Operational review of and 5-year plan for the Ecologically Significant Marine Sites (ESMS) programme (2022)

MARLBOROUGH DISTRICT COUNCIL

pisces consulting

Operational review of and 5-year plan for the Ecologically Significant Marine Sites (ESMS) programme (2022)

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Prepared for Marlborough District Council

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Executive summary

The Marlborough District Council (MDC) Ecologically Significant Marine Site (ESMS) programme promotes the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna in the Marlborough coastal marine area (CMA). This is accomplished primarily by identifying 'ecologically significant marine sites' ('significant sites') and awarding them protection through provisions in the proposed Marlborough Environment Plan (PMEP).

The core activities under the ESMS programme are the identification and monitoring of significant sites, the recognition of significant sites in the PMEP and their protection through policies and methods. At the time this report was published, 142 significant sites were recognised in the PMEP.

After ten years of running the ESMS programme, MDC wants to ensure the programme is robust, appropriately prioritised, and fit for purpose for the next phase, during which effective PMEP implementation will become a key driver of the programme. Importantly, MDC staff recognised a need to extend the spatial coverage of the programme faster than what has been achieved to date to ensure appropriate protection of marine biodiversity values.

This operational review was informed by a review of work done under the ESMS programme to date, and interviews and workshops held with MDC staff, expert panel members, and consultants associated with the ESMS programme. Based on the review findings, a range of implementation actions and key performance indicators have been identified.

This report provides an operational pathway for the ESMS programme over the next five years. The ESMS programme vision is that significant marine biodiversity in the Marlborough CMA is protected. By completing the actions and achieving the KPI identified in this report over the next five years, the ESMS programme will be fit for purpose and much closer to achieving this vision.

Contents

List of acronyms

CMA   Coastal Marine Area

DOC   Department of Conservation

ESMS   Ecologically Significant Marine Site

MDC   Marlborough District Council

MEP   Marlborough Environment Plan

KPI   Key performance indicator

PMEP   Proposed Marlborough Environment Plan

1 Introduction

1.1 ESMS programme background

The Marlborough District Council (MDC) Ecologically Significant Marine Site (ESMS) programme promotes the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna in the Marlborough coastal marine area (CMA). This is accomplished primarily by identifying 'ecologically significant marine sites'[1] and awarding them protection through provisions in the Marlborough Environment Plan (MEP).[2]

The ESMS programme sits within the broader biodiversity objectives of MDC; the statutory and regulatory context of the programme is described in Appendix 1. The ESMS programme began in 2010 and is funded by MDC with financial and in-kind support from the Department of Conservation (DOC).[3]

The ESMS programme has scientific and policy components. The core scientific components of the programme are the identification of new and monitoring of existing significant sites, which comprises gathering scientific data (mostly through scientific surveys) and assessing the ecological site characteristics against significance criteria provided in PMEP Policy 8.1.1 (shown in Table A1-1, Appendix 1). The core policy components of the ESMS programme are the identification of significant sites in the MEP and the provision of mechanisms for their protection through policies and methods.

The first milestone of the ESMS programme was the publication of a comprehensive report identifying and ranking 129 ecologically significant marine sites that could be identified from existing information (Davidson et al., 2011). The 2011 report built on a Department of Conservation (DOC) study identifying ecologically important marine, freshwater and terrestrial areas in Marlborough (Davidson et al., 1995) and a range of information gathered following publication of that report.

Since the initial report in 2011, 14 reports have been prepared for MDC under the ESMS programme, including two reports describing protocols for surveying and assessing sites (Davidson et al., 2014, 2013), six survey reports describing surveys of potential new and existing significant marine sites for site identification or monitoring (Davidson et al., 2020c, 2019, 2018b, 2017c; Davidson and Richards, 2016, 2015), and six expert panel review and site assessment reports relating to the survey reports (Davidson et al., 2020a, 2020b, 2018a, 2017a, 2017b, 2015).

The ESMS programme has achieved the recognition of 142 significant sites in the PMEP. As at 1 June 2022, seventy-two significant marine sites are listed in Appendix 27 of the Appeals Version of the PMEP[4] and all 142 sites are displayed on maps contained in PMEP Volume 4. The PMEP contains several policies and implementation methods providing a range of protection measures for these sites, which are shown in Appendix 1 of this report.

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[1] For simplicity, generally referred to as 'significant sites' in this report.
[2] At the time of preparing this report, the MEP was in the appeal phase of the Schedule 1 process, with several of the provisions relating to indigenous biodiversity (and more specifically to ESMS) under appeal. The regard to be given to objectives, policies and methods is dependent on how far through the process they are. Rules that are not under appeal, or where appeals have been resolved, can now be treated as operative. Any references to sections of the plan therefore refer to the Proposed MEP (PMEP).
[3] Two DOC staff are members of the expert panel, and the DOC covers their time and expenses.
[4] Significant sites listed in Appendix 27 are those that are granted special protection status [category A and B sites] due to their vulnerability to physical disturbance.

1.2   Review objectives

After ten years of running the ESMS programme, MDC wants to ensure the programme is robust, appropriately prioritised, and fit for purpose for the next phase.

The objectives of this review are:

1. To articulate the strategic direction for the ESMS programme, including a programme vision, clear goals and objectives.
2. To evaluate whether the ESMS programme, in its current format, is fit for purpose to achieve the objectives for marine biodiversity relevant to ecologically significant marine sites in the proposed Marlborough Environment Plan (PMEP) and, if required, identify how the ESMS programme could be modified so that it is fit for purpose.
3. To evaluate whether the ESMS programme is scientifically robust and able to effectively utilise new technologies for surveying the CMA.
4. To identify priorities and actions for the next five years.
5. To set up a regular evaluation of ESMS programme performance.

1.3   Review scope

The ESMS programme sits within the broader biodiversity objectives of MDC. While this context is acknowledged, in this report the ESMS programme is evaluated predominantly against goals and objectives specific to significant marine sites.

The scope of this review focusses on biological aspects of the ESMS programme and marine biodiversity objectives of MDC. While it may refer to related aspects, such as natural character, Māori cultural values, the role of tangata whenua iwi, community and other management agencies, these are not reviewed in detail in this report.

1.4   Review method

This review was informed by a review of reports prepared under the ESMS programme to date, and a large number of interviews and workshops held with MDC staff, expert panel members, and consultants associated with the ESMS programme. These interviews, conducted by phone and zoom, and in person workshops were held between April and November 2021. Because of the strong focus on operational aspects of the programme, no wider engagement was undertaken as part of this review.

MDC staff are intending to conduct a subsequent review of the ESMS programme after five years, which will include a review of progress on these priority areas and the identification of new priorities.

1.5   Structure of this report

This report is structured into four components:

- Section 2 provides a brief description of the scientific activities and policy identification and protection of sites under the ESMS programme to date.
- Section 3 describes the ESMS programme vision and programme goals, objectives, and 5-year priorities that have been developed as part of this review.
- Section 4 presents the findings of the ESMS programme review, structured by operational programme components.
- Section 5 outlines specific actions for implementing the findings of this review in the priority areas over the next five years and 5-year key performance indicators (KPI).

2 ESMS programme activities

2.1 Scientific ESMS programme activities

Scientific activities within the ESMS programme include conducting field surveys (for identifying and monitoring the ecological status of sites) and assessing sites for ecological significance. An expert panel comprising independent ecological experts plays a key role in the ESMS programme, tasked with reviewing field survey results and recommendations made in survey reports, and assessing the ecological status and protection requirements of sites.

Decisions on which sites to survey are made by MDC with input from the expert panel. All site surveys to date have been carried out by Davidson Environmental Limited, following a consistent methodology comprising a combination of sonar imaging, drop camera photography, underwater videography, and dive surveys as appropriate for each site. Site information has been supplemented by data from a variety of sources, including previous ESMS programme surveys (for monitoring surveys) or other programmes, e.g., marine reserve monitoring, marine farm monitoring, or NIWA multibeam bathymetric survey. For example, multibeam depth contour data have been used to delineate boundaries for sites where survey data was not able to achieve the level of detail required to identify these boundaries.

Field data collected from site surveys are entered into Excel template spreadsheets. These spreadsheets include a summary page and several other pages comprising data, maps, photos, sonar images and sample coordinates and describe other data that have been collected, such as video clips. A complete set of data for each site is handed to MDC in electronic format where it is stored in folders structured by year and site name on the standard file server.

The expert panel has been assessing sites before significance criteria for marine sites were specified in the PMEP. The criteria used by the expert panel were derived from the MDC Significant Natural Areas (SNA) project, which began in 2001 and are documented in Davidson et al. (2011) and subsequent expert panel reports. The initial significance criteria were slightly different from those in the PMEP, and some changes were made to the criteria over time by the expert panel. The main difference between the criteria used by the expert panel to date and those in the PMEP is that the former only include descriptors relevant to the marine environment.

Significant sites are categorised by the expert panel into five groups relating to their vulnerability to benthic physical disturbance and current protection status (Davidson et al., 2015). As described in Davidson et al. (2015), Categories A-C reflected the range from sites intolerant of most forms of physical disturbance (Category A) to sites tolerant of some physical disturbance (Category C). Sites already legally protected (e.g., marine reserves) were described as Category D sites. Sites not assessed as ecologically significant based on the current assessment but considered to have a potential to recover and reach significance status were described as Category E sites.

Recent survey reports include an assessment of the sensitivity of species, community and habitat and perceived threats, which is used to calculate appropriate buffer zones for category A and B significant sites for the purpose of reducing the likelihood of damage from nearby anthropogenic activities.

A summary of marine site surveys and significance assessments by the expert panel between 2011 and 2020 is provided in Appendix 2.

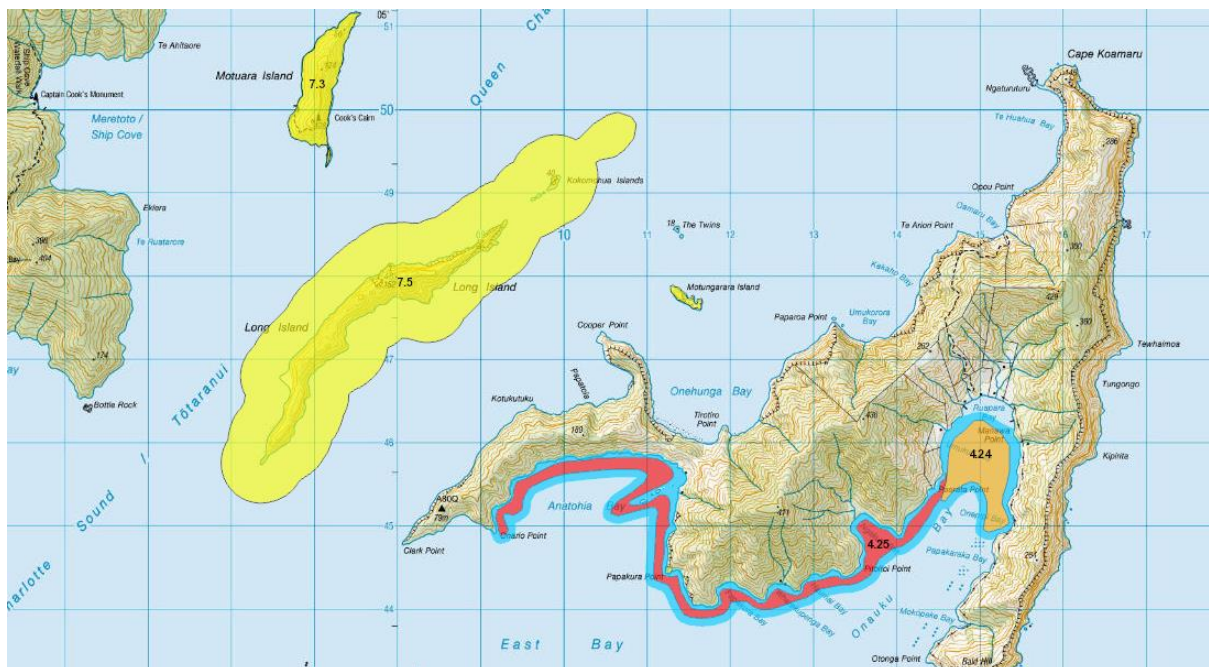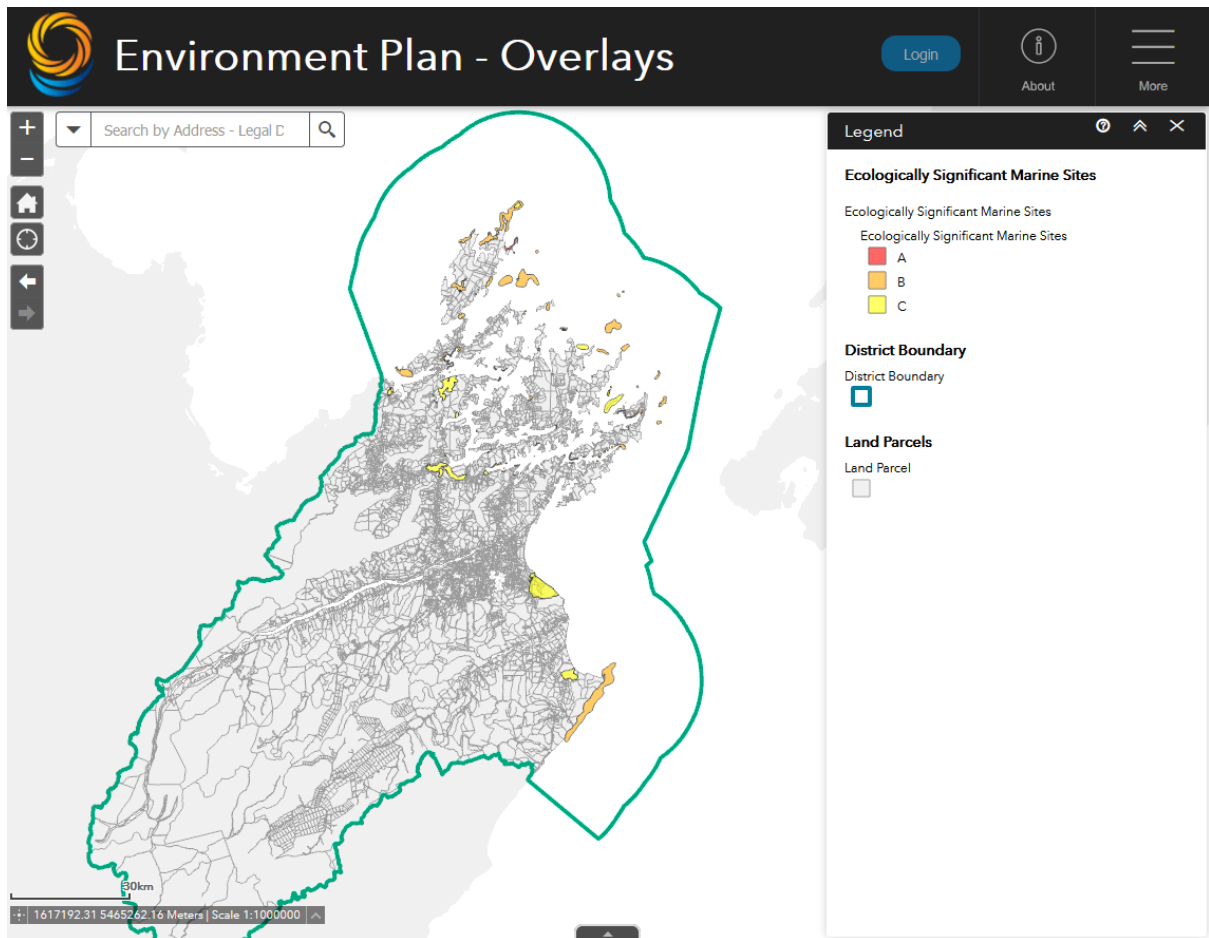**Figure 1. Top: Screenshot of the proposed overlay for the MEP (as amended by decisions on 21 February 2020) titled 'Ecologically Significant Marine Sites'. Bottom: Close up example showing significant marine sites 4.24, 4.25, 7.3, and 7.5 in Queen Charlotte Sound / Tōtaranui. See legend in top screenshot for colour coding of significant sites. Sourced from MDC Smart Maps on 1 February 2022.**

2.2   Policy ESMS identification and protection

As part of the process, provisions have been developed for the protection of significant sites, setting up processes for recognising sites identified as significant by the expert panel in the PMEP, and displaying these sites on the MDC online SmartMaps portal (Figure 1). The provisions providing the regulatory framework for ESMS are shown in Appendix 1.[5] In addition, by providing these sites with an ESMS status it triggers rules restricting benthic activity.

