunedin area. Sixteen of the submissions explicitly considered commercial fishing interests against biodiversity and habitat values, 12 of which encouraged increased usage restrictions for public enjoyment and species protection such as the Boulder Beach YEP colony.

95: "*This site has high scientific value due to the long-term (35+ years) intensive monitoring of yellow-eyed penguins, which included research of their foraging ranges.* "

1491: "*Support, and recommend inclusion of Tow Rock. This marine reserve will likely be most effective if the highly productive area of Tow Rock is included. This will be a significant marine reserve for education, research and public enjoyment, being close to a major city, and world class if connected to site F.*"

2675: "*It is very pleasing to see a proposed MPA adjacent to the large population of Dunedin. This proximity offers many people the chance to interact directly with the MPA, as occurs in Wellington with Taputeranga MR. A significant failing of many of the other proposed MPAs is that they are not readily accessible to the public, except by boat – and most of the public don't have boats. Tow Rock should obviously be included in the MR as it is an integral part of the environment and local ecosystem. Allowing fishing to occur in what is effectively the middle of a MR is completely contrary to sound ecological principles, and the previous experience of places like the Poor Knights Islands mentioned above. Excluding Tow Island will defeat the purpose of the MR.*"

367: "*Options I, J and K represent an opportunity for a set of spectacular marine protected areas on the doorstep of Dunedin City. These options are unique and therefore worthy of protection for several reasons. In particular: the paua populations in option I, the accessibility of an offshore island reef system in option K, the retention and preservation of recreational cod fishing and paua gathering in option J, and the proximity of this set of marine protected areas to Dunedin City and the University of Otago.*"

Submissions specifically addressing Site I: 30, 56, 95, 110, 121, 136, 145, 186, 218, 286, 355, 365, 367, 369, 375, 378, 394, 395, 401, 427, 559, 576, 583, 595, 625, 642, 647, 657, 678, 693, 703, 710, 712, 718, 722, 729, 733, 735, 737, 752, 753, 754, 756, 757, 758, 759, 770, 1062, 1062, 1491, 1696, 1700, 1751, 1811, 1894, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2507, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site J – White Island to Waldronville (Type 2)

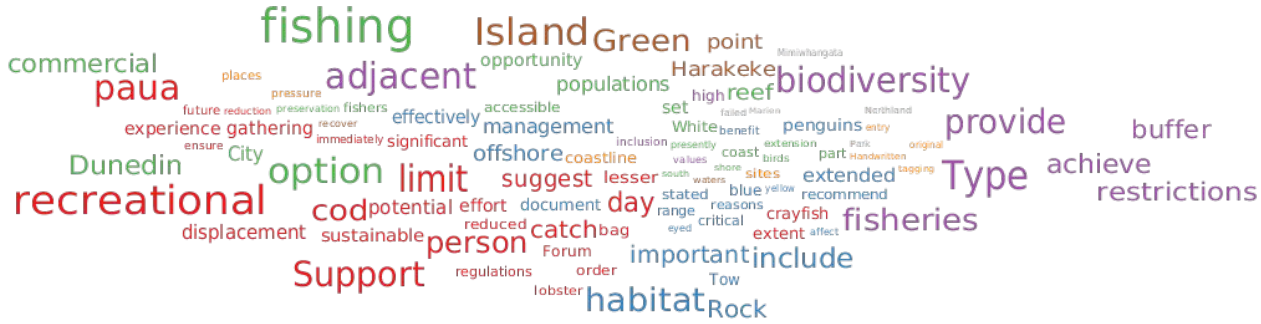

Figure 15. Word cloud of responses to Site J proposal.

The consultation document specifically requested submitter input on exclusion of all commercial fishing activities and decreased species bag limits. Responses were examined as having choices of support, oppose, or null for each of these options as positions separate from support, oppose, or change for the proposed MPA as a whole. The two opposition positions provided no comment. Of the 79 commenters, the supporters expressed concern for the proposal's small size, which was also featured by those holding 'change' positions. Reduction in bag limits were supported by those identifying as recreational fishers and those who did not. As previously mentioned in Site I response, submitters often considered I, J, and

K sites part of a jointly-valuable suite providing public access and biodiversity values, site J was considered the 'buffer' of type 2 recreational take only protection from adjacent type 1 areas following the MPA design principle of surrounding no-take areas with limited take areas to increase spill-over benefits to surrounding waters. Similar comments among different submitters responding in Site I, J, and K areas indicated that their logical support position is based on the assumption that all proposed areas are likely to be approved as one network.

625: "*The area contained within Area J has outstanding natural beauty and high biodiversity values. I consider its inclusion as a type 2 MPA to be a worthwhile undertaking to protect these values, and the recreational opportunities they afford. The area covers a good range of habitat types, yet I believe this can be improved by extending the area slightly. I do engage in recreational fishing in this area, yet am happy to concede a significantly reduced bag limit in order to protect stocks for the future. In order for this area to be successful as an MPA, I believe that bag limits need to be significantly reduced. Partially because Area J will be adjoined by two type 1 MPAs, without reduced bag limits the area may be subject to overfishing...I believe a worthwhile amendment to the Area J proposal would be to extent the area a further 2 miles offshore. This would enable protection of the rare deep reef habitat (which is somewhat lacking in this discussion document) and extent protection to more adjacent gravel habitat.*"

Submissions specifically addressing Site J: 30, 56, 121, 218, 355, 367, 375, 395, 401, 427, 576, 583, 595, 625, 642, 647, 657, 693, 703, 710, 722, 735, 737, 752, 753, 754, 756, 759, 770, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2671, 2672, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site K − Green Island (Type 1)

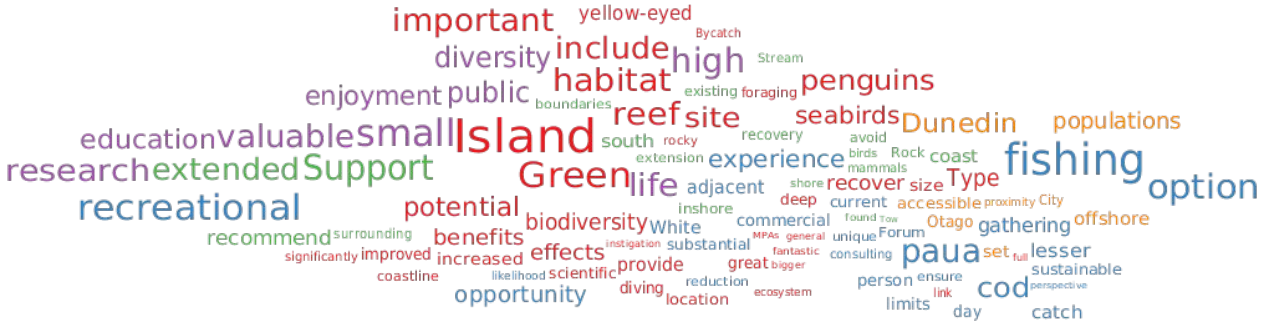

Figure 16. Word cloud of responses to Site K proposal.

Again, respondents frequently considered I, J, and K part of a single package of representative coastal Otago habitat with Green Island being a valued, rat-free nesting site for

seabirds, no-take recreational use, and habitat variation (rocky reef) providing value to adjacent populations. Relatively easy public access (27 statements) for research (26) and education (25) topped the list of submitter themes supporting this proposal. A total of 24 submitters requested enlarging the MPA using site K as an example of the Forum not proposing enough area of unfragmented coastal habitat to provide viable, ecologically functional units to at least meet the 10% governmental mandate. Fifteen submitters requested alongshore extension, mostly westward, and 14 expressly indicated extension to the adjacent shoreline to avoid complex boundaries and to include the Kaikorai estuary to maintain coastal population connectivity. Significant edge-effects resulting in reduced protection and network value was also stated, 10 submissions recommending extension to the territorial limit.

2679: "*It's imperative that this MPA extends to the shoreline. As it is, it's far too small to be effectual and will have very little, if any, benefits if not extended. No-take reserves need to be big enough to provide a meaningful haven and maintain full ecosystem functions. It will also be extremely difficult to enforce and monitor due to it currently being a very small square shape. There's great potential here for this area to be an effective MPA if extended to shore as this area has a high diversity of life and will be valuable for research, public enjoyment, and education. It's great that I, J and K are adjacent to eachother, however they all need to be extended offshore to at least 5nm. And beyond that, designated as type 2 MPAs out to 12nm/ 100m depth contour.*"

401: " *•The proposed area contains valuable rocky reef habitats and the island itself is an important nesting site for seabirds, including yellow-eyed penguins. •Together with sites I and J, the network of MPAs will allow for valuable scientific research into the effects of varied levels of protection on a stretch of urban coastline. •At 5km^2, the proposed area is very small. I recommend that the proposed reserve area be increased to improve the likelihood that benefits will accrue. To avoid impinging on the wahi tapu of Kai Tahu, the reserve should be extended westwards and offshore."*

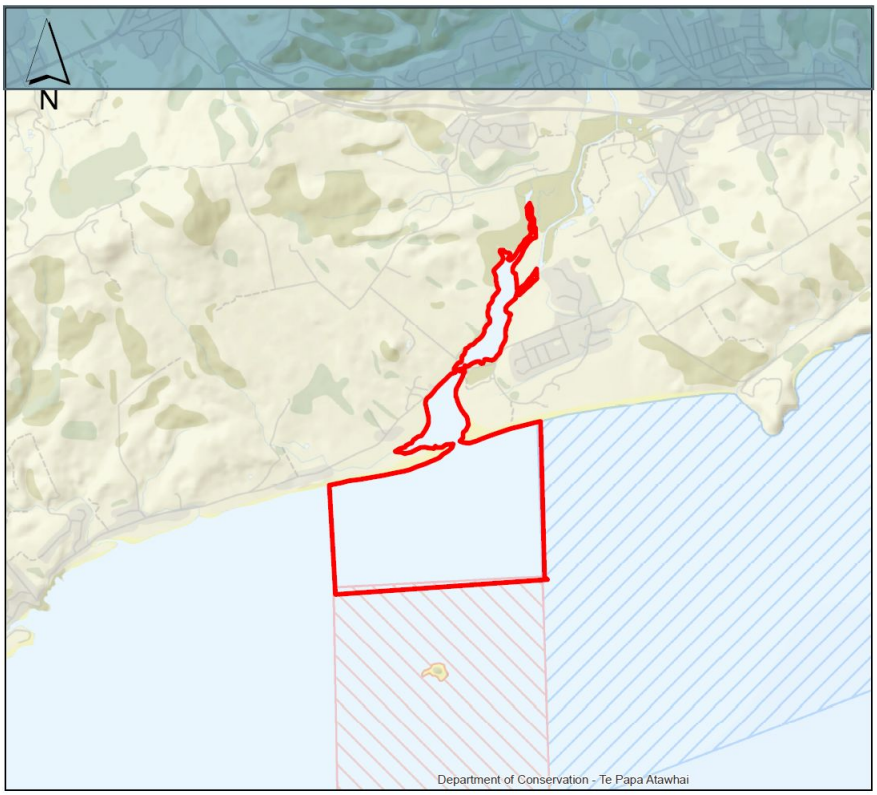

Figure 17. Diagram submitted by 355.

