Guidance on Achieving Comprehensiveness, Adequacy, and Representativeness in the Commonwealth waters component of the National Representative System of Marine Protected Areas

The Scientific Peer Review Panel for the National Representative System of Marine Protected Areas

February 20, 2006

Purpose

The purpose of this paper is to outline the approach of the Scientific Peer Review Panel for the National Representative System of Marine Protected Areas (the Peer Review Panel) in assessing the principles of comprehensiveness, adequacy and representativeness of Marine Protected Area (MPA) proposals for inclusion in the Commonwealth waters component of the National Representative System of Marine Protected Areas (NRSMPA). The advice provided in this paper is based on national guidelines produced by the Australian and New Zealand Environment and Conservation Council (ANZECC) for establishing a comprehensive, adequate and representative MPA system[1].

The Role of the Peer Review Panel: Assessing networks of MPAs developed as part of the NRSMPA

The role of the Peer Review Panel is to conduct a regional-level evaluation of the comprehensiveness, adequacy and representativeness (CAR) of the network of candidate MPAs developed by the Australian Government in its own waters through the regional marine planning (RMP) process. The Terms of Reference and membership of the Peer Review Panel are at Attachment A. This paper provides what is expected to be evolving guidance in the interpretation and use of the ANZECC guidelines and in particular the principles of comprehensiveness, adequacy and representativeness, for development of the NRSMPA in Australian Government waters.

The Australian Government will lead a process, which has been developed under the policy context as described in Attachment B, to establish a network of MPAs in each Planning Region. The outcomes of this process, initially for the South East Planning Region, will be referred to the Peer Review Panel by the Australian Government. There is an expectation that this role will continue through other Regions as regional marine planning unfolds around Australia. The Peer Review Panel will assess the network of candidate MPAs in each Planning Region against the principles of CAR, as interpreted in the Australian context. An outline of the process for determining MPAs, including the role of the Peer Review Panel, is at Figure 1.

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[1] Australian and New Zealand Environment and Conservation Council Taskforce on Marine Protected Areas (1998) *Guidelines for Establishing the National Representative System of Marine Protected Areas*, December, Commonwealth of Australia

The Peer Review Panel will not make any assessment of socio-economic considerations although it is noted these are major factors influencing the design of MPAs. It is expected that a socio-economic assessment of the impact of MPAs will be provided to the Government alongside the results of the Peer Review Panel's assessment. The Australian Government will determine the final network of MPAs, based on the Peer Review Panel's assessment, the socioeconomic implications of any proposed network of MPAs, and the results of stakeholder consultation.
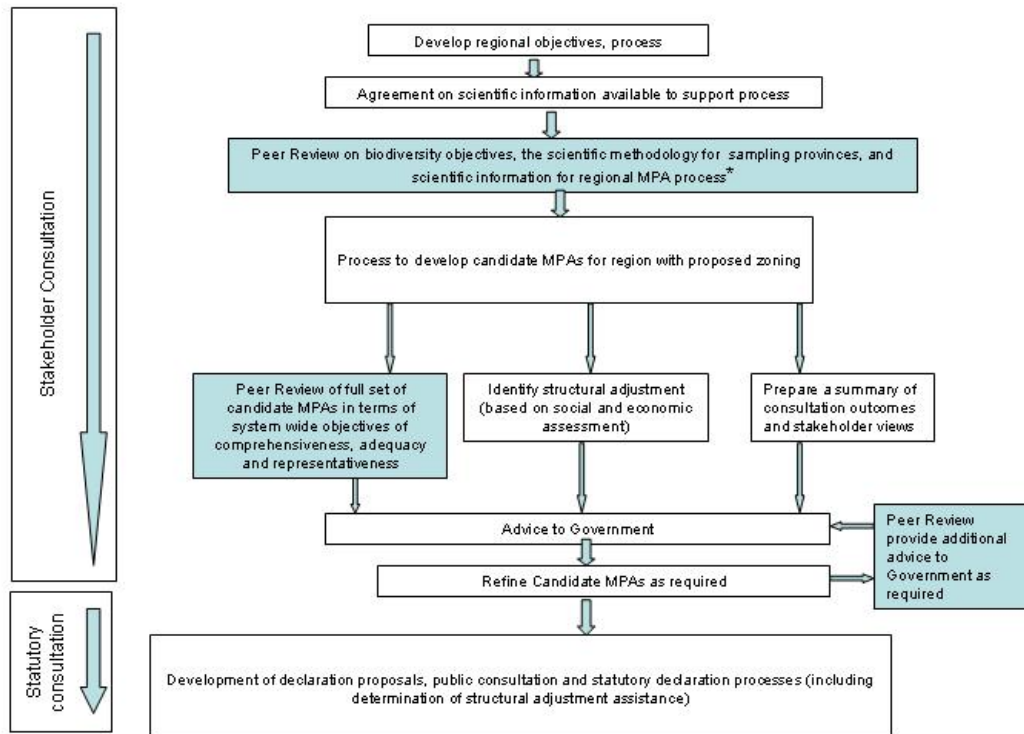

Figure 1. Depiction of the MPA development process, with the areas of Peer Review Panel engagement shaded in blue.