The Appeals Version of the PMEP currently lists 11 significant marine sites as 'Category A sites' and 61 as 'Category B sites'. Category A and B sites are those that have been evaluated as being vulnerable to seabed disturbance. Recognising that anthropogenic activities cannot necessarily be undertaken in a precise manner to avoid the adverse effects of seabed disturbance, these sites are given additional protection through 50, 100, or 200 m buffers surrounding the site. Additional 'Category C sites' are shown on maps in Volume 4 of the PMEP and Smart Maps (Figure 1).

MDC have commenced a plan variation to consider the inclusion of additional sites to the PPMEP. The variation will propose sites that were identified by the expert panel between 2017 (post the decision on the PPMEP) and 2021.

3   ESMS programme vision, goals, objectives, and 5-year priorities

In the early phase of this review, the ESMS programme vision and programme goals were identified by MDC staff. Programme objectives were developed following the initial review of programme reports during a series of workshops with MDC science and policy staff. The programme vision is an overall declaration of what MDC wants to accomplish through the ESMS programme. Programme goals and their associated objectives describe more specific desired programme outcomes.

It has been anticipated from the beginning of this review that prioritisation will be a critical task. This is because of the large proportion of the Marlborough CMA yet to be covered and assessed for potential significant sites, the cost of conducting scientific surveys in the marine area, the substantial amount of data already collected that requires fit-for-purpose data storage and management, and the broad and diverse uses of information gathered through the ESMS programme described in the PMEP. To provide a focus for the programme review, MDC science and policy staff also identified priorities for the coming five-year period during the series of workshops.

3.1   Vision

'Significant marine biodiversity in the Marlborough CMA is protected'.

3.2   Goals

Five goals of the ESMS programme have been identified:

Goal 1: The ESMS programme supports Council's marine biodiversity objectives, work programmes, and strategic priorities.

Goal 2: The ESMS programme increases public awareness and protection of marine biodiversity values.

Goal 3: The ESMS programme is scientifically robust and efficient, and programme data access is easy and appropriate for different users.

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[5] At the time of preparing this report several of these provisions were under appeal.

Goal 4: The assessment of sites is robust, transparent, efficient, and consistent over time and across the Marlborough CMA.

Goal 5: The ESMS programme supports biodiversity objectives and initiatives outside of MDC.

3.3 Objectives

Several objectives have been identified for each goal, reflecting the specific desired outcomes, outputs, and processes associated with the programme goals. A description of what achieving each objective would look like in practice is provided in Appendix 3.

3.3.1 Goal 1: The ESMS programme supports Council's marine biodiversity objectives, work programmes, and strategic priorities

Objectives:

- The ESMS programme provides information that informs initiatives and work programmes in MDC aimed at protecting significant marine sites.
- Adverse effects on and recovery and restoration opportunities of marine biodiversity values and significant marine sites are understood
- The ESMS programme is aligned with other MDC work programmes relevant to marine biodiversity
- ESMS programme outputs support effectiveness reviews of Council's resource management plans, including evaluation of the PMEP AERs.
- ESMS programme outputs support effective MDC planning and resource management decision making.
- Significant sites are monitored to identify changes over time.
- ESMS programme planning and management is strategic, systematic, and supports cost-effectiveness.
- The ESMS programme is carried out efficiently.
- The ESMS programme is appropriately resourced.

3.3.2 Goal 2: The ESMS programme increases public awareness and protection of marine biodiversity values.

Objectives:

- Information about significant marine sites is effectively communicated to the public.
- The ESMS programme facilitates positive behaviour change of the public to improve biodiversity outcomes.
- Users of the Marlborough CMA are aware of 'rules' relating to significant sites

3.3.3 Goal 3: The ESMS programme is scientifically robust and efficient, and programme data access is easy and appropriate for different users

Objectives:

- The ESMS programme utilises appropriate scientific methods and scientific best practice and knowledge.
- Data collection, analysis, and recording processes are efficient and quality controlled.
- ESMS programme data is safely and effectively stored and managed by MDC and is accessible to external parties.
- Reporting of ESMS programme data is accurate, current, consistent, and easily accessible.
- The ESMS programme makes effective use of existing MDC data and information

3.3.4 Goal 4: The assessment of sites is robust, transparent, efficient, and consistent over time and across the Marlborough CMA

Objectives:

- Application of the significance criteria is robust, transparent, and consistent over time and across the Marlborough CMA.
- Site assessments are informed by up-to-date information on valuable species and habitats in the Marlborough CMA.
- The regulatory status of sites assessed for significance is clearly communicated to the public.

3.3.5 Goal 5: The ESMS programme supports biodiversity objectives and initiatives outside of MDC

Objectives:

- The ESMS programme is aligned with the work of other management agencies in the Marlborough CMA and supports integrated management.
- The ESMS programme supports resource consent applicants in assessing and managing effects of their activity on known or potential significant marine sites.
- The ESMS programme supports biodiversity goals and initiatives of tangata whenua iwi.
- The ESMS programme identifies opportunities for addressing marine biodiversity loss that can be implemented broadly, including by tangata whenua iwi, community groups, NGOs, central and local government, businesses, industry, and individuals.

3.4 5-year priorities

A key priority for MDC staff is to extend the spatial coverage of significance assessments faster than what has been achieved over the past ten years. In other words, there is a strong desire to move faster towards having identified significant sites in the whole Marlborough CMA. To realise this intention, it is essential that already existing marine biodiversity data collected for purposes other than the ESMS programme is utilised for site assessments, that a wider group of experts is involved in the programme (for both surveying and site assessments), and that the programme is run more strategically and efficiently. MDC staff are aware of the challenges these changes pose, particularly in terms of programme robustness and consistency, and want to ensure that the many positive aspects of the current ESMS programme are maintained. In this context, an overall priority for improvements to the ESMS programme is the strengthening of systems and processes that ensure programme robustness and consistency while encouraging and facilitating the intended broadening of marine biodiversity data and information and as well as experts utilised in the programme.

Another priority identified by MDC staff is providing better and broader access to and use of ESMS programme information internally and externally with the aim of encouraging positive behaviour change of people using the Marlborough CMA recreationally and commercially and supporting regulatory decision-making. These advances are essential for achieving improved marine biodiversity protection and supporting effective MEP implementation. Due to these priorities, this review is largely focussed on operational aspects of the ESMS programme.

4   Operational review of the ESMS programme

4.1   Review process and structure of this section

The first step of the ESMS programme review was an evaluation of whether the programme in its current form is fit-for-purpose for achieving the goals and objectives described in section 3.

The detailed findings of the review, structured by programme goals and objectives, are presented in Appendix 3. Appendix 3 identifies many tasks that, if completed, would contribute to improved programme performance. This section focusses on the review findings aligned with the 5-year priorities identified for the programme. The review findings and tasks identified in Appendix 3 but not reflected in this section will provide useful input to any subsequent programme review or other relevant MDC initiatives related to the ESMS programme.

The summary of the programme review presented in this section is structured by ESMS programme components that are graphically illustrated in Figure 2. The ESMS programme components are:

1. Gathering scientific data and information
2. Assessing sites
3. Peer reviewing site assessments
4. Managing data and information
5. Using and communicating ESMS programme information
6. Managing the ESMS programme

In the following sections, the main achievements and challenges of each programme component are described. In addition, aspects of the programme that require modification, additional reviews, or development to meet the goals and objectives of the ESMS programme are identified. The summary of review findings in this section is not complete but captures the key findings of the review under the specified priorities. The detailed review findings and tasks listed in Appendix 3 provide be additional detail and context for the summaries presented in this section.

For each ESMS programme component, a mind map of sub-components and associated features and considerations is presented. Stars in the mind maps identify aspects of the programme that have been identified as challenging and that are addressed in the colour-coded boxes presented in each section.

Figure 2. ESMS programme components (centre circles in dark shading) and sub-components (lighter coloured outer circles) identified for the purpose of this programme review.

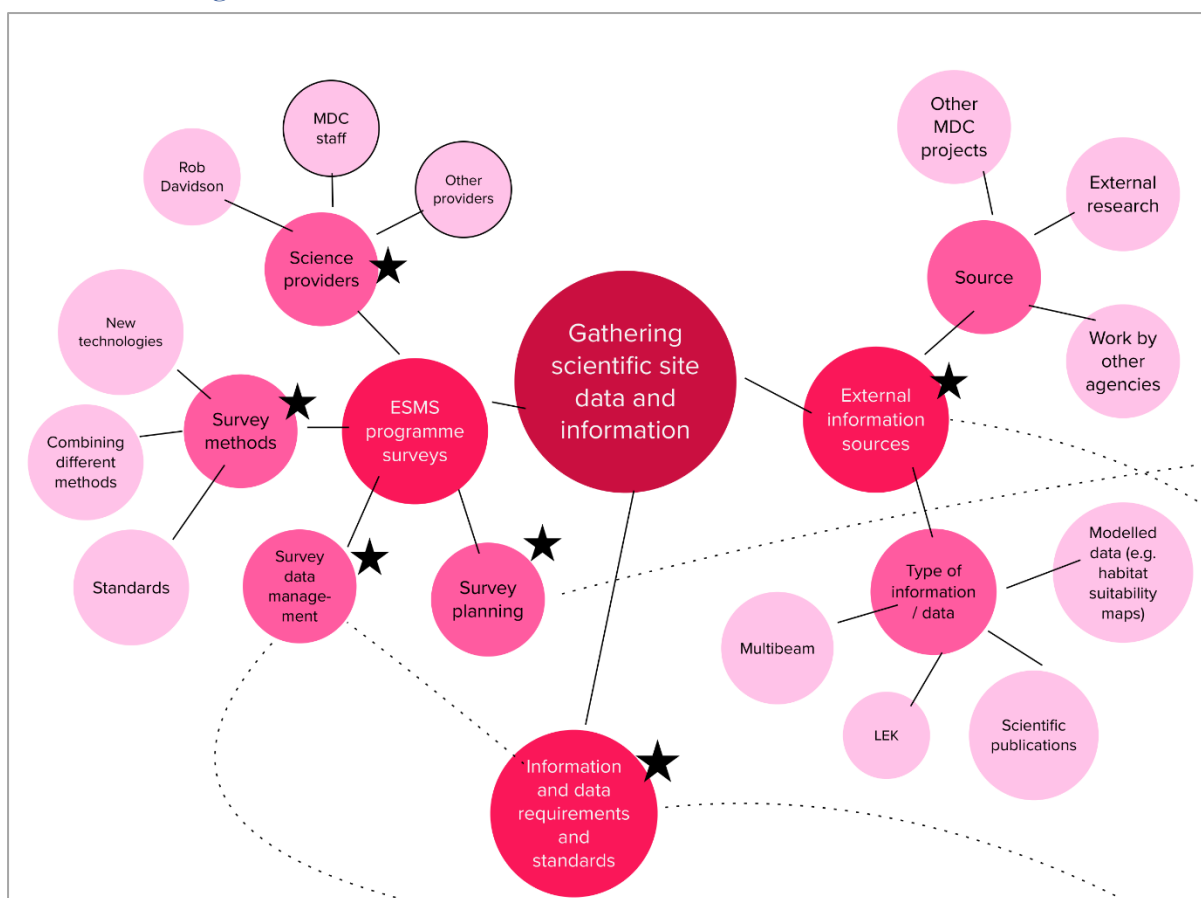## 4.2 Gathering scientific site data and information

Figure 3. Mind map showing ESMS programme review findings for programme component 'Gathering scientific site data and information'. Stars identify aspects of the programme that have been identified as challenging and for which suggestions are provided for achieving programme goals and objectives. Dashed lines indicate connections with other ESMS programme components, which are shown in Figure 2.

The following key achievements have been made within this programme component:

- ESMS programme surveys have been carried out systematically over the past years and have produced valuable data and information that led to the identification of a large number of significant marine sites, many of which are now protected under the PMEP.
- Data to date has been collected in a consistent way.

Challenges under this programme component relate to the reliance on a single provider for programme surveys, and the limited ability to utilise information gathered for other purposes, both by MDC and other providers. Specific challenges and how they could be resolved are outlined in boxes below grouped by related challenges. Challenges related to programme subcomponents 'Survey planning' and 'Survey data management' are addressed under programme components 'Managing the ESMS programme' (Section 4.7) and 'Storing and managing ESMS programme data and information' (Section 4.5), respectively.

ESMS programme surveys

Challenge

ESMS programme surveys have so far been conducted by a single provider using the same methods. This reliance on a single provider is restrictive for making progress on extending the coverage of the Marlborough CMA and the lack of alternatives also creates a general risk for the programme.

Resolution

Enabling MDC staff and other providers to conduct ESMS programme surveys. This will rely on several other challenges being addressed, specifically those related to standardising methods.

Challenge

Survey methods are currently restricted to those available to the single provider. This restricts the ability to utilise other methods that may be most appropriate or efficient for some survey areas, including new technologies that may only be accessible to selected providers.

Resolution

Standardising and documenting methods for ESMS programme surveys, including consideration of how to manage changes in methods over time or among science providers, and how to enable new technologies to be used without losing comparability of data sets.