Submissions specifically addressing Site K: 12, 30, 56, 95, 110, 121, 136, 186, 218, 355, 365, 367, 369, 375, 378, 394, 395, 401, 420, 559, 576, 583, 595, 625, 642, 647, 657, 678, 703, 710, 718, 722, 735, 737, 752, 753, 754, 756, 758, 759, 770, 1062, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2507, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site L – Akatore Estuary (Type 2)

Figure 18. Word cloud of responses to Site L proposal.

Respondents were widely supportive of this proposed MPA (and connection with proposal M) and primarily commented their affirmation and endorsement of the Forum for recognising

its representational value of the estuary flats and other nursery areas of the saltmarsh. A block of eleven of the 72 statements particular to this proposal endorsed increased protections to support eel and whitebait populations from extraction and endorsed full reserve designation.

145: "*Akatore estuary is outlined by the ORC as a regionally significant wetland, due to its high degree of naturalness which is now scarce in the Otago region; Quote: "A complete sequence of indigenous vegetation from the high-tide mark through saltmarsh and flax to tall* Leptospermum *sp.* Carmichaelia *sp. and* Olearia *sp. scrub. This scrub is considered an intrinsic part of the wetland and is the only example of its type in the Otago Coast Ecological Region". It supports high wetland biodiversity in the community, including rare plant species such as the NZ musk (*Mimulus repens*) and the bird Fernbird (various spp.). The estuary also supports mahinga kai gathering by the local iwi and waahi taoka. Extra consultation on how this may affect their estuary use should be taken into consideration*."

2675: "*This estuary probably has greater natural biodiversity values than the others in the region and it warrant full MR protection (type 1) rather than MPA (type 2). In conjunction with the coastal MR, this will create a continuous reserve from estuary to open coast, thus conferring increased biodiversity value. The 'kink' in the outer boundary of M is strange and violates the principle of maximising the area to perimeter ratio and minimising edge effects. It should be straightened by linking points M1 and M3 (fig. 46) with a straight line.*"

Submissions specifically addressing Site L: 30, 43, 56, 110, 145, 186, 218, 355, 367, 375, 378, 395, 401, 427, 559, 576, 625, 642, 647, 657, 678, 703, 710, 720, 722, 735, 737, 752, 753, 756, 759, 770, 1062, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2671, 2672, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site M and N − Akatore Coastal (Type 1) and Offshore (Type 2)

Figure 19. Word cloud of responses to Site M proposal.

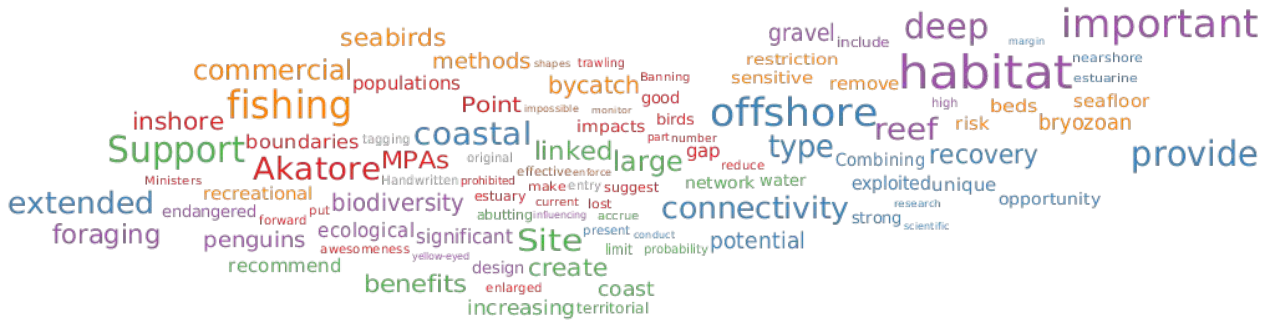

Figure 20. Word cloud of responses to Site N proposal.

Seventy commenters provided input beyond their basic position on the site M proposal and 67 on the site N offshore proposal, with the primary focus requesting offshore extension (43 statements) and treating them as one proposal. Submissions largely used specific claims, evidence, and reasoning that the special habitat values represented by an L/M/N reserve were lacking in other MPA proposals and demonstrated what was sought in MPAs in terms of whole-life history management, but - as one unified MPA with boundaries modified to have the same shore to 12nm limit - represented habitats and seabed structure appropriately. There was also large endorsement for the fisheries restrictions proposed, but again supporting greater restrictions (15 statements) to maintain an area representative of the historical Otago coastal habitats.

710: "*It seems logical to join up L, M, and N to provide a corridor of habitat from the coast to offshore,and to allow full recovery to see what the rest of the coast might look like in the absence of fishing impacts - I would have liked to have seen this at multiple points along the coast. Its important to have some deep reef habitat covered, and ideal to have it linked to adjacent coastal habitat. Suggest extending N to meet M.*

625: "*...I suggest that Area M and N be combined as a larger, continuous type 1 MPA. Connecting the two areas would create an MPA that extends from the Akatore estuary (Area L) through coastal intertidal to 12nm offshore, protecting a large swath of important deep reef habitat. Habitat connectivity is vital for the success of MPA and in the current proposal there is no allowance for connectivity of habitat under type 1 management along an inshore-offshore gradient. There is likely very strong potential for recovery of exploited species in the coastal margin should type 1 protection be extended to Area N. Combining Areas L, M and N would provide a unique opportunity to conduct scientific research into habitat connectivity between estuarine, nearshore coastal and offshore habitat. This information could greatly improve our understanding or marine ecological processes and be a significant benefit for future MPA design. Protection in Areas M and N would not influence my recreational fishing opportunities in any way.*"

657: "*Support, but recommend that it be extended to include site N Akatore Offshore to ensure that the offshore deep reef habitat is protected in a marine reserve. Also recommend straightening the boundary to make it a rectangle, as simple shapes make for easier reserve management.*"

Submissions specifically addressing Site M: 30, 43, 56, 110, 121, 186, 218, 355, 375, 395, 401, 427, 559, 576, 595, 625, 642, 647, 657, 678, 703, 710, 718, 722, 735, 737, 752, 753, 756, 759, 770, 1062, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Submissions specifically addressing Site N: 30, 43, 56, 110, 121, 186, 218, 355, 365, 375, 395, 401, 427, 559, 576, 625, 642, 647, 657, 678, 703, 710, 720, 722, 735, 737, 752, 753, 756, 758, 759, 770, 1062, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2671, 2672, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site O – Long Point (Type 1)

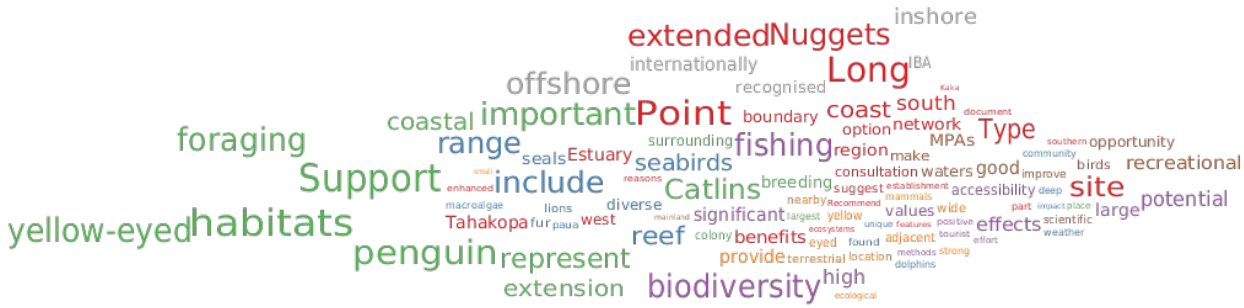

Figure 21. Word cloud of responses to Site O proposal.

Eighty-two submitters provided input beyond basic position for the site O proposal. Individual species protection (45 statements for intrinsic, economic, or indicator value), predominantly YEP and other seabirds dominated comments along with specific habitat representation of the Catlins contribution to the southern coasts biodiversity (44 statements). Thirty submissions requested offshore extension, 28 to the 12 nm limit, and 22 also requested alongshore extension. The lack of a proposal encompassing the Nuggets was a major feature of the submissions, but inclusion of this proposed area was a broadly supported alternative. Several responses included proposal O, P, and Q as part of one effective and connected MPA that represented the Catlins and provided viable connection to the northern part of the network if unified in an Tahakopa Estuary to offshore MPA.

95: "*...Foraging grounds for yellow-eyed penguins off Long Point extend out to 12 nautical miles, and also to the west of the proposed area. Extending Type 1 protection west (to connect with the reserve at the Tahakopa estuary and join the western extent of offshore*

Area P) would provide much better protection for a larger proportion of the penguin foraging region and a wide range of habitats and productive areas.

375: "...This proposed reserve is an excellent alternative to the Nuggets as an example of coastal headland with clear biodiversity values and important habitat features. I recommend that the trawl exclusion in P be altered to surround this reserve on three sides, and that the marine reserve boundary be extended to the south to encompass the finger of exposed reef habitat that comes off of the point. This is for the same reason as stated in I, that marine reserve boundaries should not cross reef habitat features (Freeman et al MEPS 2009). A small shift in the boundary here would greatly increase the effectiveness of the marine reserve.

Submissions specifically addressing Site O: 30, 56, 95, 110, 121, 145, 186, 218, 286, 355, 365, 367, 369, 375, 378, 394, 395, 401, 427, 559, 576, 583, 625, 642, 647, 657, 678, 693, 703, 710, 720, 722, 729, 735, 737, 752, 753, 754, 755, 756, 758, 759, 770, 1062, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2507, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site P − Long Point Offshore (Type 2)

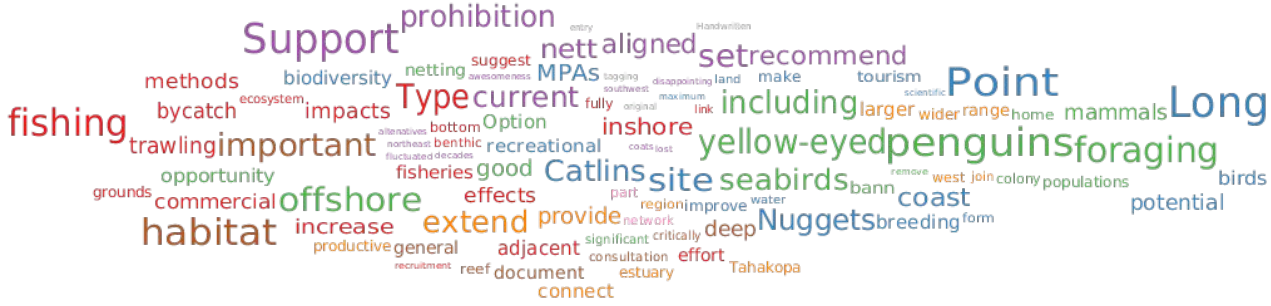

Figure 22. Word cloud of responses to Site P proposal.

While many submitters treated proposals O, P, and sometimes Q as a block MPA, 67 provided specific input on the site P proposal. The most prominent themes were increased restrictions supporting the proposed bottom-impacting and set net bans, but removing the inshore exception. Broadly, simplification of the boundaries for ecological connectivity of nesting, and foraging sites of birds and inshore to offshore contiguous fish nursery corridors was seen to support the Forum's network proposal mission as opposed to three separate proposals which are not likely to be effective individually.