* This step was not undertaken in the South East Planning Region as this process was conducted prior to the formation of the Peer Review Panel. It is, however, envisioned that this step will happen in subsequent regional marine planning processes. The process, objectives and methodology for the South East Region MPA development (including the Users Guide) were separately peer reviewed.

Guidance on how the Panel will interpret CAR in Australia

The Peer Review Panel will consider the network of MPAs developed for a Planning Region against each of the CAR principles. To do this the Panel has interpreted the CAR principles as outlined below.

Uncertainty, risk and precaution

The Panel acknowledges the Australian Government policy to use the National Marine Bioregionalisation as a framework for the design of MPAs. Regionalisations are constructs developed to represent patterns of biodiversity (e.g., provinces are not 'real' entities), with the scale of a

regionalisation being dynamic largely dependent on the data available at the time. Caution needs to be used in relying solely on regionalisations as the only basis for describing the distribution of biodiversity. The Panel anticipates that within this framework, data at various scales, including geomorphological and oceanographic information and the best available regional biological information, including information on ecological processes, will be used to underpin the design and selection of MPAs.

The Panel recognises that detailed knowledge of the distribution of actual biodiversity will always be limited by practical survey constraints and the limited availability of pre-existing data on distribution and function of the biodiversity. However, other information more easily available on physical or ecological aspects of the environment can sometimes be used as a surrogate for biodiversity. Geomorphic, oceanographic and biological information refined by expert opinion can provide information about large-scale patterns of biodiversity to guide the selection of MPAs. As these are only surrogates and may address mainly large scale patterns, their use will produce some uncertainty in many decisions about MPA location and zoning. MPA networks based on such information will not be perfect (in the sense that they fully include and protect samples of all components of biodiversity in the Region) but they will nonetheless be based on best available knowledge. The Panel expects that the risks that such MPAs may not include important components of biodiversity (or achieve the MPA biodiversity protection objectives) will be addressed specifically in the design and zoning processes through appropriately precautionary decisions aligned to specific areas of design risk (such as data deficiencies and levels of surrogacy used in the design process).

The complex nature of ecological systems and the lack of fine scale ecological data for most marine areas make it intrinsically difficult to assess the effectiveness of both on and off-reserve conservation measures. Consequently, assessment of the effectiveness of an MPA network in meeting CAR principles may provide a relatively low level of confidence that the MPA network is achieving its biodiversity objectives. However, the effectiveness of MPA networks in meeting CAR principles can be increased over time through an adaptive approach to management based on monitoring and research activities, and regular performance reviews linked to the biodiversity objectives.

The Peer Review Panel anticipates that judicious application of the precautionary principle will be needed to minimise the risk of failing to achieve CAR. This means that while there may be only scant or very uncertain information about the ecological features in an area, this should not be used to justify the delay or obstruction of MPA selection, or as justification for 'minimising' the size or number of MPAs. For biodiversity conservation objectives it will be prudent to err in the direction of larger rather than smaller MPAs where ecological information is scarce.

Reserve size affects the level of protection for ecosystems, and influences the exposure to risk associated with achieving conservation objectives. Some general ecological concepts based on scientific studies can be used to help make decisions on reserve size and location. Small marine reserves can have

positive effects on the abundance, size, diversity, and biomass of animals and plants within their boundaries. However, large reserves can include more and larger habitats, more species, and a greater number of individuals of each species. Thus, by minimising the risk that unknown aspects of species, populations, or supporting biological/oceanographic processes are not included within appropriately zoned MPAs, large reserves can protect more of the local ecosystem, and are less prone to the risks of failing to achieve biodiversity objectives. For example in larger areas, there may be larger samples of populations, reducing the risks of species elimination by catastrophic events. Risk minimisation is not only addressed through the use of larger reserves, but also through the development of complementary management regimes for activities, internal or external, that may be threatening to the reserve values and objectives.