Information and data requirements and standards

Challenge

A key challenge for other science providers conducting ESMS programme surveys and for utilising external information (that is, information gathered for other purposes, both by MDC and other providers), is the lack of clearly documented information and data requirements and standards.

Resolution

Defining requirements and standards for scientific site data and information for both, ESMS programme surveys and externally sourced information and data.

Challenge

MDC holds a lot of marine biodiversity information that currently cannot be utilised by the ESMS programme. This includes data and information obtained by MDC, for example, SOE monitoring data, and data and information obtained by other experts, for example, multibeam data and modelled habitat suitability maps.

Resolution

Developing processes for identifying suitable and utilising externally (i.e., outside the ESMS programme) sourced information and data to improve the information base for site assessments. This includes the existing multibeam data and modelled habitat suitability maps as well as SOE monitoring data.

4.3   Assessing sites for ecological significance, vulnerability, and recovery potential


Figure 4. Mind map showing ESMS programme review findings for programme component 'Assessing sites'. Stars identify aspects of the programme that have been identified as challenging and for which suggestions are provided for achieving programme goals and objectives. Dashed lines indicate connections with other ESMS programme components, which are shown in Figure 2.

The following key achievements have been made within this programme component

- Site assessments have been carried out annually and systematically over the past years.
- Site assessments informed the PMEP development, including the listing of significant sites in the PMEP and the development of policies and implementation methods aimed at protecting sites.
- The site assessment process has been robust. The robustness was largely a result of having a consistent group of experts conducting the assessments (expert panel) and having consistent scientific information on sites (mainly from programme surveys).

Challenges under this programme component include a lack of available guidance on interpreting the significance criteria, which creates a risk of inconsistent interpretations if assessments are made by others than the current expert panel. Further challenges arise from gaps in processes and linkages with the PMEP related to assessing and documenting changes in site condition and ratings over time, assessing restoration/recovery potential, threats and vulnerability of sites, and general processes for monitoring sites.

**Assessing potential new or existing sites**
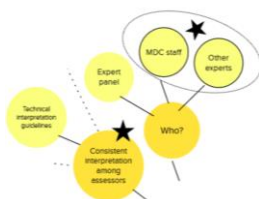
Challenge
Site assessments are restricted to the expert panel. The time and resourcing constraints for the expert panel is restrictive for making progress on extending the coverage of the Marlborough CMA. The reliance on the specific individuals on the expert panel also creates a general risk for the programme, especially as some are nearing retirement. However, broadening the group of assessors creates a risk of inconsistent interpretation of the significance criteria.

Resolution
Standardising and documenting as many aspects of the site assessment process as possible. This should include developing guidance for site assessments comprising a description of the assessment process and guidance for interpreting the significance criteria supported by a collation of important habitats and species and their ecological value, definitions and quantitative description of habitats and species (where possible), as well as descriptors of threats and sensitivities that can be used consistently.
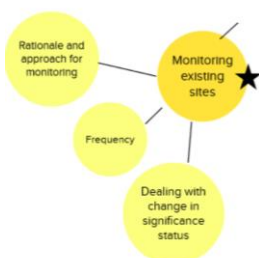
Challenge
Monitoring significant sites and assessing change in site condition (ecological condition and significance) over time has so far been a low priority as the focus of the programme has been largely on identifying new sites. However, systematic monitoring will become more important over time. Currently, subsequent assessments of the same site are discrete events and there is no clear assessment or recording of trends over time.

Resolution
Develop a monitoring plan that includes clear criteria for determining the frequency of monitoring individual sites and monitoring surveys requirements.

Challenge

Site assessments do not specifically assess change over time in site condition (beyond change in size) and site categories/ratings do not reflect the history of site assessments (for monitored sites), e.g., whether a site is deteriorating or recovering. This creates a challenge for implementing the PMEP, including Policy 8.2.9 ('Where monitoring of ecosystems, habitats and areas with significant indigenous biodiversity value shows that there is a loss of or deterioration in condition of these sites, then the Marlborough District Council will review the approach to protection').

Resolution

Refine site categories/ratings to reflect the history of site assessments, including trends over time, such as whether a site is deteriorating or recovering.
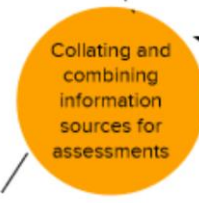
Challenge

The significance criteria used in past assessments have undergone minor revisions over time and the most recent criteria are slig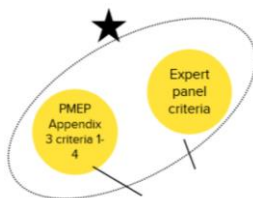htly different from the criteria in the PMEP. The expert panel took great care not to create inconsistencies between site assessments but recognised in 2017 that some sites assessed as significant in 2011 require future reassessment using the revised criteria to ensure a consistent approach is adopted (Davidson et al., 2017b). It is unclear at this point whether there will be a need to review past site assessments in light of the final significance criteria in the operative MEP.

Resolution

Once the MEP is operative seek advice from the expert panel on whether site assessments under the MEP criteria will be consistent with past assessments. If not, seek their advice on what steps to take to ensure consistency, especially for the monitoring of significant sites.

Collating and combining information sources for assessments

Challenge

Site assessments are largely based on information obtained through targeted programme surveys that following consistent methods. There is no clear and documented process for site assessment utilising different information. This restricts the ability to assess areas covered by existing biodiversity information held by MDC for potential significant sites.

Resolution

Evaluate the utilisation of existing data for site assessments, including SOE monitoring programme data, multibeam data, and modelled habitat suitability maps, and develop procedures for assessing the suitability and utilising externally sourced data and information in site assessments.

Assessing restoration/recovery potential of sites
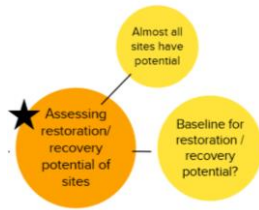
Challenge

There is no clear process for assessing the restoration/recovery potential of sites that are not currently significant and how that would feed into MDC work programmes. This gap impedes the implementation of PMEP Policy 8.2.10 ('Promote the maintenance, enhancement or restoration of ecosystems, habitats and areas of indigenous biodiversity even where these are not identified as significant in terms of the criteria in Policy 8.1.1 but are important for [list of factors]').

Resolution

Develop processes for assessing the restoration/recovery potential of sites, focussing on supporting implementation of PMEP Policy 8.2.10.

Assessing threats to and vulnerability of sites

Challenge

Assessment of threats to and vulnerability of sites is broad, and it is currently not easy for users of the programme information to find this assessment information. For example, it is challenging for consent staff to assess what impact a proposed activity may have on a significant site, especially for stressors other than physical sediment disturbance.

Resolution

Develop a systematic assessment of site vulnerabilities and threats that aligns with policies referring to specific threats (e.g., 8.3.4 and 8.3.8) and add these aspects to the public site information (e.g., SmartMaps overlay).

Application of criteria by others
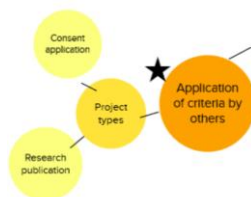
Challenge

No guidance is available for the application of the significance criteria by external parties, e.g., by resource consent applicants. This is resulting in uncertainty and potential inconsistent applications. This also poses a challenge for the achievement of anticipated environmental result 8.AER.5, which sets an expectation that the criteria will be used "to identify ecosystems, habitats or areas present with significant indigenous biodiversity value through resource consent applications or where future survey work may be undertaken".

Resolution

Develop guidance for the application of significance criteria by resource consent applicants or other external parties.

4.4   Peer review of site assessment
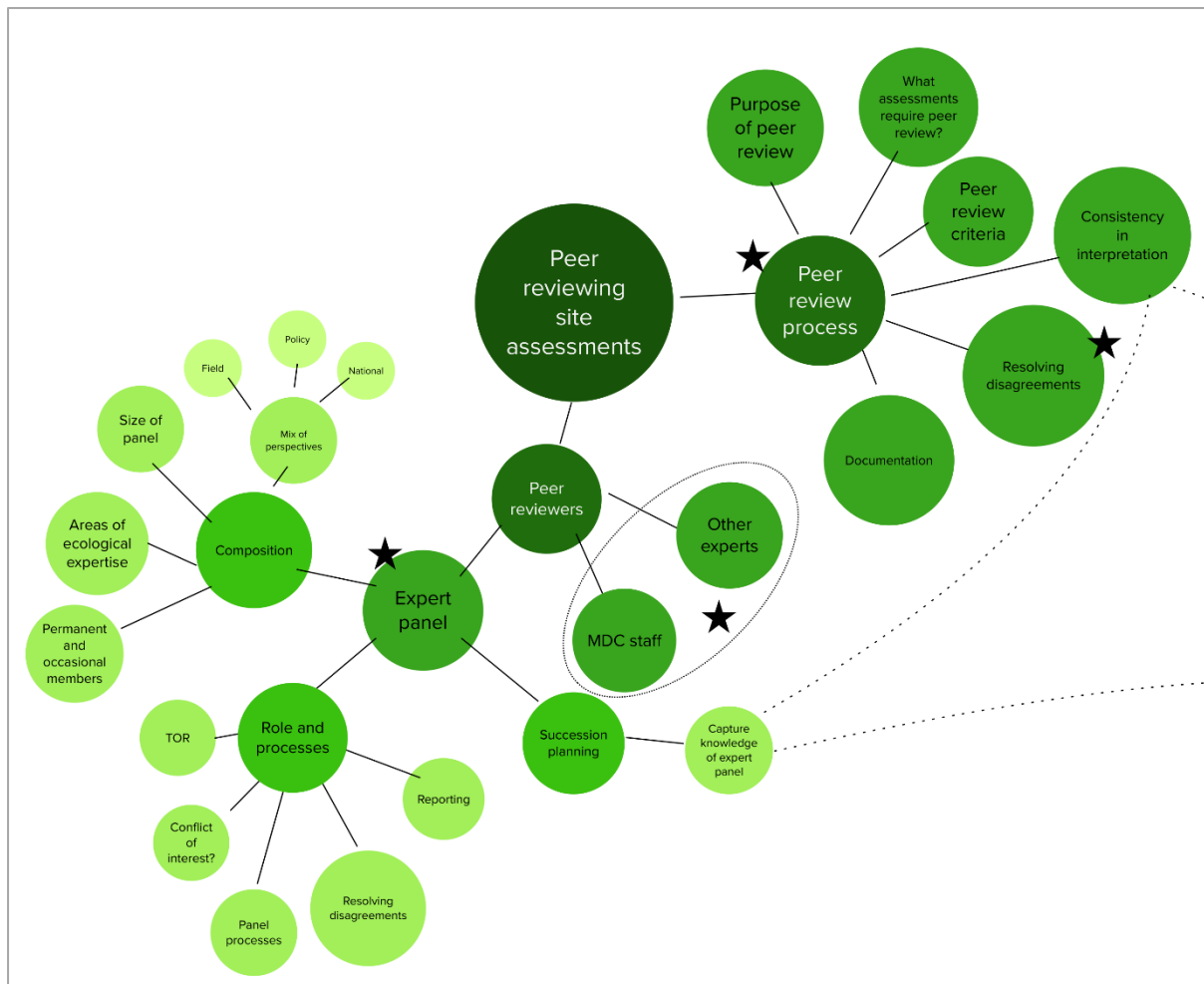
Figure 5. Mind map showing ESMS programme review findings for programme component 'Peer review of site assessment'. Stars identify aspects of the programme that have been identified as challenging and for which suggestions are provided for achieving programme goals and objectives. Dashed lines indicate connections with other ESMS programme components, which are shown in Figure 2.

The following key achievements have been made within this programme component

* All site assessments have been performed by the expert panel whose consensus-focussed approach reflects a type of peer review.

Challenges under this programme component include a lack of available guidance on peer review of site assessments, which creates a risk of inconsistent review processes if peer reviews are carried out by others than the current expert panel. Considering the intent of MDC to increase the number of site assessments and range of experts and information sources informing assessments, as well as the intended development of standards and guidance for several aspects of the ESMS programme, it is anticipated that not all assessments require peer review in the process. However, this may create a risk for the actual or perceived robustness of the site assessment process.

Peer reviewers
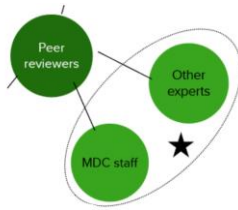
Challenge

Currently only the expert panel perform peer reviews. This is restrictive for making progress on extending the coverage of the Marlborough CMA and, considering the planned development of guidance related to the site assessment process, not considered necessary. To add capacity and provide for more streamlined peer review of assessments, it is intended that MDC staff and other experts will be able to carry out peer reviews. However, broadening the group of peer reviewers may risk inconsistent reviews.

Resolution

Standardising and documenting the peer review process, including developing guidance for determining who can carry out the peer review. This should include consideration of the complexity of the site assessment, qualifications and experience of peer reviewers and available resources. If possible, MDC staff should be the first to be considered for peer review as this is likely the most cost-effective solution and has the added benefit of developing institutional knowledge about significant sites. The feasibility of this approach will depend on the development of guidance and supporting technical information described under other programme components.
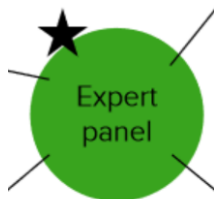

Challenge

There are currently no terms of reference or other documents that describe the expert panel composition and processes, and there has been no succession planning for the event that panel members leave. There has been very little change to the expert panel composition since the beginning of the ESMS programme, resulting in a stable and effective panel. However, it is anticipated that there will be change over the coming five years due to retirement. This poses a risk of losing critical expertise and it may be difficult to recruit and introduce new members to the panel.

Resolution

Develop terms of reference for the expert panel to clarify and document roles and processes and composition of the panel. Carry out succession planning with the current expert panel.

Peer review process

Challenge

The documentation of the peer review process has not been a priority to date as the process was restricted to the expert panel. However, broadening the group of peer reviewers and utilising a broader range of information sources will likely require a more systematic peer review process as there is otherwise a risk of inconsistent peer review processes.

Resolution

Standardising and documenting as many aspects of the peer review process as possible. This should include developing guidance for determining whether peer review is needed, criteria for peer review, and documenting peer review findings.

Challenge

The peer review process is currently based on consensus. To date there have not been any disagreements between assessors and peer reviewers (noting that assessments and peer reviews have been carried out by the expert panel); however, it is likely that disagreement will arise at some point. Considering the importance of the peer review process, a clear process for resolving disagreements is required.

Resolution

Develop and document a process for resolving disagreements.

4.5 Storing and managing ESMS programme data and information

The following key achievements have been made within this programme component:

- Significant sites are mapped in MDC SmartMaps providing clear information on their location.
- Excel templates are used to record site assessments.
- All site survey data and assessment information is submitted to MDC for storage.