625: "*...I support the implementation of a type 2 reserve at Area P. Area P is representative of important deep water habitat type along the Catlins coast and so deserves appropriate protection. The deep reef habitat is likely critically important both for exploited species and for foraging top predators such as seabirds and marine mammals. Recovery at the deep reef*

and adjacent sand habitat due to type 2 protection, as well as the influence of connectivity with the type 1 reserve inshore (Area O) will likely increase fisheries yields in this general area over time. Whilst commercial fishing effort may be displaced to more marginal habitat initially, it is likely that protection at Area P and) allow for increased recruitment and subsequent improvement of habitat quality within the general area. For this reason I believe the exclusion of commercial fishing effort from Area P is justified. To further increase the chances of success for protection at Area P, I suggest an extension to the area in a shoreward direction so as to join the adjacent Area 0, or to extend all the way to the coastline where Area P exceeds the dimensions of Area O. This would protect an important representation of Catlins deep reef habitat, that is generally under-protected by this consultation document. Further, it would allow a protection gradient in an inshore-offshore direction, promoting connectivity between these two habitats. Protecting the coastwards trawl grounds from commercial fishing would very likely promote the establishment of more productive commercial fishing grounds in adjacent areas through increased recruitment and spillover effects."

642: "...Again, please don't consider O and P as alternatives. Ecologically link them."

Submissions specifically addressing Site P: 30, 56, 95, 110, 121, 186, 218, 286, 355, 367, 369, 375, 378, 395, 401, 427, 559, 576, 583, 625, 642, 647, 657, 678, 693, 703, 710, 722, 729, 735, 752, 753, 756, 759, 1062, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2507, 2509, 2671, 2672, 2675, 2679, 2697, 2698, 2707, 2708, 2710, 2729

Site Q − Tahakopa Estuary (Type 1)

Figure 23. Word cloud of responses to Site Q proposal.

There were 77 statements about the site Q proposal beyond a basic position statement, though many considered sites O, P, and Q as a single, cohesive, coastal, representative block MPA encompassing estuary nursery and nesting areas to offshore growth, recruitment, and foraging areas. Alongshore extension within the estuary (to aid compliance and enforcement), to the mouth (12 statements), and along the coast to join with an O and P proposal was the dominant submission theme (30 statements). Nine submissions stated that the proposal was not viable without extension.

735: "*...The proposed reserve is very small and the design means that compliance with and enforcement of the regulations will be challenging. Enlarging the reserve to encompass the whole estuary will mean that benefits are more likely to accrue. The conservation benefits of marine reserves generally increase with size (Halpern 2003; Edgar et al. 2014).*"

Submissions specifically addressing Site Q: 30, 56, 110, 121, 186, 218, 286, 355, 367, 375, 378, 394, 395, 401, 420, 427, 559, 576, 584, 595, 625, 642, 657, 678, 703, 710, 720, 722, 735, 737, 752, 753, 756, 758, 759, 1062, 1491, 1696, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1976, 1981, 2472, 2484, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site R – Tautuku Estuary (Type 2)

Figure 24. Word cloud of responses to Site R proposal.

Seventy seven submitters addressed the Tautuku proposal expressing a dominant theme about the importance of protecting this estuary environment for flat fish habitat and shore birds (24 statements). The second most consistent theme was affirmation of their support for the acceptance of this MPA and the Forum's inclusion. Type 1 status was requested by 11 submitters with extension to the mouth explicitly requested by 10.

145: "*...suggest that the size of this protection is inadequate to provide any real difference. The protection of this should be extended right out to the river mouth, and potentially also incorporating the Tahakopa Bay. The DOC campsite located at Papotowai provides close access to the estuary, and there are a wide range of activities and sights for visitors nearby, thus raising the profile this MPA could have. I suggest this estuary provides a greater value than Haldane, as the Haldane estuary actually only supports a small estuarine biodiversity due to the perched nature.*"

2484: "Support the reserve but in order to protect whitebait it needs extending all the way to the beach."

2681: "...support this proposal, however I would prefer it to be a type 1 protection.
 The proposed restrictions will prevent dredging, set netting, commercial line lining, mechanical harvesting, fyke net fishing and whitebaiting. These represent some of the major threats to Tautuku Estuary but not all.
 Estuaries are a naturally rare ecosystem. Protection of naturally rare ecosystems is National Biodiversity Priority 2 from the National Biodiversity Priorities – Protection our Places (MfE, 2007).

 Ideally this proposal should be extended to include some of the adjacent open coast and possibly the iconic Tautuku Beach.
 Tautuku Estuary is probably the most intact wetland in south-eastern South Island. It is adjoined by intact native forest including areas managed by Department of Conservation. The Forest and Bird Lenz Reserve is in close proximity.
 Tautuku Estuary and the adjacent forest is recognised as an Ecological Management Unit (EMU). An EMU is a nationally important area which is a priority for management by DOC.
 The Tautuku Estuary has a boardwalk accessed by a short walk from a car park. This makes the estuary easily accessible.
 Tautuku Estuary is listed as a Regionally Important Wetland by Otago Regional Council.
 The estuary is a nursery area for some fish species and supports a range of birdlife including the threatened fernbird.
 The estuary is visited and valued by users of the nearby Tautuku Outdoor Education Centre, the adjacent Forest & Bird Tautuku Forest Cabins and by other travellers."

Submissions specifically addressing Site R: 30, 56, 110, 121, 145, 145, 186, 218, 286, 355, 367, 375, 378, 394, 395, 401, 427, 559, 576, 584, 625, 642, 657, 678, 703, 710, 720, 722, 729, 735, 737, 752, 753, 756, 759, 1062, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site S – Haldane Estuary (Type 2)

Figure 25. Word cloud of responses to Site S proposal.

The seventy-four submitters providing input on the site S proposal largely used the comments to reaffirm their support. They endorsed the Forum's recognition of the value of estuaries as habitats for wading birds and fish sustainability in general. Eleven supported elevation to Type 1 status and 7 commenting on the lack of proposal into areas such as Porpoise Bay.

2681: "*...Ideally the proposed reserve should be extended to lie adjacent to the Haldane Conservation Area and the rock headland to the east as far as Curio Bay and the entrance to Waikawa Harbour. This would greatly extend the diversity of marine habitats and shore types represented.*

Submissions specifically addressing Site S: 30, 56, 110, 121, 145, 186, 218, 355, 367, 375, 378, 395, 401, 427, 559, 576, 584, 595, 625, 642, 657, 678, 703, 710, 722, 735, 737, 752, 753, 756, 759, 1062, 1491, 1696, 1700, 1751, 1811, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2484, 2671, 2672, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

Site T − Kelp Forest (Type 'other')

Figure 26. Word cloud of responses to Site T proposal.

Submissions on the Kelp Forest protection provided 80 statements in addition to the general support (no opposition). These statements widely reflected approval of policy applicable to habitat types of value (46 statements) and request support for research into the historical extent of kelp beds prior to commercial exploitation (28 statements) with 34 statements specifically using evidence and reasoning to support their claim. Submitters supported a ban on commercial cutting of attached kelp, including canopy-harvesting methods given their ecological roles and responses to pressures including sedimentation.

559: "*...applaud the Forum for proposing the kelp beds as a habitat that warrants protection. The protective cloak of kelp that wraps along the coast provides critical habitat for a wide range of species. The kelp beds structure the environment including modifying the light, pH, and wave environment - making the coast able to be colonised by a much wider array of species than in areas where the kelp is not present or where it has been lost..strongly encourage the Forum and key government agencies to explore the ways in which the kelp beds can be protected in an integrated and effective manner to maintain the long term health of the coastal region Internationally there is considerable alarm at the decline in kelps along temperate shore lines, and the loss of the critical ecosystems services that they have provided...*"

622: "...The SEMPF has asked for input on the mechanism for protection. I believe that there should be a ban on cutting all attached habitat-forming kelp species (e.g. Durvillaea, Ecklonia, Macrocystis, Marginariella and Lessonia*). Failing this, at a minimum, I believe that there should be a ban on the commercial harvest of* Macrocystis pyrifera*. I note that at the time that* Macrocystis *was introduced into the QMS, the final advice paper to the Minister...noted that a number of submissions asked for "the setting aside of no-take areas in*

both representative and sensitive areas" and that "[section] 11 measures may also be necessary (such as closed areas, method restrictions, seasons, etc) to achieve the above desired outcomes". The proposal gives effect to these suggestions and the advice from prominent New Zealand scientists and Research Organisations about the introduction of Macrocystis *into the QMS and should be seriously considered"*

2671: "*Kelp forest habitat supports a diverse biota [19]. The harvest of kelp canopy has been shown to have multi-trophic consequences (e.g., reduced food availability for top predators [20]) and may impact on the long-term viability of kelp forests [21]. The proposal to protect kelp forest will protect significant habitat for a range of fish and invertebrate species.*"

Submissions specifically addressing Site T: 12, 30, 56, 95, 110, 121, 136, 145, 218, 286, 355, 367, 369, 375, 378, 395, 401, 427, 559, 576, 583, 595, 622, 625, 642, 647, 657, 678, 703, 710, 720, 722, 735, 737, 752, 753, 754, 756, 758, 759, 770, 1062, 1491, 1696, 1700, 1751, 1811, 1894, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2473, 2484, 2509, 2671, 2672, 2673, 2675, 2679, 2681, 2697, 2698, 2707, 2708, 2710, 2729

MPA Network Composition

Figure 27. Word cloud of responses to the MPA Network composition proposal.

A total of 63 submissions specifically provided input on constructing an MPA network (Figure 28). Fifty-five comments were extracted and 45 submissions provided specific site inclusion suggestions in the manner prompted by the online form. Seventeen of those 45 indicated support for inclusion of all sites including mutually exclusive options like those off the Otago Peninsula making it the most frequently recommended combination. The combination [A-T excepting G and H] was suggested eight times, and [A-T excepting G, H, T] was suggested twice. All other suggested combinations were unique. In general, the submissions indicated that the Proposals put forth in the Consultation documents presented one minimal network option with several individual sites requiring expansion (e.g. site A) or unification (e.g. O/P/Q, L/M/N, I/E/F, and B/C) which would be viable (30 statements). Furthermore that this is required for the protection of key species and keeping coastal ecological processes intact (30 statements). Twenty-five statements reiterated that the proposed network is insufficient to meet outdated national biodiversity aims and far under

current IUCN best practices. Among the expert subgroup there is a broad call for proposals, process, and evaluation or proposals prior to ministerial recommendation to be based on network research largely lacking in the consultation documents.