The Panel considers that adequate protection should be given to an area to allow for the on going ecological viability of that area, and of the species represented within them, to ensure that the principles of adequacy and representativeness are well addressed within the NRSMPA. The development and application of broadly-agreed and systematically-derived design principles is presently the best way to minimise the risk of failing to achieve the principles of adequacy and representativeness. This is intended to ensure that the best possible protection is afforded to the ecology of an area, even in areas where there is limited knowledge of ecological function.

In developing MPAs, to be consistent with a systematic conservation planning approach, candidate MPAs need to be selected according to an agreed set of general design principles that are expected, amongst others, to reduce edge effects, increase effective connectivity between areas, and systematically maximise the extent to which conservation objectives can be achieved. The Peer Review Panel has developed a set of guiding design principles (based on the South East principles http://www.deh.gov.au/coasts/mpa/commonwealth/identifying/appendixa.html), to provide a set of overarching considerations that the Panel will use when assessing the CAR effectiveness of a network of MPAs (contained in the 'Assessing the CAR Principles' section below).

Comprehensiveness

ANZECC has stated that the NRSMPA is to include the full range of ecosystems recognised at an appropriate scale within and across each bioregion. However, ANZECC did not establish the spatial scale intended for a bioregion in this definition. The Peer Review Panel has therefore refined the definition of comprehensiveness for the purposes of application in the current Australian context as being inclusive of the full range of ecosystems recognised at an appropriate scale within and across each <u>Province</u>. Our assessment of whether the full range of ecosystems within and across provinces has been included will be derived from the degree to which it has been demonstrated that the best available biophysical information and surrogates have been used in the design phase of the MPAs.

ANZECC has noted that: "In order to achieve the most rapid and significant improvements in the NRSMPA the main priority aim should be to address comprehensiveness". The Australian Government's policy is to work collaboratively with relevant stakeholders to establish MPAs in each of the Provinces (see Definitions below) which do not presently have MPAs.

The Panel anticipates that within each Province, appropriate samples of all recognised finer scale ecosystem levels, including biomes and the significant types of geomorphic features present, will be protected within MPAs in order for MPAs in that Province to be determined to be comprehensive.

Adequacy

The ANZECC guidelines provide that the NRSMPA will have the required level of reservation to ensure the ecological viability and integrity of populations, species and communities.

Adequacy addresses the difficult question of extent: what is the degree of protection that will ensure viability and integrity of populations, species and communities? There are many approaches used to achieve adequacy, ranging from best-guess estimates for poorly-defined ecosystems, to very precise calculations for specific populations of animals and plants.

No precise basis exists for determining criteria that provide for adequacy. As ANZECC has acknowledged, however, the general rule is that the chances of long-term survival increase with increased proportions of populations or ecosystems reserved and appropriately managed. The degree of risk also varies with different species (or suites of species), the degree of ongoing disturbance and with the degree of modification/ ongoing disturbance of the ecosystem beyond reserves. Most estimates show that the risk of loss is highest where only a small percentage of the distribution of the community or species is reserved and adjoining unreserved areas are significantly modified.

Measuring percentage of area protected relative to the total area occupied is a common method of assessing adequacy. Percentage targets for development of MPAs have been discussed through a number of forums within the international marine science community. Suggested percentage targets range from 10 to 50% of each identified habitat or area of occupancy for protection to enable the conservation of biodiversity and maintenance of healthy and productive oceans.

The Pew Fellows in Marine Conservation have released a policy statement[2] (June 2005) on MPA percentage targets that includes a recommendation that states

> "*Place* no less than 10% and as much as 50% of each ecosystem in no-take zones, according to identified needs and management options in a particular ecosystem."

The 2003 IUCN World Parks Congress formulated a series of recommendations[3] on MPAs, stating within Recommendation 5.22:

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[2] *In support of no-take zones and other marine protected areas*: a policy statement by the Pew Fellows in Marine Conservation *June 2005.* http://www.pewmarine.org/

[3] The Vth IUCN World Parks Congress, Durban, South Africa, September 2003. http://www.iucn.org/themes/wcpa/wpc2003/index.htm

> "Greatly increase the marine and coastal area managed in marine protected areas by 2012; these networks should be extensive and include strictly protected areas that amount to at least 20-30% of each habitat, and contribute to a global target for healthy and productive oceans".

This recommendation was subsequently adapted by a technical advisory body to the Convention on Biological Diversity[4] in November 2003. The advisory body recommended a target of 10% effective protection globally, with a longer term goal of 20-30% of each habitat type protected within effectively managed protected areas.