A core challenge is the lack of a database for storing and managing ESMS programme data (survey data and site assessment information). The lack of secure and systematic recording of site and assessment information in one place poses a risk for quality assurance and hinders the effective use of programme information within and outside of MDC.

Figure 6. Mind map showing ESMS programme review findings for programme component 'Storing and managing data and information'. Stars identify aspects of the programme that have been identified as challenging and for which suggestions are provided for achieving programme goals and objectives. Dashed lines indicate connections with other ESMS programme components, which are shown in Figure 2.

Processes for data qality assurance and management by MDC

Challenge

Survey and assessment results are recorded in spreadsheets and other files created by those carrying out surveys and assessing sites. There are only limited standards or guidelines for data formats or quality assurance processes, which creates a risk of data inconsistency and quality issues, particularly with the planned broadening of experts carrying out surveys and assessing sites.

Resolution

Develop procedures for data quality assurance and management, including:
- Data management associated with programme surveys and site assessments
- Data transfer to MDC for data collected by external providers
- Data upload to MDC data storage and management system
- Quality control of data in MDC data storage and management system

Systems and sytem requirements
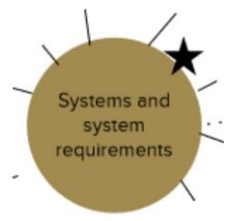
Challenge

The lack of secure and systematic recording of site and assessment information in a fit-for-purpose database poses a risk for quality assurance and hinders the effective use of programme information within and outside of MDC.

Resolution

Develop and implement data storage and management system(s), including:
- A data management system for ecological data gathered in programme surveys or obtained from other sources. It may be possible to store ESMS programme data in the planned biodiversity database, but care needs to be taken to ensure that the development project considers the needs of the ESMS programme.
- Database for marine site information (including site status, assessment information, changes over time).

The system(s) should support streamlining general programme reporting processes, including web-based information and technical reports. Transferring existing site and assessment information into a new database will be challenging and will require adequate resourcing.

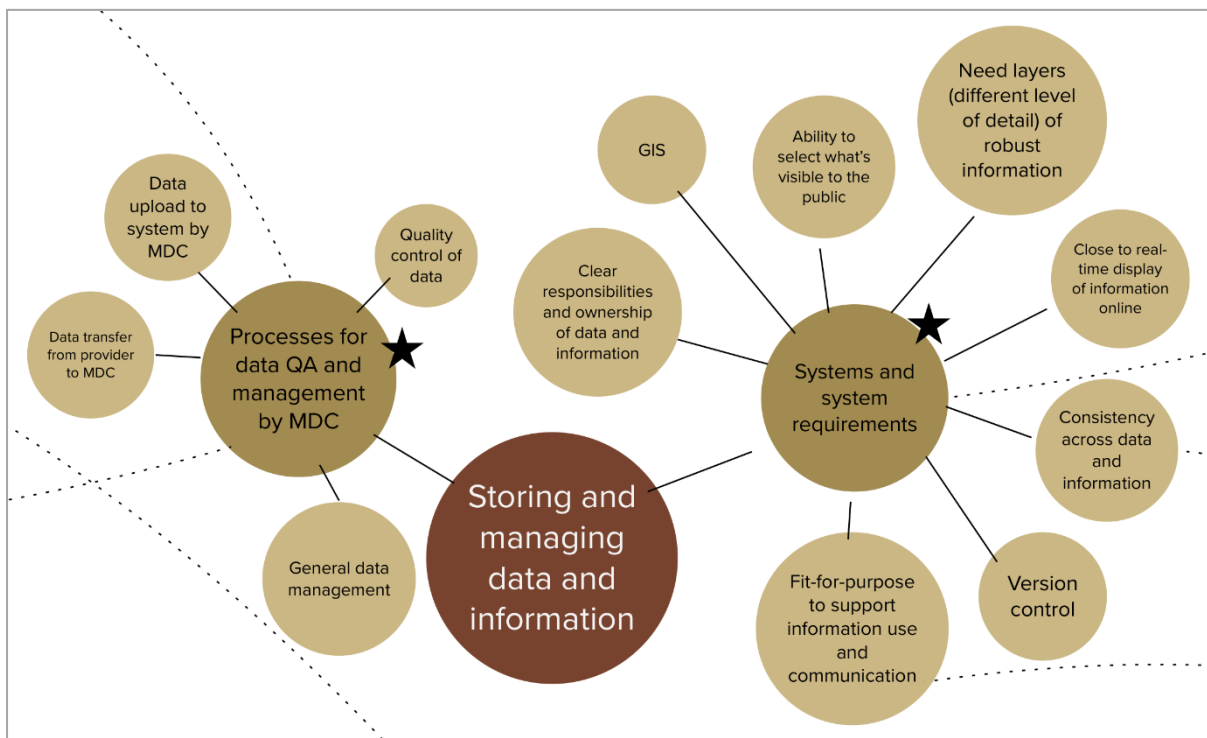## 4.6   Using and communicating ESMS programme information
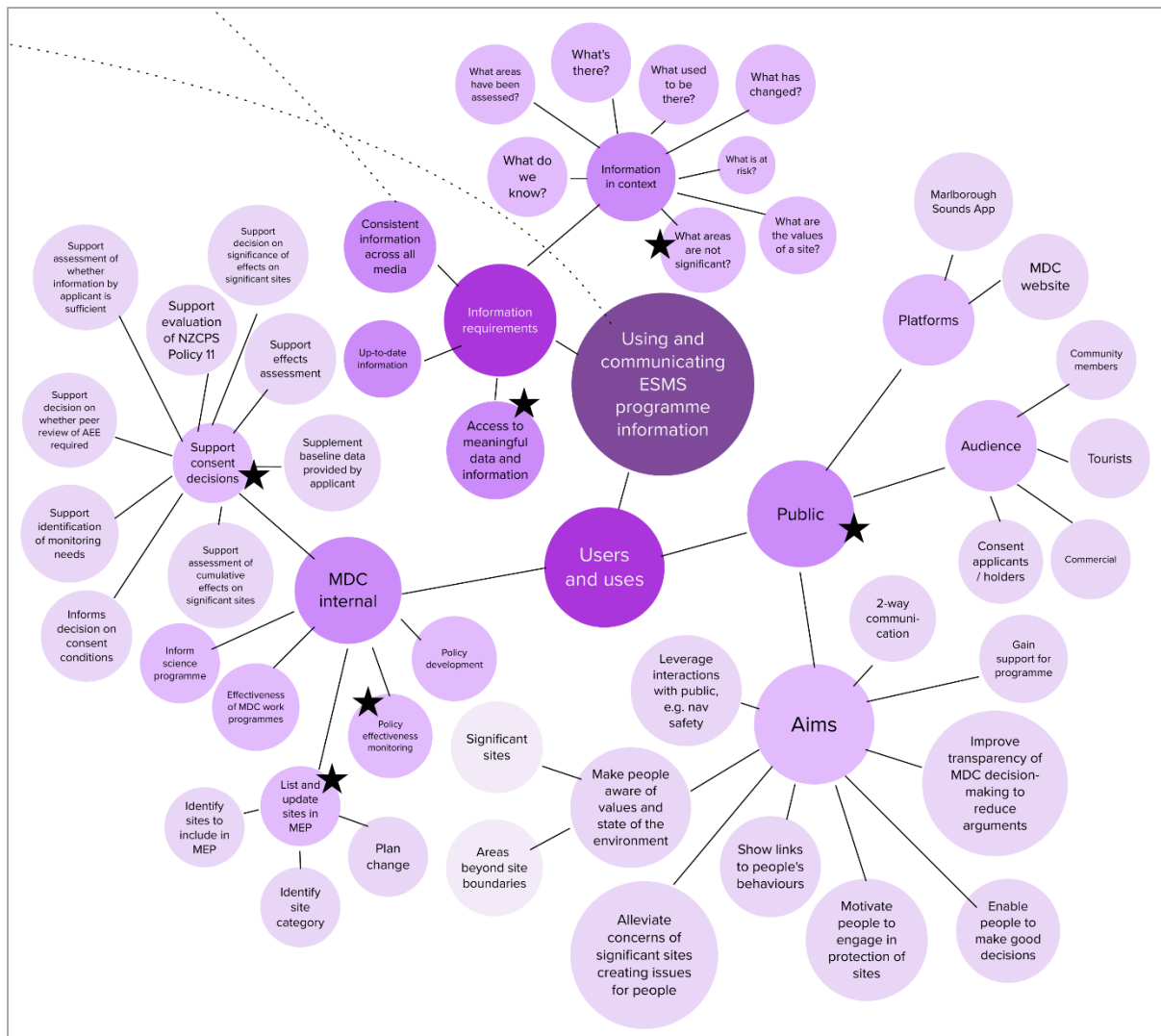
Figure 7. Mind map showing ESMS programme review findings for programme component 'Using and communicating ESMS programme information'. Stars identify aspects of the programme that have been identified as challenging and for which suggestions are provided for achieving programme goals and objectives. Dashed lines indicate connections with other ESMS programme components, which are shown in Figure 2. This mind map is reproduced in Appendix 4 to show all elements

The following key achievements have been made within this programme component:

- Significant sites are mapped in MDC SmartMaps, providing easy public access to information on site location and category.
- The 2011 ESMS programme report (Davidson et al., 2011) provides comprehensive information about important species and habitats and sites identified during this initial assessment.
- Subsequent technical survey and expert panel reports provide updated information on programme processes, site surveys and assessments.
- The ESMS programme has a high profile in the PMEP and is a cornerstone of policies aimed at protecting marine biodiversity in the Marlborough CMA.

A core challenge is access to meaningful information and data for internal and external users, which is resulting from the lack of a fit-for-purpose database, limited information provided in Smartmaps and the technical nature of programme reports. This is creating particular difficulties for internal users, such as consent staff, for whom programme information is of high value. External users would benefit from more information on the web-based SmartMaps portal, such as information on ecological values, applicable rules, and other information of interest, and less technical reports. Opportunities for raising public awareness of the ESMS programme are currently not leveraged with most programme information only accessible via the MDC website.

Once the PMEP is operative, work will be required to ensure significant site information is kept up-to-date and alignment between the information collected and specific requirements in PMEP policies to support policy effectiveness monitoring. Furthermore, information about sites that have been assessed as not being significant should be made available as this is valuable information for both internal and external users.

Users and uses

Challenge

Policy effectiveness monitoring requires accurate and targeted information on significant marine sites. The exact information needs and associated data collection, analysis, and reporting processes have not yet been developed. It is likely that this will require the development of some targeted measures and improved linkages between information currently recorded on significant sites (and sites assessed but not found to be significant) and the wording of policies in the MEP.

Resolution

Clarify, develop, and document indicators, processes and procedures required to measure the effectiveness of policies and implementation methods relating to the ESMS programme, including measuring progress on relevant anticipated environmental results.

Challenge

The PMEP provides an initial list of significant marine sites that will need to be kept up-to-date. Balancing the desire to maintain the MEP up-to-date with the requirements and associated resourcing of a variation or plan change will be a challenge. A further challenge will be appropriately managing and reflecting in the MEP significant sites that do not meet the significance criteria in a subsequent assessment.

Resolution

Clarify, develop, and document processes and procedures for updating significant marine sites in the MEP. Propose refinements to the significance categories/ratings so that a deteriorated site can maintain its significance status if it has an opportunity to recover.

Challenge

It is currently difficult for consent staff, finding out what information exists for a location they are interested in and accessing up-to-date information.

Resolution

Review the accessibility and utility of significant marine site information for MDC staff involved in resource consenting processes with the aim to improve support for effective decision-making. There is also an opportunity to identify linkages between the significant marine site assessment and NZCPS Policy 11 evaluation
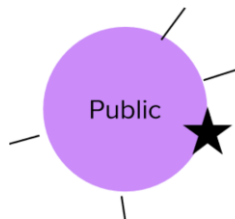
Challenge

Information available to the public is generally limited to the web-based SmartMaps portal (which provides information on significant site location and category only) and technical reports. Technical reports are highly technical and not suitable for a public audience.

Resolution

Add more information of public interest to SmartMaps. Prepare regular (~5-yearly) state of the environment-type reports on the ESMS programme, including significant marine site information and trends over time. There are opportunities for raising public awareness of the ESMS programme and for encouraging positive behaviour change. For example, the Cruise Guide for Marlborough[6] could be extended to provide information on significant sites and display the consequences of different actions on the marine environment (e.g., anchoring in different locations) in a visually appealing way.

Information requirements

Challenge

ESMS programme information is saved in different places and formats with limited standardisation and a reliance on spreadsheets and technical reports, and individuals knowing what information exists and how to find it. Information. Access to meaningful data and information is difficult for internal users and much of the programme information is not accessible for external users.

Resolution

In addition to the improvements for data and information storage and management described under another programme component, extend the significant marine sites overlay in SmartMaps to show the specific values of sites, site assessment history, rules related to the site, and other information of value to internal and external users. Develop processes, including automation, to ensure information in SmartMaps is as up-to-date as possible. Providing access to meaningful data and information likely requires engagement with potential users to clarify their needs.

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[6] https://www.marlborough.govt.nz/services/apps/cruise-guide

Challenge

Information about sites that have been surveyed and assessed but found not to be significant (including scientific information gathered during programme surveys and rating information) is currently not accessible.

Resolution

While the priority of the ESMS programme will always be information about sites that are significant, information on areas that have been surveyed and assessed but found to not be significant is also valuable for many users, for example resource consent applicants. Furthermore, it is generally important to distinguish these sites from sites that have never been assessed and are potentially significant. The site categories/ratings should be expanded to identify sites that have been assessed but are not significant.

4.7 Managing the ESMS programme

Figure 8. Mind map showing ESMS programme review findings for programme component 'Managing the ESMS programme'. Stars identify aspects of the programme that have been identified as challenging and for which suggestions are provided for achieving programme goals and objectives. Dashed lines indicate connections with other ESMS programme components, which are shown in Figure 2.

The following key achievements have been made within this programme component:

- The ESMS programme has been operated consistently over the past ten years.
- This review of the ESMS programme is carried out at the scheduled time.
- Improvements to various aspects of the ESMS programme have been made over time while largely maintaining consistency of ESMS programme processes and information.
- Resourcing has been appropriate for the methods used to date.

Going forward additional resources will be required to fund actions identified in this review, particularly the one-off investments into data storage and management system(s) and the set-up of workflows and development of guidance for programme components. Ongoing funding is expected to be less challenging because the planned improvements in systems and processes should result in more efficient operations of the ESMS programme.

A further challenge may be the availability of MDC staff from across the organisation to work on aligning the programme across MDC to optimise its value throughout the organisation, and participation in subsequent programme reviews and performance assessments. Once the PMEP is operational, policy staff are expected to take on an important role in the ESMS programme management due to the high status of the programme in the PMEP and its close linkage with wider marine biodiversity policy objectives.