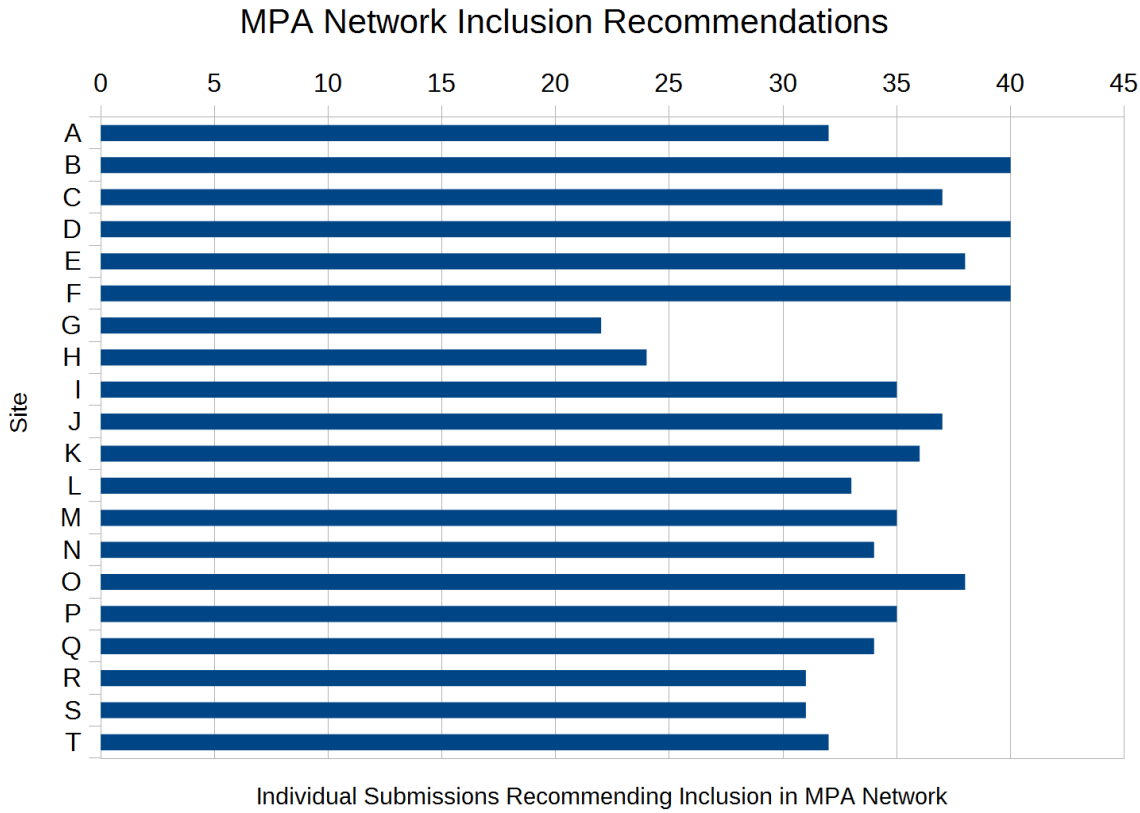

Figure 28. Number of submissions recommending individual sites for inclusion in MPA network. Please note: this figure represents aggregate recommendation whereas submitters provided discrete combinations.

722: "*...strongly support the creation of a network of marine protected areas in south-east New Zealand. The South-East Marine Protection Forum process provides a significant opportunity to improve protection for a number of important taonga species, and their supporting habitats and wider ecosystem processes. The MPA network currently proposed by the SEMPF should be considered as an absolute bare minimum level of protection for the coastal areas of Otago and the Catlins. I would recommend that the SEMPF commits to all of the proposed sites (Areas A to T) and that sites are extended as suggested under the comments for each particular area...General comments on Creating Marine Protected Area networks:*

• The aim of the New Zealand government (Biodiversity Strategy action 3.6b) is to protect 10% of New Zealand's territorial waters (out to 12 nautical miles from shore) in a comprehensive network of protected areas by 2010. This is however far lower than the current recommendation from the International Union for the Conservation of Nature (IUCN, motion 53) for effective protection of at least 30% of the ocean which has no extractive activities in order to achieve effective protection of biodiversity (e.g. O'Leary et al. 2016). The proposed network of MPAs under consideration by SEMPF includes 5.2% of

the area in non-extractive marine reserves, with an additional 15.3% in type 2 protected areas which allow extractive activity. Thus, even if all the proposals went ahead, the IUCN recommendation would not be met. Therefore, the forum should consider proposals extending and enlarging proposed sites, to further extend the network of MPAs.

• Currently there are no Marine Reserves along the south-east coast between Pohatu (Banks Peninsula) and Ulva Island (Stewart Island). We have an opportunity to rectify this through the South-East Marine Protection Forum process.

• New Zealand's MPA policy states that "a marine reserve will be established to protect at least one sample of each habitat or ecosystem type in the network" (MPA Policy & Implementation Plan, para. 93). Therefore, the network of reserves that is designated as a result of the SEMPF process must meet this goal. All habitats should be effectively represented by a protection network and ideally the network should include replicates of each habitat type which ensures that all biodiversity is protected (Gaines et al. 2010).

• Marine protected areas are useful tools for ecosystem management, preserving biodiversity (e.g. directly by preventing bycatch or indirectly by protecting prey) and habitat (e.g. avoiding habitat destruction from mining, fishing and dredging).

• It is now accepted that marine reserves can result in the recovery of species which have been previously exploited (e.g. Halpern 2003; Willis 2013). Marine reserves in New Zealand have been shown to lead to large increases in the size and abundance of fish and other species within their boundaries (snapper, crayfish and blue cod; Babcock 2003), assuming that the reserve is well designed to protect the habitat and their communities...

o Net export of biomass from marine reserves or spillover effect requires long-term study of the movement patterns and abundance of a target species. Typically, spillover effects extend a few hundred metres outside the no-take zone (e.g. Russ et al. 2003). This is largely dependent on the mobility of the species, and is strongly affected by fishing effort around the boundary. Few studies until recently, have quantified the positive contribution of spilled fish to local fisheries (Goni et al. 2010).

o Larval replenishment of areas immediately adjacent to the reserve due to movement of larvae across boundaries (via currents and water movement) are likely to occur. For example, the populations of two species of exploited reef fish resident in marine reserves exported 83% of coral trout and 55% of stripey snapper to fished reefs outside the reserve (Harrison et al. 2012).

• The size of each reserve is important and the conservation benefits generally increase with size (Halpern 2003; Edgar et al. 2014). Larger is better particularly for long-ranging animals such as seabirds and marine mammals. A recent review determined that conservation benefits were greatest for marine reserves > 100 km2 (Edgar et al. 2014); currently only the proposed sites F (and the alternative site H), and B (with the extension) achieve this. Based on studies of marine reserves in New Zealand, the ideal reserve size should include a minimum coastline length of > 5 km (although 10-20 km is preferred) and extend offshore to the 12 nautical mile limit to cover adult ranges for the species (Thomas & Shears 2013). Reserves should also be a simple shape which makes them easier to manage,

whilst also reducing any potential edge effects. Edge effects mean that the effective area of a marine reserve is smaller than the actual size of the reserve due to the removal of fish at or near the reserve boundaries...

• Marine Protected Areas also indirectly benefit larger species by removing competition for the same resource (e.g. blue cod) or by protecting the habitat (e.g. biogenic reefs as fish nursery habitat) from damage or disturbance. For example, Marine Reserves have been shown to have positive effects on penguin populations. A no-take marine reserve was established in 2009 in Algoa Bay, South Africa and within 3 months of closing the area to fishing, the foraging effort of the penguins had decreased by 25-30% (Pichegru et al. 2010) due to an increase in prey (sardines and anchovies).

• Effective marine protected areas ideally need to be linked and to reach into deep water, to cover the different species and life stages that are needed for a healthy ecosystem. Yellow-eyed penguins are known to forage well beyond the 12 nautical mile limit the Forum is restrained to. I strongly encourage the Forum to recommend an extension of protection measures to beyond 12 nautical miles to Government..."

Submissions specifically addressing constructing an MPA network: 30, 43, 56, 65, 95, 121, 144, 145, 157, 186, 355, 367, 369, 373, 375, 379, 392, 394, 401, 420, 420, 427, 559, 576, 595, 625, 642, 647, 657, 703, 707, 712, 720, 722, 729, 733, 735, 738, 754, 755, 770, 1696, 1751, 1811, 1894, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2473, 2509, 2672, 2697, 2698, 2707, 2708, 2710

General Comments

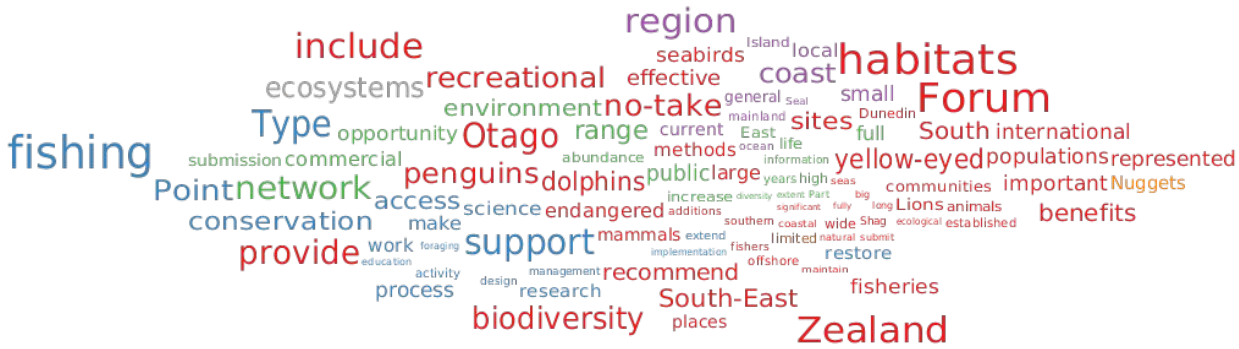

Figure 29. Word cloud of General comments.

General comments were provided by 76 respondents and tended to be moderately verbose (collectively 27,044 words). Submissions' general comments included repeated references to individual sites or topics (attempts were made to capture such), expressed thanks to the Forum and support staff, and presented their scientific and technical *bona fides* - frequently inviting any requests from the forum for more discussion or consultation. The comments largely provided input on the philosophy underlining their submission With the dominant themes being protection of iconic species (42 statements; as indicators, the most well known coastal habitat users, and as national and economic value exceeding localised commercial

fishing industry valuations). They requested further restrictions (increase in core Type 1 areas; 39 statements) based on evidence (35 statements), recognising the importance of commercial fishing operations (35 statements), but that these proposals - even if taken all together - fail to meet the Forum's mandate (33 statements) to maintain functional coastal processes (33 statements) with coastal gaps (especially to southern extent, 32 statements) and a lack of recreational-only fishing surrounding core no-take areas (32 statements). These submissions primarily asked the Forum to consider including incorporating buffer zones (whether type 2, local control like mataitai, or other legislation) surrounding core no-take MPAs connecting inshore (inlets, estuaries, and rocky or sandy coastlines) with nearshore and offshore habitats as connected corridors to the open sea with simplified boundaries. Submissions cite national (e.g. Leigh MPA) and international examples of marine community, fishery, and no-take economic benefits (access allowing tourism and resident diving, snorkelling, and coastal recreation) resulting from effective MPA placement and management and request greater research on MPA consequences to biodiversity and fishing displacement (including recreational).

355: "*As a marine scientist, I strongly urge the Forum to include the requirement or at least recommendation for monitoring and evaluation of effectiveness of our protected network after it is approved and gazetted.*"

2507: " *But more than just single species concerns, yellow-eyed penguins sit at the top of the food chain, they sample the marine environment and integrate conditions, and are thus indicators or marine health. Yellow-eyed penguins also act as umbrella species, whereby MPAs that are good for YEPs will also be good for many other marine species. A specific concern is that the size and location of the proposed MPAs is inadequate to protect penguins and other marine species that regularly forage over the shelf.* "

401: "*The spacing of reserves in a network is also an important consideration. Inter reserve distances from tens to about 100 km can enhance both conservation and fishery benefits, because they approach without exceeding the mean larval dispersal distances estimated for many fished coastal marine species (Gaines et al. 2010). The proposed network meets these guidelines, provided that all the coastal marine reserves are designated.*"

642: "*Māori kaitiaki have faced enormous political obstacles to establish Customary Management Areas i.e. mātaitai and taiāpure and rāhui (temporary fishing closures). The resulting potentially enormous biodiversity benefits and integration of use and environmental care have therefore been denied to many of us by strident self-interest of fishers. Sophal Chhun, a talented environmental economist from Cambodia, completed his PhD at the University of Otago's Centre for Sustainability in 2013. He had 1055 randomly selected New Zealanders perform a 'choice model', a type of virtual on-line auction where*

they had to choose between conflicting outcomes for our coastal ecosystems (Chhun et al. 2013, 2015). Dr Chhun's results were startling! On average New Zealanders considered biodiversity restoration (marine reserves) to be by far the most important priority: 2.18 times more important than recreational fishing, 2.30 times more important than Māori marine management (Taiāpure and Mātaitai), and 2.35 times more important than commercial fishing interests. Obviously New Zealanders prioritise biodiversity, but they are also fair minded. They want fishers and Māori to also have a reasonable and about equal share of the fish pie once biodiversity is protected. Support for biodiversity was widespread throughout NZ, urban and country areas, males and females, and all cultures. So while your work as a Forum has a strong local focus, I urge you to consider and adequately incorporate the needs and vision of all New Zealanders...Underlying demographic prediction models are not available for most species, so we are forced to rely on the poor monitoring approach – akin to try to drive a car safely (sustainably) by looking in the rear vision mirror rather than looking forward and predicting the road ahead...The extent of your EOMPF area is a political construct, not an ecologically defined span. Please ensure that every habitat type is well represented at least two reserves to help build regional ecological resilience."

Submissions specifically providing General Comments: 30, 56, 65, 84, 95, 121, 144, 157, 186, 355, 367, 369, 373, 375, 378, 379, 394, 559, 583, 622, 625, 642, 647, 657, 678, 693, 707, 708, 710, 718, 722, 729, 732, 735, 737, 738, 743, 752, 753, 754, 756, 758, 759, 770, 776, 1062, 1491, 1696, 1700, 1751, 1811, 1894, 1903, 1904, 1905, 1955, 1969, 1976, 1981, 2472, 2473, 2484, 2507, 2509, 2671, 2673, 2675, 2679, 2681, 2683, 2697, 2698, 2707, 2708, 2710, 2729

Brief Discussion

Given the structure of the consultation prompts, the analytical tools used in this summation are blunt, especially the basic position results due to the response collection methods with respect to differently lettered options (e.g. Otago Peninsula proposals). For instance opposition to MPA proposal G (401: "*The larger option E is supported as explained above*.") is opposition in preference for another supported MPA, whereas other submissions state a preference among options, but post support for what may be an 'any is better than nothing' strategy. In fairness to providing a robust summation of submissions a number of qualitative factors became apparent during the review and should be kept in mind while forming conclusions.

Default support - Across the submissions, whether changes are proposed or not the default assumption seems to be that all sites together form a single, minimum (and insufficient) network proposal. While all areas received support compared to the alternative of non-inclusion, it is apparent that positions and proposed boundaries would likely change dramatically for any site if an adjacent site were not enacted.

Geography - With such a broad geographic area being covered it is possible that the total number of responses relevant to each proposed MPA can reasonably be expected to vary with the population adjacent to proposed sites. Additionally, the effective consultation campaign penetration and response opportunity (especially online submissions) into those different communities is likely to have affected submissions regardless of perceived proposal viability. The larger number of more complex, more referenced, higher CER, and more verbose responses in the Dunedin sites than others may reflect the adjacent population more than the information available for creating a viable MPA network or specialist knowledge of the sites.

Submission populations - The cursory latent analysis begun in this document indicated that many submissions have verbosity and vocabulary characteristics which potentially indicates

discrete submission groups present within site response areas as well as geographically across site response areas.

Survey fatigue - The consultation document and online form appeared to uniformly prompt for submissions in a progression from North to South. Comment structural changes throughout the submission pool and the systematic decrease in 'No Comment' tags beyond support position indicated that survey fatigue may play a role in this public consultation and the non-randomly presented prompts may have introduced a systemic bias. Attempts were made to capture (by copying and pasting) the submitter's intents but comments such as "Please see above," "For the reasons already stated," and other phrases were common and further complicated analysis.

A number of submissions expressed discontent at the lack of use, or at least lack of presentation in the consultation document, of the rigorous research methods available to place individual MPAs and to construct viable networks based on natural processes instead of perceived public interest groups.

A cursory review of NZ and Australian government public policy summation documents indicated a tendency for summary authors and policymakers reading summaries to 'lump' identical or nearly-identical template submissions as one entry representing a monolithic population block instead of using analytical methods which reflect that they are the views of individual submitters. These and many other practical matters can delay or even confound the public consultation process. Beyond such practical and systematic challenges inherent in collecting public policy views fairly, actual recording and data management processes can further distort the interpretation of public opinion. In the present study, data were collected via multiple portals. This openness provided more opportunities for public submissions, but may have distorted public views due to difficulties in data reduction resulting in an under-representation of some of the most carefully crafted public consultation submissions.

In the future, the Forum is encouraged to continue developing their public-consultation protocols, describing their review process in advance, and consider engaging

polling or survey-design specialists to reduce survey-induced biases. Such specialists would be able to provide a clear end-to-end plan for collecting, reducing, and presenting public input to advisors. It seems likely that improved data management would have increased the analytical depth or reduced the time and cost of this analysis by more than a factor of two within the allotted timeframe. In addition, experience with this study indicates that issues which receive a large number of submissions may under-represent detailed, evidence-based technical open-text responses if a rigorous, iterative process is not anticipated.

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Report References

Barth, L., Stephen G. Kobourov, Sergey Pupyrev, An Experimental Study of Algorithms forSemantics-Preserving Word Cloud Layout,

Barth, L., S.G. Kobourov, S. Pupyrev, (2014) Experimental Comparisonof Semantic Word Clouds

Bekos, M., T. van Dijk, M. Fink, P. Kindermann, S.G. Kobourov, S. Pupyrev, J. Spoerhase, A. Wolff (2014) Improved Approximation Algorithmsfor Box Contact Representations

Braun, V. and V. Clarke (2012) Thematic Analysis *in* APA Handbook of Research Methods in Psychology: Vol. 2. Research Designs, H.Cooper (Editor in Chief), pages 57−71. DOI: 10.1037/13620-004

SEMPF (2016) https://south-eastmarine.org.nz/YourSay/ Accessed 3 April 2017.

SEMPF (2017) Marine Protection Forum to request more time for Deliberations, https://south-eastmarine.org.nz/2017/03/30/marine-protection-forum-to-request-more-time-for-deliberations/ Accessed 3 April 2017.

Appendix 1 – Draft Terms of Reference (27 March 2017)

Provided as separate PDF document.

Appendix 2 – Citations/Evidence provided by submitters

Please note, citations are listed in order of appearance in submission texts. Any citation may be referred to by one or more submissions. The format of the original submission citation has been imperfectly preserved and [sic] notation has not been used.

Submission 95

Babcock, R.C. (2003). The New Zealand marine reserve experience: the science behind the politics. Conserving marine environments. Out of sight out of mind, 108-119.

Batson, P.B. and Probert, P.K. 2000: Bryozoan thickets off Otago Peninsula. New Zealand Fisheries Assessment Report 2000/46. 31p

BirdLife International. (2012). Megadyptes antipodes. The IUCN Red List of Threatened Species 2012. Downloaded on 17 November 2016.

Croxall, J.P. and Davis, L.S. (1999). Penguins: paradoxes and patterns. Marine Ornithology, 27(1): 1-12.

Darby JT and Dawson SM (2000) Bycatch of yellow-eyed penguins (Megadyptes antipodes) in gillnets in New Zealand waters 1979-1997. Biological Conservation 93 (3):327-332

FAO (2010) The State of World Fisheries and Aquaculture 2010, The United Nations Food and Agriculture Organization.

Gaines, S. D. White, C. Carr, M. H. and Palumbi, S. R. (2010) Designing marine reserve networks for both conservation and fisheries management. Proceedings of the National Academy of Sciences 107, 18286–18293

Goni R, Hilborn R, Diaz D (2010) Net contribution of spillover from a marine reserve to fishery catches. Marine Ecology Progress Series. 400: 233–243.

Harrison, H.B. Williamson, D.H. Evans, R. D. Almany, G.R. Thorrold, S.R. Russ, G. R. Feldheim, K.A. Van Herwerden, L. Planes, S. Srinivasan, M. and Berumen, M.L. (2012). Larval export from marine reserves and the recruitment benefit for fish and fisheries. Current biology, 22(11), 1023-1028.

Ministry for Primary Industries (2016) Data provided by the Research Data Management Team at MPI from the Centralised Observer Database and commercially reported catches. September 2016.

O'Leary, B.C. Winther-Janson, M. Bainbridge, J.M. Aitken, J. Hawkins, J.P. and Roberts, C.M. (2016) Effective coverage targets for ocean protection. Conservation Letters.

Paleczny, M. Hammill, E. Karpouzi, V. and Pauly, D. (2015). Population trend of the world's monitored seabirds, 1950-2010. PloS one, 10(6), e0129342.

Pichegru, L. Grémillet, D. Crawford, R.J.M. and Ryan, P.G. (2010). Marine no-take zone rapidly benefits endangered penguin. Biology Letters, 6(4): 498-501.

Pauly, D. Christensen, V. Guénette, S. Pitcher, T.J. Sumaila, U.R. Walters, C.J. Watson, R. and Zeller, D. (2002). Towards sustainability in world fisheries. Nature, 418(6898): 689-695.

Russ, G. R. Alcala, A. C. & Maypa, A. P. (2003). Spillover from marine reserves: the case of Naso vlamingii at Apo Island, the Philippines. Marine Ecology Progress Series, 264, 15-20.

Skewgar E. Simeone A. and Boersma D (2009) Marine reserve in Chile would benefit penguins and ecotourism. Ocean Coast. Manag. 52, 487–491. (doi:10.1016/j.ocecoaman.2009.07.003)

Tisdell C (2007) Valuing the Otago Peninsula: The economic benefits of conservation. Working paper number 145, The University of Queensland, Australia.

Thomas, H.L. and Shears, N. (2013). Marine Protected Areas: A comparison of approaches. The Royal Forest and Bird Protection Society of New Zealand, Wellington, New Zealand.