Operational guidance

Operational guidance

Challenge
As described under several programme components, there is a need for developing processes, procedures, and associated guidance for several aspects of the ESMS programme.

Resolution
Wherever possible, processes and procedures for internal use should be formatted as workflows that are accessible online (instead of static documents), with links to templates and other relevant documents, so that they can be centrally managed and kept up-to-date. Guidance to be used externally may need to be formatted as stand-alone documents. These documents need to be carefully managed to ensure they are updated with strict version control and accessible from the MDC website.

Strategic direction of programme

Vertical and horizontal alignment within MDC
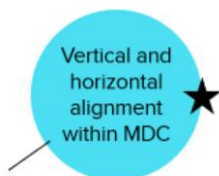
Challenge
Up to this point the ESMS programme has been mostly managed by the MDC science team. Once the PMEP is operational, policy staff are expected to take on a larger role in programme management due to the high status of the programme in the PMEP and its close linkage with wider marine biodiversity policy objectives. In addition, to optimise the value of the programme, staff from across MDC will need to contribute to the alignment of the programme across MDC. The availability of MDC staff for this next phase of the programme may be a challenge.

Resolution
Identify what level of input is required from MDC staff outside the science team to implement the actions identified in this review.

Resourcing

Challenge

Additional resourcing is required to fund actions identified in this review, particularly the one-off investments into data storage and management system(s) and the set-up of workflows and development of guidance for programme components. Ongoing funding is expected to be less challenging because the planned improvements in systems and processes should result in more efficient operations of the ESMS programme.

Resolution

Identify resourcing requirements for the actions identified in this review, including capital and operational costs and staff time.

Programme planning

Challenge

To complete the actions and achieve the KPI identified in this review, strategic 5-year and annual planning will be required. This needs to include strategic aspects of the programme, including the actions identified in this review, as well as planning for scientific survey and site assessments.

Resolution

Create a timeline for the actions identified in this review and scientific surveys and site assessments intended to be carried out over this time. Develop a 5-year action plan and annual plans. Allow for flexibility to take up opportunities that may arise, both in terms of operational actions and surveys or site assessments.

5 5-year actions and KPI for transitioning towards a fit-for-purpose ESMS programme

5.1 Actions for implementing the findings of this review

Based on the findings of this review presented in the previous section and general programme priorities, the following implementation actions have been identified. Completing the actions listed in this section will achieve most (if not all) of the resolutions identified in the previous section.

1. **Facilitate the utilisation of existing data on marine biodiversity and newly acquired data outside the ESMS programme** (by MDC or external providers) in site assessments. Specifically, evaluate the utilisation of:
   a. SOE monitoring programme data;
   b. Multibeam data; and
   c. Modelled habitat suitability maps.

2. **Engage with tangata whenua/ iwi to develop meaningful involvement in the ESMS programme.** Specifically, explore with tangata whenua/ iwi the ways in which they would like to be involved in the ESMS programme.

3. **Develop and implement ESMS programme standards, processes, procedures, and guidance** as follows:

    a. Scientific standards and guidelines for ESMS programme surveys.

    b. Procedures for assessing the suitability and utilising externally sourced data and information in site assessments.

    c. Procedures for data quality assurance and management, including:

        i. Data management associated with programme surveys and site assessments;

        ii. Data transfer to MDC for data collected by external providers;

        iii. Data upload to MDC data storage and management system; and

        iv. Quality control of data in MDC data storage and management system.

    d. Guidelines for assessing sites, including applying significance criteria, peer review, and data and information management.

4. **Develop and implement data storage and management system(s)**, including:

    a. A data management system for ecological data gathered in programme surveys or obtained from other sources. ESMS programme data may be saved in the currently planned biodiversity database, but care needs to be taken to ensure that the development project considers the needs of the ESMS programme.

    b. Database for marine site information (including site status, assessment information, changes over time).

    c. Streamlining general programme reporting processes, including web-based information and technical reports.

    d. Exploring whether it is possible to enable the public to submit information to the MDC database.

    All programme databases should have an MDC SmartMaps or other web-based interface.

5. **Develop and implement a monitoring plan for significant marine sites**

6. **Refine site categories/ratings used in the data management system and public information** to reflect site survey, scientific assessment, and regulatory status as required. Each location in the Marlborough CMA should be rated through a system that identifies:

    a. Whether the location has been scientifically assessed (i.e., whether ecological site information has been assessed against the significance criteria), including the peer review status. For example, ratings could be: 'no rating (not surveyed)', 'no rating (surveyed but not yet assessed)', 'potentially significant (peer review pending)', 'potentially not significant (peer review pending)', 'significant (peer reviewed)', 'not significant (peer reviewed)', 'potentially significant (insufficient information)[7].

    b. If a site has been assessed as significant, the significance category, i.e., A-C.

    c. If a site has been scientifically assessed as significant, information on its regulatory status, e.g., 'listed in MEP', 'awaiting plan variation'.

    d. The site assessment history, including whether the site is deteriorating or recovering.

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[7] A site may be potentially significant if there are indications that it is significant, but data did not meet the required standards for a robust site assessment. This may be the case if modelled data was used to inform the assessment.

7. **Clarify, develop, and document indicators, processes and procedures supporting MEP implementation**, including those related to:

    a. Updating significant marine sites in the MEP.

    b. Evaluating effectiveness of policies and implementation methods relating to the ESMS programme, including measuring progress on relevant anticipated environmental results.

8. **Review the accessibility and utility of significant marine site information for MDC staff involved in resource consenting processes** with the aim to improve support for effective decision-making, including identifying linkages between the significant marine site assessment and NZCPS Policy 11 evaluation.

9. **Collate, create, and report information on marine biodiversity and guidance on interpreting the MEP significance criteria** relevant for site assessments, peer review, and raising public understanding and awareness, including:

    a. Important habitats and species and their ecological value.

    b. List of threats (natural and anthropogenic stressors)/sensitivity assessment, including how significant sites may be affected by the threat and how that can be assessed and managed.

    c. Definitions and quantitative description of habitats and species that are aligned to significance criteria descriptors and are to be used in survey data analysis and site assessments (e.g., quantitative descriptors of horse mussel beds).

    d. Guidance for the interpretation of the MEP significance criteria to be used in site assessments and peer review.

    e. Guidance for consent applicants on how to use the significance criteria in resource consent applications.

10. **Improve public information and communication** on the ESMS programme, including:

    a. Extending the significant marine sites overlay in SmartMaps to show the specific values of sites, site vulnerabilities, existing threats, site assessment history, rules related to the site, and other relevant information.

    b. Preparing approximately 5-yearly SOE-type reports on ESMS programme progress and site information.

    c. Exploring options for raising public awareness of marine biodiversity and protection needs, trying where possible to leverage what's already being done, e.g., MDC SmartMaps, Marlborough Sounds App.

    d. Identifying options for effectively communicating information on rules for significant sites to users of the Marlborough CMA.

11. **Undertake operational planning for the next 5 years**, including:

    a. Identify resourcing requirements for the actions identified in this review, including capital and operational cost and staff time.

    b. Create a timeline for the actions identified in this review.

    c. Set up a process for annual planning and review of progress on the 5-year action plan.

12. **Develop processes for assessing the restoration and recovery potential of sites**

    a. Develop approaches for identifying recovery and restoration opportunities, taking into consideration the timeframe for recovery based on different protection and intervention mechanisms.

b. Identify recovery opportunities for degraded significant marine sites.

c. Identify areas that are not significant marine sites but have a potential to be restored to ecological significance.

d. Develop recovery and restoration approaches.

e. Work with tangata whenua/ iwi, local communities, and others on restoration efforts.

5.2 Five-year key performance indicators (KPI)

In line with the priorities identified for the next five years, the following key performance indicators (KPI) have been developed for the 5-year period starting with the publication of this report:

1. Parts of the CMA covered by existing multibeam data are assessed and peer reviewed by June 2026.

2. All other existing data on marine indigenous biodiversity (excluding data collected in relation to resource consents) is considered for significance assessment and, if appropriate, assessed and peer reviewed by June 2024.

3. All newly acquired data (by MDC or external providers) is considered for significance assessment and, if appropriate, assessed and peer reviewed within one year of receipt by MDC.

4. A significant marine site monitoring plan is set up by June 2024.

5. All ESMS programme data is stored in an MDC data management system and up-to-date site information is presented in MDC SmartMaps or an alternative web-based portal by June 2023.

6. A report on the state and trends of significant marine sites and programme progress is prepared by December 2026.

7. Tangata whenua/ iwi are meaningfully involved in the ESMS programme.

8. All assessed sites go through a plan variation within 24 months of completion of assessment peer review.

9. MEP implementation and effectiveness monitoring related to significant marine sites is established within 12 months of the MEP becoming operative.

It is recommended that another full review of the ESMS programme is carried out after five years to assess achievement of these KPI and, if necessary, re-evaluate priorities and actions. Future reviews may incorporate some of the improvement tasks identified in this review that are not priorities at this point and are therefore not covered under the actions and KPI identified in this section.

6   Conclusion

This report provides an operational pathway for the ESMS programme over the next five years. The ESMS programme vision is that significant marine biodiversity in the Marlborough CMA is protected. By completing the actions and achieving the KPI identified in this report over the next five years, the ESMS programme will be fit for purpose and much closer to achieving this vision.

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Appendix 1: Statutory and regulatory context of the ESMS programme

Resource Management Act 1991 (RMA)

The Resource Management Act 1991 (RMA) requires local authorities to monitor the state of the whole or any part of the environment (s35(2)(a)). MDC has specific management responsibilities over regional coastal waters and habitats which lie within New Zealand's territorial seas between the mean high water spring tide mark (MHWS) out to 12 nautical miles offshore, the CMA. These responsibilities include recognising and providing for the matters of national importance listed in Section 6 of the RMA. Of particular relevance to the ESMS programme is the responsibility to provide for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna (Section 6(c)). Furthermore, a variety of other obligations exist in relation to managing indigenous biodiversity (s30(1)(ga)).

New Zealand Coastal Policy Statement 2010 (NZCPS)

The New Zealand Coastal Policy Statement 2010 (NZCPS) contains several objectives and policies relating to indigenous biodiversity within the coastal environment. While several objectives are not directly relevant to the ESMS programme, they contribute to the wider context in which the programme should be considered.

Objective 1 of the NZCPS seeks to safeguard the integrity, form, functioning, and resilience of the coastal environment and sustain its ecosystems through various means, including by protecting representative or significant natural ecosystems and sites of biological importance and maintaining the diversity of New Zealand's indigenous coastal flora and fauna.

Objective 6 of the NZCPS seeks to enable people and communities to provide for their social, economic, cultural wellbeing and their health and safety, through subdivision, use, and development, while recognising that (among other factors):

- the protection of the values of the coastal environment does not preclude use and development in appropriate places and forms, and within appropriate limits;
- the protection of habitats of living marine resources contributes to the social, economic and cultural wellbeing of people and communities;
- the potential to protect, use, and develop natural and physical resources in the coastal marine area should not be compromised by activities on land; and
- the proportion of the coastal marine area under any formal protection is small and therefore management under the Act is an important means by which the natural resources of the coastal marine area can be protected.

Policy 4 of the NZCPS provides for the integrated management of natural and physical resources in the coastal environment, and activities that affect the coastal environment, identifying that this requires (among other factors):

- co-ordinated management or control of activities within the coastal environment, and which could cross administrative boundaries;
- working collaboratively with other bodies and agencies with responsibilities and functions relevant to resource management; and
- particular consideration of situations where effects may cross the line of mean high water springs; activities may affect water quality and marine ecosystems through increasing sedimentation; or significant adverse cumulative effects are occurring, or can be anticipated.

Policy 6 of the NZCPS stipulates requirements for managing activities, including the need to:

- where appropriate in the coastal environment, buffer areas and sites of significant indigenous biological diversity, or historic heritage value; and
- recognise that there are activities that have a functional need to be located in the coastal marine area, and provide for those activities in appropriate places.

Policy 11 aims to protect indigenous biological diversity in the coastal environment. The policy approach has three levels.[8] The highest level requires that adverse effects of activities on indigenous ecosystems and vegetation types that are threatened in the coastal environment and on the habitats of indigenous species that are at the limit of their natural range be avoided (NZCPS Policy 11(a)). The next level requires that significant adverse effects of activities on other defined categories of indigenous vegetation, habitats and ecosystems be avoided (NZCPS Policy 11(b)). The third level states that where those adverse effects are not significant, all other adverse effects of activities on indigenous biodiversity should be avoided, remedied or mitigated (NZCPS Policy 11(b)).

Policy 13 of the NZCPS clarifies that natural character may include matters such as natural elements, processes and patterns, and biophysical and ecological aspects, illustrating the link between natural character and the ESMS programme. This is further emphasised in Policy 14 of the NZCPS, which promotes the restoration or rehabilitation of the natural character of the coastal environment. Policy 14 provides example approaches for restoring or rehabilitating degraded areas of the coastal environment, including restoring indigenous habitats and ecosystems, encouraging natural regeneration of indigenous species, and creating or enhancing habitat for indigenous species.

Policy 20 of the NZCPS provides for the control of vehicle use apart from emergency vehicles, on beaches, foreshore, seabed and adjacent public land where this may result in harm to ecological systems or to indigenous flora and fauna, for example marine mammal and bird habitats or breeding areas and shellfish beds.

Policy 21 of the NZCPS stipulates that where the quality of water in the coastal environment has deteriorated so that it is having a significant adverse effect on ecosystems or natural habitats (as well as specific activities or uses not relevant to the ESMS programme) priority is to be given to improving that quality through a sequence of steps that include, where practicable, restoring water quality to at least a state that can support ecosystems and natural habitats.

Policy 23 of the NZCPS sets requirements for the management of discharges of contaminants to the coastal environment and directs that particular regard shall be had to the sensitivity of the receiving environment and the capacity of the receiving environment to assimilate the contaminants.

Te Mana o te Taiao - Aotearoa New Zealand Biodiversity Strategy 2020

Additional context is provided through the objectives of Te Mana o te Taiao - Aotearoa New Zealand Biodiversity Strategy 2020. These include halting the decline in New Zealand's indigenous biodiversity, maintaining and restoring a full range of remaining natural habitats and ecosystems to a healthy functioning state, enhancing critically scarce habitats, and sustaining the more modified ecosystems in production and urban environments. Further councils should do what is necessary to protect a full range of natural marine habitats and ecosystems to effectively conserve marine biodiversity.

Te Mana o te Taiao also emphasises that actions to address biodiversity loss need to involve everyone in the biodiversity system – whānau, hapū, iwi, Māori organisations, NGOs, central and local

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[8] https://www.doc.govt.nz/globalassets/documents/conservation/marine-and-coastal/coastal-management/guidance/policy-11.pdf

government, businesses, organisations, industry, and every individual – and that implementation will need to be at national, regional, and local level with people working alongside each other to actively manage threats to nature and taking proactive and positive measures to protect and restore nature.

Te Mana o te Taiao - Aotearoa New Zealand Biodiversity Strategy Implementation Plan 2022

The Te Mana o te Taiao - Aotearoa New Zealand Biodiversity Strategy Implementation Plan 2022 has a specific action for Marlborough, the 'development of a significant natural area framework for the marine environment in the Marlborough Sounds.' The ESMS programme is an integral part of achieving this action

Proposed Marlborough Environment Plan (PMEP)

Background

MDC has reviewed the Marlborough Regional Policy Statement, the Marlborough Sounds Resource Management Plan and the Wairau/Awatere Resource Management Plan to create a single resource management document for the district. The Proposed Marlborough Environment Plan (PMEP) sets out what people can do on their land and how it may be developed. It also guides how individuals, businesses and the wider community may use public resources such as fresh water and coastal space. At the time of preparation of this report, several of the provisions providing the regulatory framework for the ESMS programme were under appeal.

Volume 1, Chapter 8 of the PMEP (Indigenous Biodiversity) sets out the issue, objectives, policies, methods to be used, and the anticipated environmental results in recognising and providing for the protection of areas of significant indigenous vegetation and significant habitats of indigenous fauna as well as the wider indigenous biodiversity objectives of MDC. Appendix 3 of the PMEP presents the ecological significance criteria and Appendix 27 of the PMEP lists significant marine sites.

Issues relating to indigenous biodiversity in the Marlborough marine environment

Issue 8A of the PMEP identifies that there has been a reduction in the extent and condition of indigenous biodiversity in Marlborough over time. In terms of marine environments, this issue recognises that, despite the extensive length and physical size of Marlborough's coastline, many marine habitats and species are fragile and vulnerable to impact. It further indicates that further loss of or deterioration in condition of indigenous biodiversity will occur if past trends continue, with the increasing use of the coastal environment for recreational, cultural and commercial activities leading to a corresponding increase in the potential for adverse effects on marine biodiversity. Finally, Issue 8A recognises the logistical challenges of surveying the CMA but also recognises that scientific technologies for assessing marine biodiversity are constantly improving and evolving.

Objectives relating to indigenous biodiversity in the Marlborough marine environment

The PMEP describes two objectives for indigenous biodiversity in the marine environment:

- Objective 8.1: Protect intrinsic values of remaining indigenous biodiversity in marine environments; and
- Objective 8.2: Increase in area/extent of indigenous biodiversity and restoration or improvement in the condition of areas that have been degraded.

Policies relating to indigenous biodiversity in the Marlborough marine environment

Policies 8.1.1 to 8.1.3 in the PMEP set out the criteria used for determining whether marine ecosystems, habitats, or areas have significant indigenous biodiversity value (i.e., are significant marine sites), how significant sites and buffers around sites will be identified in the PMEP, and commitments

by MDC to continue gathering information on the state of biodiversity in marine environments to enable assessment of impacts from activities and uses.

Policies 8.2.1, 8.2.3, 8.2.4, 8.2.8, 8.2.9, 8.2.10, 8.2.11, and 8.2.13 set out how MDC will protect and enhance indigenous biodiversity, including by:

- Emphasising that a variety of methods are necessary to achieve the protection and enhancement, including partnerships, support for and liaison with landowners, resource users, community groups and Marlborough's tangata whenua iwi; pest management, legal protection, education, and the provision of information and guidelines;
- Giving priority in terms of their protection, maintenance and restoration to ecosystems, habitats and areas assessed as having significant indigenous biodiversity value, for example, king shag, and Marlborough's most threatened environments, including and marine habitats;
- Committing to developing and implementing a strategic approach for pest species that impact on indigenous biodiversity values;
- Clarifying that ongoing monitoring of the condition of sites with significant indigenous biodiversity value will be necessary and committing to reviewing voluntary approaches to protection where monitoring shows a loss of or deterioration in the condition of significant sites as a result of the voluntary approach to determine whether increased use of regulation should be pursued;
- Promoting the maintenance, enhancement or restoration of ecosystems, habitats and areas of indigenous biodiversity even where these are not identified as significant but are important for a range of factors that are important for the overall functioning of ecological processes;
- Promoting to the general public and landowners the importance of protecting and maintaining indigenous biodiversity; and
- Encouraging and supporting private landowners, Marlborough's tangata whenua iwi, community and industry groups, central government agencies and others in their efforts to protect, restore or re-establish areas of indigenous biodiversity.

Policies 8.3.1, 8.3.4, 8.3.5, and 8.3.8 specify how effects of subdivision, use and development on indigenous biodiversity will be managed. This includes reflecting the priority approach of NZCPS Policy 11, identifying a range of adverse effects that may result from subdivision, use and development, and which may need to be avoided to protect indigenous biodiversity values, recognising the risk to king shag within foraging distances of their breeding sites, and directing those activities resulting in seabed disturbance must be avoided within vulnerable significant sites.

PMEP Chapter 8 policies, implementation methods, and anticipated environmental results with relevance to marine indigenous biodiversity are listed in Table A1-1. Anticipated environmental results are ten-year targets, unless otherwise specified.

Table A1-1. PMEP Chapter 8 policies, methods of implementation, and anticipated environmental results with relevance to marine indigenous biodiversity.

Policies	

8.1.1	When assessing whether terrestrial, wetlands, freshwater or marine or terrestrial ecosystems, habitats and areas have significant indigenous biodiversity value, the following criteria will be used:
	Identification Criteria
	    (a) representativeness;
	    (b) rarity;
	    (c) diversity and pattern;
	    (d) distinctiveness;
	Management Criteria
	    (e) size and shape;
	    (f) connectivity/ecological context;
	    (g) sustainability; and
	    (h) adjacent catchment modifications.
	For a site to be considered significant, one of the first four criteria (representativeness, rarity, diversity and pattern or distinctiveness/special ecological characteristics) must rank medium or high.

8.1.2	Sites in the coastal marine area and natural wetlands assessed as having significant indigenous biodiversity value will be specifically identified in the Marlborough Environment Plan.
8.1.3	Continue to gather information on the state of biodiversity in terrestrial, freshwater and marine environments in Marlborough to enable decision makers to assess the impact on biodiversity values from various activities and uses.
8.2.1	A variety of means will be used to assist in the protection, maintenance and enhancement of areas and habitats with indigenous biodiversity value.
8.2.3	Priority for Council funding and partnership resources will be given to the protection, maintenance and restoration of habitats, ecosystems and areas that have significant indigenous biodiversity values, particularly those that are legally protected.
8.2.4	Priority will be given to encouraging the re-establishment and enhancement of indigenous biodiversity in Marlborough's most threatened environments including lowland and marine habitats.
8.2.8	A strategic approach to the management of undesirable animals and plants that impact on indigenous biodiversity values will be developed and implemented.
8.2.9	Where monitoring of ecosystems, habitats and areas with significant indigenous biodiversity value shows that there is a loss of or deterioration in condition of these sites, then the Marlborough District Council will review the approach to protection.

8.2.10	Promote the maintenance, enhancement or restoration of ecosystems, habitats and areas of indigenous biodiversity even where these are not identified as significant in terms of the criteria in Policy 8.1.1, but are important for:
	    (a) the continued functioning of ecological processes;
	    (b) providing connections within or corridors between habitats of indigenous flora and fauna;
	    (c) cultural purposes;
	    (d) providing buffers or filters between land uses and wetlands, lakes or rivers and the coastal marine area;
	    (e) botanical, wildlife, fishery and amenity values;
	    (f) biological and genetic diversity; and
	    (g) water quality, levels and flows.

Table A1-1 contd.

Policies	
8.2.11	Promote to the general public and landowners the importance of protecting and maintaining indigenous biodiversity because of its intrinsic, conservation, social, economic, scientific, cultural, heritage and educational worth and for its contribution to natural character.
8.2.13	Encourage and support private landowners, Marlborough's tangata whenua iwi, community and industry groups, central government agencies and others in their efforts to protect, restore or re-establish areas of indigenous biodiversity.

8.3.1	Manage the effects of subdivision, use or development in the coastal environment by:
	    (a) avoiding adverse effects where the areas, habitats or ecosystems are those set out in Policy 11(a) of the New Zealand Coastal Policy Statement 2010;
	    (b) avoiding adverse effects where the areas, habitats or ecosystems are mapped as significant wetlands or ecologically significant marine sites in the Marlborough Environment Plan; or
	    (c) avoiding significant adverse effects and avoiding, remedying or mitigating other adverse effects where the areas, habitats or ecosystems are those set out in Policy 11(b) of the New Zealand Coastal Policy Statement 2010.
	    (d) creating a buffer to manage activities in proximity to an Ecologically Significant Marine Site in order to avoid adverse effects on the Ecologically Significant Marine Site.

8.3.4	In the context of Policy 8.3.1 and Policy 8.3.2, adverse effects to be avoided or otherwise remedied or mitigated may include:
	    (a) fragmentation of or a reduction in the size and extent of indigenous ecosystems and habitats;
	    (b) fragmentation or disruption of connections or buffer zones between and around ecosystems or habitats;
	    (c) changes that result in increased threats from pests (both plant and animal) on indigenous biodiversity and ecosystems;
	    (d) the loss of a threatened or at risk species or their habitats and species that are rare within the region or biogeographic area;
	    (e) loss or degradation of wetlands, dune systems or coastal forests;
	    (f) loss of mauri or taonga species;
	    (g) impacts on habitats important as breeding, nursery or feeding areas, including for birds;
	    (h) impacts on habitats for fish spawning or the obstruction of the migration of fish species;
	    (i) impacts on any marine mammal sanctuary, marine mammal migration route or breeding, feeding or haul out area;
	    (j) a reduction in the abundance or natural diversity of indigenous vegetation and habitats of indigenous fauna;
	    (k) loss of ecosystem services;
	    (l) effects that contribute to a cumulative loss or degradation of habitats and ecosystems;
	    (m) loss of or damage to ecological mosaics, sequences, processes or integrity;
	    (n) effects on the functioning of estuaries, coastal wetlands and their margins;
	    (o) downstream effects on significant wetlands, rivers, streams and lakes from hydrological changes higher up the catchment;
	    (p) natural flows altered to such an extent that it affects the life supporting capacity of waterbodies;

Table A1-1 contd.

Policies	
	(q) a modification of the viability or value of indigenous vegetation and habitats of indigenous fauna as a result of the use or development of other land, freshwater or coastal resources; (r) a reduction in the value of the historical, cultural and spiritual association with significant indigenous biodiversity held by Marlborough's tangata whenua iwi; (s) a reduction in the value of the historical, cultural and spiritual association with significant indigenous biodiversity held by the wider community; and (t) the destruction of or significant reduction in educational, scientific, amenity, historical, cultural, landscape or natural character values.
8.3.5	Take into account that king shag could feed in the coastal marine area within 25km of the breeding sites recorded as Ecologically Significant Marine Sites 1.6, 2.11, 2.14, 2.21, 3.3 and 7.9.
8.3.8	Within vulnerable ecologically significant marine sites, activities that disturb the seabed must be avoided.
Methods of implementation	
8.M.1 Regional rules	Dredging, bottom trawling, deposition, reclamation and anchoring within the areas identified as a vulnerable ecologically significant marine site will be prohibited. Resource consent is required for most uses or activities within the coastal marine area and an assessment of the effects of the activity on indigenous biodiversity will be undertaken, including whether there are any significant biodiversity values.
8.M.4 Identification of areas with significant biodiversity value	The Council has also identified in the resource management plan significant wetlands and ecologically significant marine sites on maps in Volume 4. In the case of ecologically significant marine sites, buffer areas are also identified for all Category A and B sites. The extent of the buffer area is determined by the vulnerability of the site to sea bed disturbance and is 50, 100 or 200m. The extent of the buffer area is identified in Appendix 27. Whale migration routes and dolphin distribution in Marlborough's coastal marine area are depicted on maps in Volume 4.
8.M.5 Monitoring	The Council will establish baseline monitoring programmes that provide a benchmark for determining the ongoing condition of habitats, ecosystems and areas that have significant indigenous biodiversity values. Where appropriate, the Council will also require resource consent holders to monitor the effects of their activity on marine biodiversity. The Council is aware that its knowledge on areas with biodiversity value is incomplete and is therefore committed to carrying out and supporting research, and undertaking state of the environment monitoring to gain a better understanding of Marlborough's biodiversity.
8.M.7 Information	Increasing the knowledge and understanding of landowners and the public of the occurrence of significant areas of ecological value not only leads to greater appreciation of those values, but can motivate voluntary action to maintain and enhance indigenous biodiversity. The type of information already available or to be provided includes: • web-based information on Marlborough's indigenous biodiversity, the various programmes of support available and guidelines on various issues; • on specific issues affecting indigenous biodiversity through groups such as the Sounds Advisory Group; • through maintenance of a database that records studies of marine areas undertaken by a variety of science providers. (This database is available on the Council's website.) The studies undertaken include those for resource

Table A1-1 contd.

Policies	
	consent applications or other scientific investigation, e.g. those undertaken on dusky dolphins in Admiralty Bay; and • state of the environment reporting on the extent and condition of Marlborough's biodiversity.
8.M.8 Guidelines	Guidelines have already been developed by the Council and other agencies for a range of aspects concerning biodiversity, including: • approaching marine mammals from land, sea and air and on minimising acoustic disturbance to mammals from seismic survey operations (both produced by the Department of Conservation). The Council will prepare guidelines to assist developers on options available for enhancing indigenous biodiversity. As the need arises, the Council will develop further guidelines in an endeavour to enhance overall biodiversity in Marlborough.
Anticipated environmental result	
8.AER.1 An increase in the number and extent of ecosystems, habitats and areas with indigenous biodiversity value that are formally protected or covenanted (where practicable).	There is an increase in the number of marine protected areas.
8.AER.2 Maintenance and enhancement of the condition of ecosystems, habitats and areas with indigenous biodiversity value.	Baseline monitoring programmes established for a representative sample of terrestrial, river and wetland sites and progressively for intertidal areas show no loss of indigenous biodiversity values over the life of the MEP. Measured against baseline monitoring programmes established for ecologically significant marine sites in 2015/2016, there is no loss of indigenous biodiversity values over the life of the MEP. There is no increase in the extent or distribution of known aquatic pest species identified as declared pests in the Regional Pest Management Plan for Marlborough.
8.AER.5 An increase in knowledge of Marlborough's indigenous biodiversity.	Use of scheduled criteria to identify ecosystems, habitats or areas present with significant indigenous biodiversity value through resource consent applications or where future survey work may be undertaken. Knowledge and understanding of indigenous biodiversity in Marlborough's coastal marine area is enhanced through maintenance of the marine database of information and from supporting research in areas where little is known about marine biodiversity.