Submission 121

6th IUCN World Parks Congress in Sydney 2014 which called for a minimum of 30% protected marine area for each habitat type worldwide. https://mpanews.openchannels.org/news/mpa-news/world-parks-congress-recommends-target-30-no-take-mpa-coverage-worldwide

(Reuchlin-Hugenholtz and McKenzie (2015)

http://www.oceanhealthindex.org/methodology/components/marine-protected-areas-coastal

Boris Worm et al. study from 2006

Stanford University News: http://news.stanford.edu/news/2006/november8/ocean-110806.html

Submission 401

Auge AA, et al. 2012 Autumn diet of recolonising female New Zealand sea lions based at Otago Peninsula, New Zealand. New Zealand Journal of Marine & Freshwater Research 46: 97-110.

Darby JT & Dawson SM. 2000. Bycatch of yellow-eyed penguins in gillnets in New Zealand waters 1979-1997. Biological Conservation 93: 327-332.

De Leo FC, et al. 2010. Submarine canyons: hotspots of benthic biomass and productivity in the deep sea. Proceedings of the Royal Society B 277: 2783-2792.

Edgar GJ, et al. 2014 Global conservation outcomes depend on marine protected areas with five key features. Nature 506: 216-220.

Gaines SD, et al. 2010 Designing marine reserve networks for both conservation and fisheries management. PNAS 107: 18286-18293

Gormley AM, et al. 2012. First evidence that marine protected areas can work for marine mammals. Journal of Applied Ecology 49: 474-480.

Halpern BS. 2003 The impact of marine reserves: do reserves work and does reserve size matter? Ecological Applications 13: S117-S137

MacKenzie DL & Clement DM. 2014. Abundance and distribution of ECSI Hector's dolphin. New Zealand Aquatic Environment and Biodiversity Report No. 123. 79p.

Pichegru L, et al. 2010. Marine no-take zone rapidly benefits endangered penguin. Biology Letters 64: 498-501.

Robertson BC & Chilvers BL. 2011 The population decline of the New Zealand sea lion: a review of possible causes. Mammal Review 41: 253-275.

Santora JA and Reiss CS. 2011. Geospatial variability of krill and top predators within an Antarctic submarine canyon system. Marine Biology 158: 2527-2540.

Slooten E & Dawson SM. 2013. Assessing the effectiveness of conservation management decisions: likely effects of new protection measures for Hector’s dolphin. Aquatic Conservation: Marine & Freshwater Ecosystems 20: 334-347.

Willis T. 2013. Scientific and biodiversity values of marine reserves: a review. DOC Research and Development Series 340.

Submission 427

Peebles, B.A. 2013. Otago submarine canyons: mapping and macrobenthos. MSc thesis, University of Otago. http://hdl.handle.net/10523/4769)

Hooper, R.L. 2009. Southern New Zealand estuaries and inlets: a broad-scale inventory and classification. MSc thesis, University of Otago

Submission 622

http://www.fish.govt.nz/NR/rdonlyres/9EA0FF66-FCBB-4DBF-BE9B-C34CCAA8D735/0/FAP_Bladder_kelp.pdf

Submisson 642

Akins, A.: Scott, N.; McCarthy, A.; Moller, H., Hepburn, C. (2013). Ngāi Tahu Marine Cultural Health Index User Manual. He Kōhinga Rangahau No. 16. 8 pp. University of Otago, Dunedin.

Barth, N. (2013). New Zealand Speleological Bulltin 206. Volume. Pp 140-154.

Bird, T.; Moller, H.; Scott, N.; Pirker, J. (2009) Traditional Māori and scientific methods for translocating and re-seeding pāua (Haliotis iris). He Kōhinga Rangahau No. 8. 92 pp. University of Otago, Dunedin. [Online at: www.mahingakai.org.nz/publications]

Chhun, S., Kahui, V., Moller, H., Thorsnes, P. (2015). Advancing Marine Policy Toward Ecosystem-based Management by Eliciting Public Preferences. Marine Resource Economics 30: 261-275.

Chhun, S.; Thorsnes, P.; Moller, H. (2013) Preferences for Management of Near-Shore Marine Ecosystems: A Choice Experiment in New Zealand. Resources 2:406-438.

Dick, J., Stephenson, J., Kirikiri, R., Moller, H., Turner R. (2012) Listening to the Tangata Kaitiaki: Consequences of the loss of abundance and biodiversity in coastal ecosystems in Aotearoa New Zealand. MAI Journal 1:117-130.

Garibaldi A, Turner N. (2004). Cultural keystone species: implications for ecological conservation and restoration. Ecology and Society 9: 1–18.

Grumbine, R.E. (1994). What is ecosystem management? Conservation Biology. 8(1): p. 27-38.

Lyver, P.O'B.; Akins, A.; Phipps, H.; Kahui, V.; Towns, D.; Moller, H. (2016). Key biocultural values to guide restoration action and planning in New Zealand. Restoration Ecology. 24: 314-323.

McCarthy, A.; Hepburn, C.; Scott, N.; Schweikert, K.; Moller, H. (2013). Local people see and care most? Severe depletion of inshore fisheries and its consequences for Māori communities in New Zealand. Aquatic Conservation: Marine and Freshwater Ecosystems. DOI: 10.1002/aqc.2378

Moller, H. (1996). Customary use of indigenous wildlife - Towards a bicultural approach to conserving New Zealand's biodiversity. In Biodiversity. B. McFagen and P. Simpson (eds.). Wellington, Department of Conservation. 89 - 125.

Moller, H. (2016). Decision all about values. Otago Daily Times, Monday 12 December, 2016, p 7.

Moller, H.; Horsley, P.; Lyver, P. O'B.; Taiepa, T.; Davis, J.; Bragg, M. (2000) Co-management by Māori and Pākehā for improved conservation in the 21st century. Pp 156 – 167. In Perkins, H. & Memon, A. (eds.) Environmental Planning and Management in New Zealand. Dunmore Press, Palmerston North.

Moller, J.; Moller, H.; Stirling, F. (2013) Native Planting Survey at Tūmai Beach Sanctuary. Ecosystems Consultants Report No. 2013/02. 72 + v pages 10

Moller, S.I.; Moller, H. (2012). Environmental and Lifestyle Values at Tūmai Beach Sanctuary. Ecosystems Consultants Report No. 2012/03. 32 + v pages.

Piggott, M.P., S.C. Banks, P. Tung, and L.B. Beheregaray. (2008). Genetic evidence for different scales of connectivity in a marine mollusc. Marine Ecology-Progress Series 365:127-136.

Roberts, R.D. and C. Lapworth. (2001). Effect of delayed metamorphosis on larval competence, and post-larval survival and growth, in the abalone Haliotis iris Gmelin. Journal of Experimental Marine Biology and Ecology 258:1-13.

Sasaki, R. and S.A. Shepherd. (1995). Larval dispersal and recruitment of Haliotis discus hannai and Tegula spp. on Miyagi coasts, Japan. Marine and Freshwater Research 46:519-529.

Schneider, V., A (2006). Bioeconomic Analysis of Marine Reserves for Paua (Abolone) Management at Stewart Island, New Zealand, in Department of Economics 2006, University of Otago: Dunedin, New Zealand. p. 289.

Schweikert, K., McCarthy, A., Akins, A., Scott, N., Moller, H., Hepburn, C. and Landesberger, F. (2012). A Marine Cultural Health Index for sustainable management of mahinga kai in Aotearoa - New Zealand. He Kōhinga Rangahau No. 15. 88 pp. University of Otago, Dunedin.

Shepherd, S.A., D. Lowe, and D. Partington. (1992). Studies on Southern Australian abalone (Genus Haliotis). 13. Larval dispersal and recruitment. Journal of Experimental Marine Biology and Ecology 164:247-260.

Shepherd, S.A. and D. Partington. 1995. Studies on Southern Australian abalone (Genus Haliotis). 16. Recruitment, habitat and stock relations. Marine and Freshwater Research 46:669-680.

Stanley, S. (2016). Reserves won't necessarily protect marine biodiversity. Otago Daily Times, Monday 12 December, 2016, p 7.

Stephens, SA., N. Broekhuizen, A.B. Macdiarmid, C.J. Lundquist, L. McLeod, and R. Haskew. (2006). Modelling transport of larval New Zealand abalone (Haliotis iris) along an open coast. Marine and Freshwater Research 57:519-532.

Taiepa, T., Lyver, P., Horsley, P., Davis, J., Bragg, M. and Moller, H. (1997) Co-management of New Zealand's Conservation Estate by Māori and Pākehā: a review. Environmental Conservation 24 (3): 236 – 250.

Submission 722

Babcock, R.C. (2003). The New Zealand marine reserve experience: the science behind the politics. Conserving marine environments. Out of sight out of mind, 108-119.

Batson, P.B. and Probert, P.K. 2000: Bryozoan thickets off Otago Peninsula. New Zealand Fisheries Assessment Report 2000/46. 31p

BirdLife International. (2012). Megadyptes antipodes. The IUCN Red List of Threatened Species 2012. Downloaded on 17 November 2016.

Boersma, P. D. (2008). Penguins as marine sentinels. BioScience, 58(7), 597-607.

Darby JT and Dawson SM (2000) Bycatch of yellow-eyed penguins (Megadyptes antipodes) in gillnets in New Zealand waters 1979-1997. Biological Conservation 93 (3):327-332

Edgar, G.J. Stuart-Smith, R.D. Willis, T.J. Kininmonth, S. Baker, S.C. Banks, S. Barrett, N.S. Becerro, M.A. Bernard, A.T. Berkhout, J. and Buxton, C.D. (2014). Global conservation outcomes depend on marine protected areas with five key features. Nature, 506(7487): 216-220.

FAO (2010) The State of World Fisheries and Aquaculture 2010, The United Nations Food and Agriculture Organization.

Gaines, S. D. White, C. Carr, M. H. and Palumbi, S. R. (2010) Designing marine reserve networks for both conservation and fisheries management. Proceedings of the National Academy of Sciences 107, 18286–18293

Goni R, Hilborn R, Diaz D (2010) Net contribution of spillover from a marine reserve to fishery catches. Marine Ecology Progress Series. 400: 233–243.

Gormley, A. M. Slooten, E. Dawson, S. Barker, R. J. Rayment, W. du Fresne, S. and Bräger, S. (2012). First evidence that marine protected areas can work for marine mammals. Journal of Applied Ecology, 49(2), 474-480.

Halpern BS. 2003 The impact of marine reserves: do reserves work and does reserve size matter? Ecological Applications 13: S117-S137

Harrison, H.B. Williamson, D.H. Evans, R. D. Almany, G.R. Thorrold, S.R. Russ, G.R. Feldheim, K.A. Van Herwerden, L. Planes, S. Srinivasan, M. and Berumen, M.L. (2012). Larval export from marine reserves and the recruitment benefit for fish and fisheries. Current biology, 22(11), 1023-1028.

Ministry for Primary Industries (2016) Data provided by the Research Data Management Team at MPI from the Centralised Observer Database and commercially reported catches. September 2016.

Moore, S. E. (2008). Marine mammals as ecosystem sentinels. Journal of Mammalogy, 89(3), 534-540.

O'Leary, B.C. Winther-Janson, M. Bainbridge, J.M. Aitken, J. Hawkins, J.P. and Roberts, C.M. (2016) Effective coverage targets for ocean protection. Conservation Letters.

Paleczny, M. Hammill, E. Karpouzi, V. & Pauly, D. (2015). Population trend of the world's monitored seabirds, 1950-2010. PloS one, 10(6), e0129342.

Pichegru, L. Grémillet, D. Crawford, R.J.M. and Ryan, P.G. (2010). Marine no-take zone rapidly benefits endangered penguin. Biology Letters, 6(4): 498-501.

Pauly, D. Christensen, V. Guénette, S. Pitcher, T.J. Sumaila, U.R. Walters, C.J. Watson, R. and Zeller, D. (2002). Towards sustainability in world fisheries. Nature, 418(6898): 689-695.

Russ, G. R. Alcala, A. C. & Maypa, A. P. (2003). Spillover from marine reserves: the case of Naso vlamingii at Apo Island, the Philippines. Marine Ecology Progress Series, 264, 15-20.

Skewgar E. Simeone A. and Boersma D (2009) Marine reserve in Chile would benefit penguins and ecotourism. Ocean Coast. Manag. 52, 487–491. (doi:10.1016/j.ocecoaman.2009.07.003)

Tisdell C (2007) Valuing the Otago Peninsula: The economic benefits of conservation. Working paper number 145, The University of Queensland, Australia.

Thomas, H.L. and Shears, N. (2013). Marine Protected Areas: A comparison of approaches. The Royal Forest and Bird Protection Society of New Zealand, Wellington, New Zealand.

Willis T. 2013. Scientific and biodiversity values of marine reserves: a review. DOC Research and Development Series 340.

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Batson, P.B. and Probert, P.K. 2000: Bryozoan thickets off Otago Peninsula. New Zealand Fisheries Assessment Report 2000/46. 31p

BirdLife International. (2012). Megadyptes antipodes. The IUCN Red List of Threatened Species 2012. Downloaded on 17 November 2016.

Boersma, P. D. (2008). Penguins as marine sentinels. BioScience, 58(7), 597-607.

Darby JT and Dawson SM (2000) Bycatch of yellow-eyed penguins (Megadyptes antipodes) in gillnets in New Zealand waters 1979-1997. Biological Conservation 93 (3):327-332

Edgar, G.J. Stuart-Smith, R.D. Willis, T.J. Kininmonth, S. Baker, S.C. Banks, S. Barrett, N.S. Becerro, M.A. Bernard, A.T. Berkhout, J. and Buxton, C.D. (2014). Global conservation outcomes depend on marine protected areas with five key features. Nature, 506(7487): 216-220.

FAO (2010) The State of World Fisheries and Aquaculture 2010, The United Nations Food and Agriculture Organization.

Gaines, S. D. White, C. Carr, M. H. and Palumbi, S. R. (2010) Designing marine reserve networks for both conservation and fisheries management. Proceedings of the National Academy of Sciences 107, 18286–18293

Goni R, Hilborn R, Diaz D (2010) Net contribution of spillover from a marine reserve to fishery catches. Marine Ecology Progress Series. 400: 233–243.

Gormley, A. M. Slooten, E. Dawson, S. Barker, R. J. Rayment, W. du Fresne, S. and Bräger, S. (2012). First evidence that marine protected areas can work for marine mammals. Journal of Applied Ecology, 49(2), 474-480.

Halpern BS. 2003 The impact of marine reserves: do reserves work and does reserve size matter? Ecological Applications 13: S117-S137

Harrison, H.B. Williamson, D.H. Evans, R. D. Almany, G.R. Thorrold, S.R. Russ, G.R. Feldheim, K.A. Van Herwerden, L. Planes, S. Srinivasan, M. and Berumen, M.L. (2012). Larval export from marine reserves and the recruitment benefit for fish and fisheries. Current biology, 22(11), 1023-1028.

Ministry for Primary Industries (2016) Data provided by the Research Data Management Team at MPI from the Centralised Observer Database and commercially reported catches. September 2016.

Moore, S. E. (2008). Marine mammals as ecosystem sentinels. Journal of Mammalogy, 89(3), 534-540.

O'Leary, B.C. Winther-Janson, M. Bainbridge, J.M. Aitken, J. Hawkins, J.P. and Roberts, C.M. (2016) Effective coverage targets for ocean protection. Conservation Letters.

Paleczny, M. Hammill, E. Karpouzi, V. & Pauly, D. (2015). Population trend of the world's monitored seabirds, 1950-2010. PloS one, 10(6), e0129342.

Pichegru, L. Grémillet, D. Crawford, R.J.M. and Ryan, P.G. (2010). Marine no-take zone rapidly benefits endangered penguin. Biology Letters, 6(4): 498-501.

Pauly, D. Christensen, V. Guénette, S. Pitcher, T.J. Sumaila, U.R. Walters, C.J. Watson, R. and Zeller, D. (2002). Towards sustainability in world fisheries. Nature, 418(6898): 689-695.

Russ, G. R. Alcala, A. C. & Maypa, A. P. (2003). Spillover from marine reserves: the case of Naso vlamingii at Apo Island, the Philippines. Marine Ecology Progress Series, 264, 15-20.

Skewgar E. Simeone A. and Boersma D (2009) Marine reserve in Chile would benefit penguins and ecotourism. Ocean Coast. Manag. 52, 487–491. (doi:10.1016/j.ocecoaman.2009.07.003)

Tisdell C (2007) Valuing the Otago Peninsula: The economic benefits of conservation. Working paper number 145, The University of Queensland, Australia.

Thomas, H.L. and Shears, N. (2013). Marine Protected Areas: A comparison of approaches. The Royal Forest and Bird Protection Society of New Zealand, Wellington, New Zealand.

Willis T. 2013. Scientific and biodiversity values of marine reserves: a review. DOC Research and Development Series 340.

Submission 733

http://bit.ly/2hOmPrw

http://www.int-res.com/abstracts/meps/v343/p295-306/.

Submission 735

De Leo et al. 2010; Santora & Reiss 2011

Halpern 2003

Willis 2013

Submission 2472

Darby JT & Dawson SM. 2000. Bycatch of yellow-eyed penguins in gillnets in New Zealand waters 1979-1997. Biological Conservation 93: 327-332.

De Leo FC, et al. 2010. Submarine canyons: hotspots of benthic biomass and productivity in the deep sea. Proceedings of the Royal Society B 277: 2783-2792.

Department of Conservation and Ministry of Fisheries. 2005. Marine Protected Areas – Policy and Implementation Plan. Wellington, New Zealand.

Edgar GJ, et al. 2014 Global conservation outcomes depend on marine protected areas with five key features. Nature 506: 216-220.

Gaines SD, et al. 2010 Designing marine reserve networks for both conservation and fisheries management. PNAS 107: 18286-18293

Gormley AM, et al. 2012. First evidence that marine protected areas can work for marine mammals. Journal of Applied Ecology 49: 474-480.

Halpern BS. 2003 The impact of marine reserves: do reserves work and does reserve size matter? Ecological Applications 13: S117-S137.

Ministry of Fisheries and Department of Conservation. 2008. Marine Protected Areas – Classification, protection standard and implementation guidelines. Wellington, New Zealand.

Pichegru L, et al. 2010. Marine no-take zone rapidly benefits endangered penguin. Biology Letters 64: 498-501.

Rawlence, N. J., Paul Scofield, R., Spencer, H. G., Lalas, C., Easton, L. J., Tennyson, A. J. D., Adams, M., Pasquet, E., Fraser, C., Waters, J. M. and Kennedy, M. (2016) Genetic and morphological evidence for two species of Leucocarbo shag (Aves, Pelecaniformes, Phalacrocoracidae) from southern South Island of New Zealand. Zool J Linn Soc, 177: 676–694. doi:10.1111/zoj.12376.

Robertson BC & Chilvers BL. 2011 The population decline of the New Zealand sea lion: a review of possible causes. Mammal Review 41: 253-275.

Santora JA and Reiss CS. 2011. Geospatial variability of krill and top predators within an Antarctic submarine canyon system. Marine Biology 158: 2527-2540.

Slooten E & Dawson SM. 2013. Assessing the effectiveness of conservation management decisions: likely effects of new protection measures for Hector's dolphin. Aquatic Conservation: Marine & Freshwater Ecosystems 20: 334-347.

Willis T. 2013. Scientific and biodiversity values of marine reserves: a review. DOC Research and Development Series 340.

Submission 2473

Augé, A. A., Chilvers, B. L., Moore, A. B., Davis, L. S. (2011) Foraging behaviour indicates marginal marine habitat for New Zealand sea lions: remnant versus recolonising populations. Marine Ecology Progress Series 432 : 247-256

Augé, A. A., Chilvers, B. L., Moore, A. B., Davis, L. S. (2012) Importance of studying foraging site fidelity for spatial conservation measures in a mobile predator. Animal Conservation 17 : 61-71

Chilvers, B. L. (2008) New Zealand sea lions Phocarctos hookeri and squid trawl fisheries: bycatch problems and management options. Endangered Species Research 5 : 193-204

Submission 2484

Bethan C. O'Leary, Marit Winther-Janson, John M. Bainbridge, Jemma Aitken, Julie P. Hawkins, Callum M. Roberts. Effective coverage targets for ocean protection Running Title: Effective targets for ocean protection. Conservation Letters, 2016; DOI: 10.1111/conl.12247

Ballantine, W.J., (2014). Fifty years on: Lessons from marine reserves in New Zealand and principles for a worldwide network. Biological Conservation Volume 176, pp. 297-307.

Dickey, A L. (2005, June 3). The development of commercial New Zealand ecotourism: A longitudinal study (1999-2004) (Thesis, Master of Tourism).

Edgar, G. J., Stuart-Smith, R.D., Willis, T.J., Kininmonth, S. Baker, S.C., Banks, S., et al.,(2014) Global conservation outcomes depend on Marine Protected Areas with five key features. Nature 506, 216-200

Goni R, Hilborn R, Diaz D (2010) Net contribution of spillover from a marine reserve to fishery catches. Marine Ecology Progress Series. 400: 233-243.

Harrison, H.B., Williamson, D.H., Evans, R. D., Almany, G.R., Thorrold, S.R., Russ, G. R., Feldheim, K.A., Van Herwerden, L., Planes, S., Srinivasan, M. and Berumen, M.L. (2012). Larval export from marine reserves and the recruitment benefit for fish and fisheries. Current biology, 22(11), 1023-1028.

Lester SE, Halpern BS (2008) Biological responses in marine no-take reserves versus partially protected areas. Marine Ecology Progress Series 367:49-56

Race S, (2011). The characteristics and experiences of summer visitors to Goat Island Marine Reserve, New Zealand. Thesis. Auckland University of Technology.

Tisdell C (2007) Valuing the Otago Peninsula: The economic benefits of conservation. Working paper number 145, The University of Queensland, Australia.

M. J. Tegner, and P. K. Dayton (2000) Ecosystem effects of fishing in kelp forest communities. ICES Journal of Marine Science, 57: 579-589.

Pulliam H.R. (1988) Sources, Sinks, and Population Regulation. The American Naturalist Vol. 132, No. 5 (Nov., 1988), pp. 652-661

Williams ID, Walsh WJ, Miyasaka A, Friedlander AM (2006) Effects of rotational closure on coral reef fishes in Waikiki Diamond Head Fishery Management Area, Oahu, Hawaii. Marine Ecology Progress Series 31 O: 139-149

Submission 2509

Department of Conservation and Ministry of Fisheries. 2005. Marine Protected Areas – Policy and Implementation Plan. Wellington, New Zealand.