Appendix 2: Summary of marine site surveys and significance assessments by the expert panel between 2011 and 2020

The first marine significant site report was produced by MDC and DOC in 2011 (Davidson et al., 2011)[9]. This report built on a DOC study identifying ecologically important marine, freshwater and terrestrial areas in Marlborough (Davidson et al., 1995). The assembled group of expert authors ("expert panel") developed a set of criteria to assess the relative biological importance of a range of sites. Sites that received a medium or high score were ranked "significant". A total of 129 significant sites were recognised and described during this process.

Davidson et al. (2013) produced a protocol for identifying and assessing new candidate sites and for reassessing existing ecologically significant marine sites. The goal of that protocol was to establish consistency and to ensure a rigorous and consistent process for site identification, data collection and assessment.

Under the established protocols, changes of significant marine sites (and sub-sites) over time could be due to five main reasons:

1. Discovery of a new site - A new site that supports biological features that would likely reach a medium or high rank.
2. Rejection of an existing site - The site no longer supports medium or high biological attributes.
3. Reduction in the area or biological attributes - Part of the significant site no longer supports medium or high biological attributes.
4. Addition to an existing site - An area adjacent or contiguous with an existing significant site also supports medium or high biological attributes.
5. Rehabilitation/recovery - Biological values increase by recovery or rehabilitation.

Davidson et al. (2014) provided guidance for the collection, storage and publication of biophysical data from potential new significant sites as well as existing sites. They described biological investigation processes for (1) surveys of new sites, (2) collection of additional information from existing significant sites or sites that previously were not ranked as being ecologically significant; and (3) status monitoring of existing significant sites. Davidson et al. (2014) also identified a range of candidate sites for survey and monitoring.

Since the 2014/15 summer, marine sites have been surveyed annually. Sites selection for these surveys has been guided by:

- Sites initially identified as having limited or old biological information (Davidson et al., 2011).
- Sites where additional information was needed (Davidson et al., 2014, and subsequent reports).
- Recommended sites for monitoring (Davidson et al., 2014, and subsequent recommendations).
- New potential sites based on new information received since 2011.

During the first survey over the 2014/15 summer, the survey and monitoring protocols of Davidson et al (2013, 2014) were implemented for the first time, focussing on selected sites from Davidson et al. (2014) in Queen Charlotte Sound / Tōtaranui, Tory Channel / Kura Te Au and Te Anamāhanga / Port

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[9] References for this appendix are included in the general reference list of this report.

Gore (Davidson and Richards, 2015). These areas were selected by a joint MDC/DOC monitoring steering group that also considered advice from Davidson Environmental Limited. It was agreed that surveys should focus on biogenic habitats because of their biological importance (e.g., substratum stabilisation, increase biodiversity, juvenile habitats, food sources) and the fact that these habitats have often been reduced due to a variety of anthropogenic activities.

Overall, one potential new site was found, and two existing sites were recommended to be removed from the programme. Seven existing sites were recommended to be reduced in size, whereas 12 sites or sub-sites were recommended to increase in size. The overall result was a decline of 1317.8 ha (or 71.6%) of the significant sites area compared to the sites described in Davidson et al. (2011).

The expert panel[10] reassessed sites based on the new survey information (Davidson et al., 2015). The panel slightly modified the wording of some of the criteria developed and applied by Davidson et al. (2011) to avoid misinterpretation and help clarify their meaning. Not all recommendations from Davidson and Richards (2015) were supported but most were. Davidson et al. (2015) also assessed the protection needs of significant sites that support benthic biological values from physical disturbance. They assess the level of site sensitivity to a range of physical disturbance types and expressed this in categorise (A-E). They also provided guidance for peripheral management areas (buffers) around significant sites.

The second survey was conducted in the summer of 2015-2016 and targeted 15 sites and subsites in the Croisilles Harbour and D'Urville Island areas (Davidson and Richards, 2016). Of the total 15 sites and sub-sites investigated, five increased in reported size (178.4ha total), while eight sites and sub-sites were reduced (by 214.6ha). One site remained unchanged (Hunia king shag colony) between surveys. A new site is also described at Lone Rock, Croisilles Harbour. Overall the area occupied by significant sites in the Croisilles - D'Urville area declined by 214.6 hectares between that reported in Davidson et al. (2011) and the second survey. Unlike the previous survey conducted by Davidson and Richards (2015), change was attributed solely to more detailed information compared to previous data.

The expert panel accepted all but one boundary modification proposed by Davidson and Richards (2016) in their annual peer review and assessment process (Davidson et al., 2017a). The panel recommended that the Chetwode significant site (2.20) remain unchanged from that defined in Davidson et al. (2011) and not be enlarged until further data are collected to support the proposed increase.

The third survey in 2016/17 focussed on Croisilles Harbour, D'Urville Island, and outer Sounds areas, including three new sites (Davidson et al., 2017c). Three sites increased in size by a total of 583.3 ha due to an improvement in the level of detail. Four sites declined in size by a total of 458.9 ha due to a combination of improved information and, in two cases, a loss of habitat likely due to physical damage. No existing significant sites were recommended for removal. Overall, the area occupied by significant sites investigated in the present study increased by 130.4 hectares between previous studies (Davidson et al., 2011; Davidson and Richards, 2016) and the third survey.

In addition to the recommendations of the third survey, the expert panel also reviewed recommended new sites suggested by Davidson et al (2017b) based on a survey of Tory Channel / Kura Te Au conducted for NZKS. The expert panel accepted the boundary modifications proposed by Davidson et al. (2017c) and Tory Channel / Kura Te Au sites suggested by Davidson et al. (2017b). Two other new sites and one new sub-site were also accepted by the review group. The Expert Panel recommended

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[10] In reports referred to as 'peer review panel' or 'expert panel'.

that one site proposed by Davidson et al., (2017c) be reassessed in the future once more information was available. During the review, some further minor revisions to the assessment criteria were proposed and adopted. The expert panel recognised that some 2011 significant sites would require future reassessment using the revised criteria to ensure a consistent approach is adopted.

The fourth survey in 2017/18 investigated sites in the Pelorus Sound / Te Hoiere biogeographic region (Davidson et al., 2018b). A total of 14 sites were described, including six potential new significant sites. Three existing significant sites increased in size by a total of 146.2 ha, due to either an improvement in the level of detail or redefining of the boundaries. Four sites declined in size by a total of 112.68 ha, mainly due to the improved level of information, however, small areas of one site were impacted by marine farms and therefore removed. The report also describes impacts of significant sites by exotic algae, an apparent increase in silt compared to historic observations conducted in the 1990's, and signs of direct human impact at three of the potential new significant sites in form of damaged *Galeolaria hystrix* tubeworm mounds and a rhodolith bed, likely from anchors or anchor chains used by recreational fishers and dragging of marine farm anchor blocks. In addition, at one site evidence of commercial dredging was observed.

The Expert Panel accepted all the boundary modifications proposed by Davidson et al. (2018b) following the fourth survey (Davidson et al., 2018a). Five new sites were also accepted by the Panel, while one site proposed by Davidson et al. (2018b) was recommended to be reassessed in the future once more data is collected. The expert panel also assessed site sensitivity/impacts from a range of anthropogenic threats including physical disturbance. Five sites are recommended for urgent management actions, of which four have ongoing impacts that will result in further degradation of significant site biological values.

During the fifth survey in 2018/19 a total of 11 sites were investigated (Davidson et al., 2019). At four existing significant sites, additional data were collected and presented. Of these, it was suggested that two sites be increased in size. Four potential new significant sites were described. Of these, one (Hitaua Bay) had previously been a significant site. Three sites were investigated that did not support biological values likely to be sufficient to warrant ranking as a significant site. Direct human impact was observed at Ouokaha Island where approximately 11% of tubeworm mounds had been likely impacted by anchoring. Indirect human impact from sedimentation was observed at proposed new site along the coast north and south of Nikau Bay. Inorganic rubbish was observed under a moored boat in Penzance Bay.

The expert Panel accepted recommendations for three new sites (Davidson et al., 2020a). Three sites that were surveyed were rejected as they did not support features that were considered significant. New quantitative data collected for two existing sites were accepted. Adjustments to the boundaries of two existing sites were approved. One site located at the head of Hitaua Bay (subtidal cockle bed), previously removed as a significant site was reinstated. The Panel also recommended one site for urgent management action and other sites for future management action based on their assessment of site sensitivity/impacts from a range of anthropogenic threats, including physical disturbance. Other recommended management actions included the selection of mooring types in Penzance Bay and widespread actions to minimise sediment originating from the Pelorus catchment.

For this sixth survey in 2019/20 fieldwork was limited due to Covid-19 restrictions. This created an opportunity to update significant sites in Queen Charlotte Sound / Tōtaranui, Tory Channel / Kura Te Au and Port Underwood using data collected in previous years during surveys undertaken as part of other projects commissioned by the MDC (Davidson et al., 2020c). The report covers 17 sites, of which one was rejected, three sites are new and the remaining 13 are either enlarged or reduced in size due

to the improved level of information. The total area of significant sites discussed in this report has increased by 425.34 ha.

The sixth survey report also provides a summary of the major species, community or habitat types that are used for site evaluations and presents an updated process for assessing species, community or habitat sensitivity and perceived threats that is linked to the calculation of appropriate buffer zones for significant sites aimed at reducing the likelihood of damage from anthropogenic activities (e.g., dredging, trawling, anchoring, sedimentation, pollution).

The Expert Panel accepted recommendations proposed in the sixth survey report (Davidson et al., 2020b). Three new sites were accepted by the Panel. One existing significant site recommended by Davidson et al. (2020c) and based on new data collected by Anderson et al. (2020) was rejected. Adjustments to the boundaries of 13 sites comprising many sub-sites in Cook Strait, Tory Channel / Kura Te Au and Queen Charlotte Sound / Tōtaranui were accepted. The Panel also assessed site sensitivity/impacts from a range of anthropogenic threats including physical disturbance, adopting an updated version of the revised assessment by Davidson et al. (2020c).

Appendix 3: Findings of the ESMS programme review

Table A3-1. Findings of the ESMS programme review. Each programme objective is explained by, firstly, describing what achieving this objective would look like in practice (column 3) and by providing indicative performance measures (column 4). The ESMS programme in its current format was then evaluated against the goals and objective of the ESMS programme and tasks required to achieve each objective were identified (column 5).

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required
Goal 1: The ESMS programme supports Council's marine biodiversity objectives, work programmes, and strategic priorities				

1.1	The ESMS programme provides information that informs initiatives and work programmes in MDC aimed at protecting significant marine sites	• Sites in the Marlborough CMA that warrant protection under ESMS programme-related policies are identified and mapped in the MEP.
		• MDC uses its functions under the RMA to adequately protect significant marine sites.
			• ESMS are mapped.
			• Protection of significant marine sites is effective.
			• Buffer areas are set appropriately.
				1. Review effectiveness of current protection of ESMS:
				 • Identify examples where it worked and where it did not
				 • Explore why protection worked/did not work
				 • Consider relevant factors, including:
				  • Connectivity of sites (consider grouping significant sites into areas of connected sites)
				  • Purpose of buffers, buffer size and restrictions that apply in buffer areas (determine whether buffers effectively protect against all relevant stressors)
				2. If deemed necessary based on the findings of the review under point 1, develop options for improving the protection of significant marine sites.
				3. Confirm and document process for updating significant marine sites in the MEP.

Table A3-1 contd.

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required
1.2	Adverse effects on and recovery and restoration opportunities of marine biodiversity values and significant marine sites are understood	• Potential and actual adverse effects (from natural and anthropogenic stressors) to significant marine sites are identified, considering those listed in PMEP Policy 8.3.4. • The vulnerability of significant sites to adverse effects, including those listed in PMEP Policy 8.3.4., is described. • Recovery opportunities for degraded significant marine sites are identified. • Non-significant sites with a potential to be restored to ecological significance are identified.	• Information on adverse effects on significant marine sites is accessible. • Information on assessed sites (whether significant or not) includes information on potential recovery and restoration opportunities.	4. Create a list of threats to marine biodiversity from both natural and anthropogenic stressors that is aligned with the wording in PMEP Policy 8.3.4. 5. For each threat, identify how significant marine sites may be affected and how that threat can be assessed and managed, including through buffer zones. 6. For each threat estimate change over the coming ~50 years, e.g., anticipated change in threat to marine biodiversity values due to climate change and anticipated developments. 7. Explore how to identify recovery and restoration opportunities for sites and how they could be realised.
1.3	The ESMS programme is aligned with other MDC work programmes relevant to marine biodiversity	• The ESMS programme is aligned with SOE monitoring and other marine biodiversity programmes. • The ESMS programme is aligned with other work programmes in MDC relevant to impacts on marine biodiversity, including catchment and freshwater management.	• SOE monitoring programmes relating to marine biodiversity are identified. • SOE programme data is managed consistent with ESMS programme processes and utilised in the ESMS programme as appropriate. • Alignments between other MDC work programmes relating to marine biodiversity and the ESMS programme are identified and optimised and contribute to programme outcomes.	8. Identify SOE monitoring programmes aligned to ESMS programme, points of alignment, and options for optimising alignments and programme outcomes. 9. Identify other MDC work programmes relating to marine biodiversity (e.g., NPS-FM related, catchment management, marine biosecurity/pest management), points of alignment, and options for optimising alignments and programme outcomes.

Table A3-1 contd.

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required

1.4	ESMS programme outputs support effectiveness reviews of Council's resource management plans, including evaluation of the MEP AERs.	• The ESMS programme monitors:
		  o the number, size and total spatial coverage of significant marine sites and their protection status.
		  o the gain and loss of indigenous biodiversity values of significant marine sites
		• ESMS programme outputs support MDC policy effectiveness monitoring.
			• The ESMS programme outputs support evaluation of AERs.
			• The ESMS programme provides the right information to support policy effectiveness monitoring.
				10. Determine how to measure 'indigenous biodiversity values' of significant marine sites and develop appropriate indicators.
				11. Clarify relevant information requirements to evaluate AERs and wider policy effectiveness and ensure ESMS programme outputs provide the information needed.

1.5	ESMS programme outputs support effective MDC planning and resource management decision making.	• Information on significant marine sites is readily accessible and of use to MDC decision makers • Information on species, habitats, ecosystems, and areas collected under the ESMS programme and recorded for the purpose of supporting MDC planning and resource management decision making identifies linkages to NZCPS Policy 11 descriptors. • Sites identified as significant through site assessments are considered for recognition in the MEP in a timely manner.	• MDC planning processes are informed by ESMS programme outputs. • Resource management decision making, including resource consenting processes, are informed by ESMS programme outputs. • Significant site information in the MEP is updated in a timely manner.	12. Review the use of ESMS programme information in recent resource consent processes and identify opportunities for improving the value of the ESMS programme for resource consent decision-making. 13. Identify alignments and differences between site assessments under the ESMS programme and assessments under NZCPS Policy 11(a) and (b). 14. Review sites that are at different stages of the identification and plan variation process
1.6	Significant sites are monitored to identify changes over time.	• Baselines are established to measure performance against. • Systematic monitoring of significant marine sites is carried out	• Changes in condition of significant marine sites over time are reported.	15. Develop and implement a monitoring programme for significant marine sites.