Edgar GJ, et al. 2014 Global conservation outcomes depend on marine protected areas with five key features. Nature 506: 216-220.

Fernandes, L., Day, J., Kerrigan, B., Breen, D., De'ath, G., Mapstone, B., et al. (2009). A process to design a network of marine no-take areas: Lessons from the Great Barrier Reef. Ocean and Coastal Management, 52(8), 439–447.

Gaines SD, et al. 2010 Designing marine reserve networks for both conservation and fisheries management. PNAS 107: 18286-18293

Gormley AM, et al. 2012. First evidence that marine protected areas can work for marine mammals. Journal of Applied Ecology 49: 474-480.

Halpern BS. 2003 The impact of marine reserves: do reserves work and does reserve size matter? Ecological Applications 13: S117-S137.

Ministry of Fisheries and Department of Conservation. 2008. Marine Protected Areas – Classification, protection standard and implementation guidelines. Wellington, New Zealand.

Pichegru L, et al. 2010. Marine no-take zone rapidly benefits endangered penguin. Biology Letters 64: 498-501.

Rawlence, N. J., Paul Scofield, R., Spencer, H. G., Lalas, C., Easton, L. J., Tennyson, A. J. D., Adams, M., Pasquet, E., Fraser, C., Waters, J. M. and Kennedy, M. (2016) Genetic and morphological evidence for two species of Leucocarbo shag (Aves, Pelecaniformes,

Phalacrocoracidae) from southern South Island of New Zealand. Zool J Linn Soc, 177: 676–694. doi:10.1111/zoj.12376.

Robertson BC & Chilvers BL. 2011 The population decline of the New Zealand sea lion: a review of possible causes. Mammal Review 41: 253-275.

Santora JA and Reiss CS. 2011. Geospatial variability of krill and top predators within an Antarctic submarine canyon system. Marine Biology 158: 2527-2540.

Slooten E & Dawson SM. 2013. Assessing the effectiveness of conservation management decisions: likely effects of new protection measures for Hector's dolphin. Aquatic Conservation: Marine & Freshwater Ecosystems 20: 334-347.

Willis T. 2013. Scientific and biodiversity values of marine reserves: a review. DOC Research and Development Series 340.

Submission 2671

1. South-East Marine Protection Forum: Roopu Manaaki ki te Toka. (2016) *Proposed marine protected areas for New Zealand's South Island South-East Coast: Public Consultation document 2016.* **1**, p. 205.

2. Ministry for Primary Industries. (2016). *Fisheries Assessment Plenary May 2016: Stock Assessments and Stock Status.* Wellington, New Zealand.

3 Roberts, C.D., A.L. Stewart, And C.D. Struthers. (2015). ed.^eds. *The Fishes of New Zealand.* Systematic Accounts. Vol. 2. 1-576.

4. Claudet, J., et al. (2010). *Marine reserves: fish life history and ecological traits matter.* Ecological applications. **20**(3): p. 830-839.

5. Thomas, H. and N. Shears. (2013). *Marine Protected Areas: A comparison of approaches.* The Royal Forest and Bird Protection Societ of New Zealand, Wellington, New Zealand., p. 67.

6. Ministry of Fisheries and Department of Conservation. (2008). *Marine Protected Areas: Classification, Protection Standard and Implementation Guidelines*. Ministry of Fisheries and Department of Conservation: Wellington, New Zealand. p. 54.

7. Agnew, P.M. (2015). *Demographic parameters, foraging and responses to environmental variation of little penguins (Eudyptula minor). Department of Marine Science*, University of Otago: Dunedin, New Zealand. **PhD Thesis**, p. 172.

8. Stone, G., et al. (2005). *Hector's dolphin (Cephalorhynchus hectori hectori) satellite tagging, health and genetic assessment.* Department of Conservation: Auckland. p. 77.

9. Wood, A. (2015). *Habitat-forming bryozoans in south-eastern New Zealand. A science summary for the South-East Marine Protection Forum*. South East Marine Protection Forum. p. 12.

10. Beck, M.W., et al. (2001). *The identification, conservation, and management of estuarine and marine nurseries for fish and invertebrates: a better understanding of the habitats that serve as nurseries for marine species and the factors that create site-specific variability in nursery quality will improve conservation and management of these areas*. Bioscience. **51**(8): p. 633-641.

11. Melusky, D.S. and M. Elliott. (2004). *The estuarine ecosystem: ecology, threats and management*. Oxford University Press.

12. Carbines, G. (2004). *Age, growth, movement and reproductive biology of blue cod (Parapercis colias, Pinguipedidae): implications for fisheries management in the South Island of New Zealand. Department of Marine Science*, University of Otago: Dunedin, New Zealand. **PhD thesis**, p. 211.

13. Morrison, M.A., et al. (2014). *Linking marine fisheries species to biogenic habitats in New Zealand: a review and synthesis of knowledge*, in *New Zealand Aquatic Environment and Biodiversity Report*. Ministry for Primary Industries. p. 160.

14. Morrison, M.A., et al. (2014). *Habitats and areas of particular significance for coastal finfish fisheries management in New Zealand: A review of concepts and life history knowledge, and suggestions for future research*, in *New Zealand Aquatic Environment and Biodiversity Report*. Ministry for Primary Industries **125**, p. 201.

15. Gillanders, B. (2002). *Connectivity between juvenile and adult fish populations: do adults remain near their recruitment estuaries?*

16. Jones, G., et al. (1999). *Self-recruitment in a coral reef fish population*. Nature. **402**(6763): p. 802-804.

17. Swearer, S.E., et al. (1999). *Larval retention and recruitment in an island population of a coral-reef fish*. Nature. **402**(6763): p. 799-802.

18. Moore, P.J., et al. (1995). *Yellow-eyed penguin foraging study, south-eastern New Zealand*. Science and Research series(83).

19. Graham, M.H. (2004). *Effects of local deforestation on the diversity and structure of southern California giant kelp forest food webs*. Ecosystems. **7**(4): p. 341-357.

20. Lorentsen, S.-H., K. Sj0tun, and D. Gremillet. (2010). *Multi-trophic consequences of kelp harvest*. Biological Conservation. **143**(9): p. 2054-2062.

21. Geange, S.W. (2014). *Growth and reproductive consequences of photosynthetic tissue loss in the surface canopies of Macrocystis pyrifera* (L.) C. Agardh. Journal of Experimental Marine Biology and Ecology. **453**: p. 70-75.

22. Richardson, K., et al. (2014). *Awhina reloaded: updated results from a programme for Maori and Pacific tertiary graduate and postgraduate success in science, engineering, and architecture and design, in Maori and Pasifika Higher Education Horizons*, in *Diversity in Higher Education*, F. Cram, et al., Editors. Emerald Press.

23. Wilson, M., et al. (2011). *Awhina: a programme for Maori and Pacific tertiary science graduate and postgraduate success.* Higher Education. **62**(6): p. 699-719.

24. South-East Marine Protection Forum: Roopu Manaaki kite Toka. (2016). *Proposed marine protected areas for New Zealand's South Island South-East Coast: Supporting Information for the Public Consultation Document 2016*. **2**, p. 170.

25. Ellison, E. (2006). *Customary Rights: Holding the Line*. Public History Review. **13**: p. 86-94.

26. Christie, P. and A.T. White. (2007). *Best practices for improved governance of coral reef marine protected areas*. Coral Reefs. **26**(4): p. 1047-1056.

27. Hoelting, K.R., et al. (2013). *Factors affecting support for Puget sound marine protected areas*. Fisheries Research. **144**: p. 48-59.

28. Mcclanahan, T.R., et al. (2006). *A comparison of marine protected areas and alternative approaches to coral-reef management*. Current Biology. **16**(14): p. 1408-1413.

29. Mccarthy, A., et al. (2014). *Local people see and care most? Severe depletion of inshore fisheries and its consequences for Maori communities in New Zealand*. Aquatic Conservation: Marine and Freshwater Ecosystems. **24**(3): p. 369-390.

30. Edgar, G.J., et al. (2014). *Global conservation outcomes depend on marine protected areas with five key features*. Nature. **506**(7487): p. 216-220.

31. Rife, A.N., et al. (2013). *When good intentions are not enough ... Insights on networks of "paper park" marine protected areas*. Conservation Letters. **6**(3): p. 200-212.

32. Morgan, C.L., N.A. Odunton, and A.T. Jones. (1999). *Synthesis of environmental impacts of deep seabed mining*. Marine Georesources and Geotechnology. **17**(4): p. 307-356.

33. Ministry for the Environment & Statistics New Zealand. (2016). *New Zealand's Environmental Reporting Series: Our marine environment 2016*. p. 71.

Submission 2671

"To my knowledge, elephant fish lay eggs in shallow waters along this coast all the way up to, and beyond, Banks Peninsula."

Submission 2679

Ballantine, B. (2014). Fifty years on: Lessons from marine reserves in New Zealand and principles for a worldwide network. Biological Conservation 176: 297–307

Hamner, R.M., Pichler, F. B., Heimeier, D., Constantine, R., & Baker, C. S. (2012). Genetic differentiation and limited gene flow among fragmented populations of New Zealand endemic Hector's and Maui's dolphins. Conservation Genetics. Published online 24 April 2012.

Ministry for Primary Industries. (2013). Operation Achilles: Preliminary Investigation Report Dumping/Discarding. (Operation ACHILLES Preliminary investigation Report, 26 July 2013). Wellington, New Zealand: Ministry for Primary Industries

Ministry for Primary Industries. (2012). Operation Hippocamp Investigation Report. Wellington, New Zealand: Ministry for Primary Industries.

Rayment, W, Dawson, S., Slooten, E., Bräger, S., Fresne, S. D., & Webster, T. (2009). Kernel density estimates of alongshore home range of Hector's dolphins at Banks

Peninsula, New Zealand. Marine Mammal Science, 25(3), 537-556. Wiley-Blackwell, 111 River Street Hoboken NJ 07030-5774 USA.

Robertson BC & Chilvers BL. 2011 The population decline of the New Zealand sea lion: a review of possible causes. Mammal Review 41: 253-275.

Simmons et al, 2016. Reconstruction of marine fisheries catches for New Zealand (1950- 2010). Global Fisheries Cluster, Institute for the Oceans and Fisheries. University of British Columbia, 2202 Main Mall, Vancouver, BC, V6T 1Z4, Canada.

Slooten E. and Dawson S.M. 2010. Assessing the effectiveness of conservation management decisions: Likely effects of new protection measures for Hector's dolphin. Aquatic Conservation: Marine and Freshwater Ecosystems 20: 334-347.

Turek, J.L. (2011). The distribution and abundance of Hector's dolphins around the Otago coastline, New Zealand. Unpublished MSc Thesis. University of Otago. 97p.
Weir, J. & Sagnol, O. (2015). Distribution and abundance of Hector's dolphins (Cephalorhynchus hectori) off Kaikoura, New Zealand, New Zealand Journal of Marine and Freshwater Research. 49(3):1-14