Table A3-1 contd.

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required
1.7	ESMS programme planning and management is strategic, systematic, and supports cost-effectiveness.	• ESMS programme planning (including identification of candidate sites, survey areas, and sites to be monitored) is strategic and supports programme goals and objectives. • Strategic annual- and long-term ESMS programme plans are developed that allow for modification if unforeseen opportunities for improved outcomes arise. • ESMS programme planning takes into consideration opportunities provided from outside the programme, including scientific data gathering initiatives in the Marlborough CMA. • Likely short- and long-term changes in condition of and threats to significant sites are regularly predicted and feed into strategic programme planning. • The performance of the ESMS programme is regularly reviewed. • The goals and objectives of the ESMS are periodically assessed against MDC strategic priorities.	• Up-to-date strategic annual- and long-term programme plans are in place, including a schedule for candidate site surveys and assessments and significant site monitoring. • Up-to-date predictions of short- and long-term changes in condition of and threats to significant sites are available. • Opportunities for improved ESMS programme outcomes are considered in programme planning.	16. Write a strategic plan for the ESMS programme, covering long-term goals, objectives, performance measures, resource allocation, and programme review. 17. Develop programme performance indicators, including environmental outcome-focussed measures. 18. Create dashboard of key indicators and automatic reporting linked to MDC ESMS programme database.
1.8	The ESMS programme is carried out efficiently.	• The programme budged is allocated efficiently • The actual costs of the ESMS programme are measured. • The costs of the programme are regularly reviewed. • The predicted costs of the programme remain current.	• ESMS programme performance indicators assessing programme efficiency are evaluated annually and met.	19. Develop ESMS programme performance indicators assessing programme efficiency.

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required
		• The ESMS programme is carried out within budget. • The ESMS programme takes advantage of opportunities for improving programme efficiency, e.g., leveraging other projects.		
1.9	The ESMS programme is appropriately resourced.	• The ESMS programme budget matches the programme needs. • ESMS programme costs are known, including the costs of foreseeable changes in programme components. • Shortfalls in resourcing are detected early and proactively addressed.	• ESMS programme budgets are created in a timely manner to enable appropriate resource allocation. • The ESMS programme is resourced appropriately.	20. Identify resourcing needs for the ESMS programme, including routine operation and one-off costs, such as data management system development. 21. Develop a budgeting and financial management system that supports decision-making on and tracking of programme resourcing.
Goal 2: The ESMS programme increases public awareness and protection of marine biodiversity values				
2.1	Information about significant marine sites is effectively communicated to the public.	• Significant sites are shown on MDC digital platforms, including the MDC website and the Marlborough Sounds App. • Biodiversity values, vulnerabilities, and changes in status and condition over time of significant marine sites are described on the MDC digital platforms. • Studies undertaken as part of the ESMS programme are reported on the MDC website.	• Significant site and ESMS programme information on MDC digital platforms is up-to-date and fit-for-purpose for the respective audiences. • ESMS programme information and outputs are reported to the public in ways that suit target audiences.	22. Review opportunities for presenting significant marine site information on existing MDC digital platforms, including the MDC website, SmartMaps, and the Marlborough Sounds App. 23. Review the value of the current ESMS programme reports (survey and expert panel site assessments) and confirm how future survey and assessment information is to be documented and published. 24. Create online information on important habitats and species and their ecological value for a public audience.

Table A3-1 contd.

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required
2.2	The ESMS programme facilitates positive behaviour change of the public to improve biodiversity outcomes.	• Historic and recent trends in the state of marine biodiversity of the Marlborough Sounds are effectively communicated to the public. • The effects (positive and negative) of human activities on significant marine sites are effectively communicated to people utilising the Marlborough CMA. • People are presented with opportunities for positive behaviour change that assist and encourage them in making decisions that improve biodiversity outcomes.	• People make decisions that support positive biodiversity outcomes.	25. Identify the effects of human activities – positive and negative – on marine biodiversity. 26. Create online information on the effects (positive and negative) of human behaviour on significant marine sites and marine biodiversity in general.
2.3	Users of the Marlborough CMA are aware of 'rules' relating to significant sites	• Include the rules relating to sites in SmartMaps and other digital platforms • Users of the Marlborough CMA can easily find information about rules if they are looking for them. • Users of the Marlborough CMA are directed to rules when accessing other information on the Marlborough CMA, e.g., navigation or tourism information.	• Users of the Marlborough CMA comply with rules for significant marine sites.	27. Explore options for effectively communicating information on rules for significant sites to users of the Marlborough CMA.
Goal 3: The ESMS programme is scientifically robust and efficient, and programme data access is easy and appropriate for different users				
3.1	The ESMS programme utilises appropriate scientific methods and scientific best practice and knowledge.	• ESMS programme surveys use appropriate scientific methods. • Processes are in place to determine whether methods used for data gathering other than ESMS programme surveys are appropriate for the ESMS programme. • The programme encourages the use of new technologies.	• ESMS programme data and outputs are based on appropriate scientific methods and scientific best practice and knowledge.	28. Review scientific methods used in past ESMS surveys, other projects carried out in the Marlborough CMA that may have generated data and information of value for the ESMS programme and anticipated future methods. 29. Identify methods that are appropriate for use in the ESMS programme. 30. Develop a system to ensures that the ESMS programme utilises scientific best practice and

Table A3-1 contd.

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required
		• Resources of the ESMS programme (e.g., database of important species and habitats) are up to date, reflect scientific best practice and knowledge, and are used in decision-making.		knowledge.
3.2	Data collection, analysis, and recording processes are efficient and quality controlled.	• ESMS data-related processes are documented and quality controlled, including: 　○ Survey methods 　○ Laboratory methods (incl. taxonomy) 　○ Data analysis 　○ Data recording • Process documentation is up-to-date and accessible. • Data collection, analysis, and recording (including surveys of candidate sites or monitoring surveys) are not dependent on or restricted to individuals or specific organisations.	• All ESMS programme data adheres to relevant standards and is quality controlled.	31. Develop procedures for: 　○ Survey methods 　○ Laboratory methods (incl. taxonomy) 　○ Data analysis 　○ Data recording 32. Develop site survey data standards (e.g., statistical rigor, sampling and analytical methods, qualifications) 33. Develop procedures for evaluating whether data meets to standards (to use for ESMS programme surveys and other data sources)
3.3	ESMS programme data is safely and effectively stored and managed by MDC and is accessible to external parties	• A central ESMS programme database is operated by MDC and contains all relevant data. • Data collected in the ESMS programme are displayed on MDC website (SmartMaps) with the option to restrict data to internal view only (i.e., the public may only view a sub-set of all data). • Processes are documented and quality controlled, including: 　○ Data transfer to MDC for data collected by external providers	• All relevant data collected in ESMS programme surveys are stored in MDC database. • ESMS programme data and site information is saved in MDC database and displayed in MDC SmartMaps.	34. Determine what survey data should be stored and managed by MDC and made accessible internally and externally. 35. Explore whether the currently planned biodiversity database development project considers the needs of ESMS programme data. Advocate for it to enable storage of ESMS programme data. 36. Create database for significant site information (including data, assessment information, trends over time) and SmartMaps interface (this may be the currently planned biodiversity database)

Table A3-1 contd.

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required

		o Data upload to MDC database
		o Quality control of data in MDC database
		o Display of selected data in MDC SmartMaps
				37. Develop procedures for:
				  o Data transfer to MDC for data collected by external providers
				  o Data upload to MDC data storage and management system
				  o Quality control of data in MDC data storage and management system
				  o Display of selected data in MDC SmartMaps

3.4	Reporting of ESMS programme data is accurate, current, consistent, and easily accessible.	• The primary reporting platform for ESMS programme data is MDC SmartMaps. • The structure and scope for technical reports is specified by MDC at the time of commissioning their preparation.	• All reports of ESMS programme information (electronic or technical report format) are quality checked, consistent, and easily accessible. • All reports of ESMS programme information are consistent with data stored in MDC database and displayed on MDC SmartMaps.	38. Clarify ESMS programme reporting process – what data and information is reported where and when? This includes a review of the role of technical reports. 39. Create ~5-yearly ESMS programme SOE-type report summarising information on significant marine sites.
3.5	The ESMS programme makes effective use of existing MDC data and information	• Existing marine biodiversity data and information gathered for different purposes is used to inform the ESMS programme where possible. • New marine biodiversity data and information gathered for different purposes is used to inform the ESMS programme where possible. • All recommendations made in ESMS programme reports are addressed.		40. Review existing MDC marine biodiversity data and information and identify opportunities for utilising them for use within the ESMS programme. 41. Consider developing a schedule for future marine biodiversity projects commissioned by MDC outlining data requirements and other means of optimising utility of project data for the ESMS programme. 42. Review all reports prepared under the ESMS programme (including survey and expert panel

Objectives		What does that look like in practice?	Indicative performance measures	Tasks required
				report) to: • identify outstanding actions and recommendations • review recommendations and create action plans for those that are to be implemented
Goal 4: The assessment of sites is robust, transparent, efficient, and consistent over time and across the Marlborough CMA				
4.1	Application of the significance criteria is robust, transparent, and consistent over time and across the Marlborough CMA.	• Site assessments are not dependent on or restricted to individuals or specific organisations and significance criteria are applied consistently by different assessors. • Site assessments are independent of the scientific methods used for data collection and anticipates changes in methods over time due to the increased availability of novel technologies. • All site assessment decisions are peer reviewed with the peer review process matching the complexity of site assessments. • Scientific data and information used to inform site assessments is referenced or stored with the assessment information in a way that allows re-creation of assessment decision-making as prescribed by MDC. • Processes are in place to manage potential and actual problems relating to consistency. • All site assessment information is submitted to and stored by MDC.	• The significance criteria are applied consistently. • The peer review process is effective. • The process for applying the significance criteria is documented. • Site assessment decisions are documented and can be re-created from accessible information. • The status of sites is displayed on MDC SmartMaps alongside relevant significance assessment information.	43. Update site assessment and peer review processes documented in earlier reports by the expert panel. 44. Develop general guidance for the interpretation of the significance criteria. 45. Develop and document an approach for combining different survey and analysis methods in a way that results in consistent site assessments. 46. Decide what site status information to display and develop an interface for presenting the status of sites, including relevant significance assessment information, on MDC SmartMaps.

Objectives		What does that look like in practice?	Indicative performance measures	Tasks required
		• Site assessment information is presented on MDC SmartMaps.		
4.2	Site assessments are informed by up-to-date information on valuable species and habitats in the Marlborough CMA.	• Up-to-date information on valuable species and habitats in the Marlborough CMA is available to and utilised by site assessors and peer reviewers.	• Site assessments reflect current information on valuable species and habitats in the Marlborough CMA.	47. Collate and document information on species and habitats useful or required for informing site assessments, including definitions used in site assessments (e.g., quantitative definitions of horse mussel beds). Consider and align where possible with Tara Anderson's 2019 report definitions.
4.3	The regulatory status of sites assessed for significance is clearly communicated to the public.	• There is a clear understanding of the regulatory status of sites assessed for significance by ecologists through the application of significance criteria and those recognised as significant in the MEP. • The regulatory status of sites is clearly reflected in all internal and external reporting and communication.	• Internal and public information accurately reflects the regulatory status of sites.	48. Clarify the regulatory status of sites derived from assessments by ecologists (i.e., assessment through application of significance criteria to scientific data) and the status of sites as shown in the MEP (i.e., recognition of significant marine sites listed in the MEP). 49. Consider and reflect the different regulator statuses in the ESMS database, MDC SmartMaps, and other reports and communications.
Goal 5: The ESMS programme supports biodiversity objectives and initiatives outside of MDC				
5.1	The ESMS programme is aligned with the work of other management agencies in the Marlborough CMA and supports integrated management.	• Work programmes of other management agencies in the Marlborough CMA related to marine biodiversity and potential alignments are identified and supported where practicable.	• The ESMS programme benefits from and contributes to work programmes of other management agencies.	50. Identify areas of potential alignment with goals and work programmes of other management agencies in the Marlborough CMA. 51. Engage with other management agencies to identify opportunities for integrated management that can be supported by the ESMS programme.

Table A3-1 contd.

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required
5.2	The ESMS programme supports resource consent applicants in assessing and managing effects of their activity on known or potential significant marine sites.	• Expectations for managing effects of activities on significant marine sites are clearly articulated by MDC. • Guidance on how to use the significance criteria for identifying ecosystems, habitats or areas with significant indigenous biodiversity value through resource consent applications and how to undertake surveys for initial assessments and subsequent surveys (including monitoring) is developed and readily accessible.	• Resource consent applicants have a good understanding of the requirements related to assessing and managing effects on significant marine sites. • The effects of consented activities in the Marlborough CMA on significant marine sites are avoided or mitigated as appropriate.	52. Clarify and document how effects from consented activities on significant marine sites are expected to be assessed and managed. 53. Clarify and document how the significance criteria are expected to be applied in AEEs and other aspects of resource consent processes. 54. Develop guidance for resource consent applicants on how to access and use information on significant marine sites to inform resource consent applications. 55. Clarify the intention of anticipated environmental result 8.AER.5 and ensure appropriate processes are incorporated in the ESMS programme.
5.3	The ESMS programme supports biodiversity goals and initiatives of tangata whenua iwi.	• In terms of supporting biodiversity goals and initiatives of tangata whenua iwi, the ESMS programme aspects sit under MDC-wide approach, and therefore need to be considered as part of a wider process.	• The ESMS programme contributes to the support of biodiversity goals and initiatives of tangata whenua iwi by MDC.	56. Consider ESMS programme in MDC development of engagement and collaboration strategies with tangata whenua iwi. 57. Hold MDC internal session to summarise existing knowledge and capabilities, including existing relationships and collaborations, and explore how to proceed on an organisational level and ESMS programme-specific level. 58. Consider specifically potential consequences of ESMS programme decision-making on commercial and customary fisheries.
5.4	The ESMS programme identifies opportunities for addressing marine biodiversity loss that can be implemented broadly, including by	• Knowledge on how to protect, maintain, enhance, and restore marine biodiversity, including significant marine sites, continues to be improved and shared with the public.	• Interested individuals and groups have access to information on practical actions they can take to address marine biodiversity loss.	59. Include information on practical actions individuals and groups can take to address marine biodiversity loss in public information on significant marine sites and general marine biodiversity.

Table A3-1 contd.

	Objectives	What does that look like in practice?	Indicative performance measures	Tasks required
	tangata whenua iwi, community groups, NGOs, central and local government, businesses, industry, and individuals.			