While the use of percentage targets as a generic standard is not Australian Government policy, experience in two Australian MPAs – the Great Barrier Reef and the state waters of the Ningaloo Marine Park– resulted in an outcome of about 30% high level protection. In the South-east the approach has been to set biodiversity conservation objectives appropriate to each ecosystem under consideration.

The Panel will assess the adequacy of each proposed network of MPAs in Commonwealth waters in the light of the emerging range of Australian and international policy and practice on percentage of MPA area compared to the area of occupation in the Province of each identified aspect of biodiversity; on the ecological requirements of identified ecosystems, habitats and populations; on the scale and magnitude of threats to the biodiversity or its constituent species in each Planning Region; on the likely effectiveness of other conservation measures being employed in the Region; and on the extent to which the candidate MPAs achieve the principles of comprehensiveness and representativeness.

The Panel notes that the area required for protection may be highly variable depending on the specific circumstances of each Province. The Panel will expect that an explanation will be provided for the proportion of the Province proposed for protection, particularly where the area is outside of the range of 10-50% as discussed above.

Representativeness

ANZECC has stated that those marine areas that are selected for inclusion in MPAs should reasonably reflect the biotic diversity of the marine ecosystem from which they derive.

The Peer Review Panel has identified that the principle of representativeness has similarities to that of comprehensiveness, however is at a finer spatial and taxonomic scale. An understanding of the heterogeneity of a Region will be important for the Australian Government to consider when designing a strategy to representatively sample the range of biotic diversity across ecosystems in an MPA network.

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[4] United Nations Environment Program. Convention on Biological Diversity. Subsidiary body on scientific, technical and technological advice. 9th meeting, Montreal. November 2003, Item 7 of provisional agenda. http://www.unep.org/

The Peer Review Panel considers that it is not possible to know the fine detail about the location of every element of biodiversity that occurs within an ecosystem. Representativeness should be approached in a practical way, and the Peer Review Panel anticipates that available or readily acquirable data, depending on its type, quality, and resolution, will be used in the design of a reserve system.

The Peer Review Panel supports the use of geomorphic datasets as province-wide surrogates for broad-scale ecosystems and habitats. However, geomorphic datasets should be refined or interpreted at finer scales with ecological datasets that may be available, including ecological and oceanographic data that may apply to only parts of the Province, or to broader-scale processes that may affect the Province. Where such data on the actual biodiversity (as opposed to the high level geomorphic surrogates) is limited, modelled biological attributes may be required (such as the modelled distribution of fish populations) to provide province-wide data useful for MPA selection.

The Panel anticipates that within each Province, appropriate samples of all recognised biodiversity features, expressed at the finest level of taxonomic resolution or surrogacy that is practical to achieve, will be protected within MPAs in order for MPAs in that Province to be determined to be representative.

Assessing the CAR Principles

The following section provides some guidance on how each of the CAR principles will be assessed by the Peer Review Panel, based on the interpretation of these principles expressed above.

The Peer Review Panel notes that each of the CAR principles is equally important in delivering a network of MPAs to protect biodiversity. However, the degree of confidence in assessing each of the CAR principles will vary. The degree of confidence will be highest in our assessment of comprehensiveness and lowest in our assessment of adequacy.

The Peer Review Panel will assess MPA options provided to us by the Australian Government based on the extent to which a network of MPAs meets the CAR principles.

In determining the spatial limits of a proposed reserve system, the Peer Review Panel considers that a logical sequence of the application of the CAR criteria by the designers of the MPA network (i.e., the Australian Government) would be implemented iteratively to achieve an optimum outcome, as below:

First – Comprehensive: select candidate areas and adjust the boundary of the candidate MPA area(s) to meet the requirements to include representatives of the high level features (such as provinces, biomes, biodiversity features of significance);

Second – Representative: refine the boundaries to include as much as possible of the known features within the above classes (such as ecosystems, habitats, assemblages);

Third – Adequate: finally, the boundaries are assessed and revised where necessary on the ability of the areas within the reserve system to sustain the conservation objectives over time.

The Panel will consider details on the information used, the process followed and the outcomes delivered during the design process. The Peer Review Panel will rely on existing bodies, such as the Scientific Reference Panel formed to support MPA development in each Region, to inform our understanding of the process used to develop a network of candidate MPAs and the relative strengths, weaknesses and risks attached to the candidate MPA network(s). The Panel will also look for a level of assurance accompanying the proposed areas that a systematic review mechanism is in place to allow for adaptive management to occur where improved knowledge and understanding of the ecological function of an area may lead to a change in management regimes or area boundaries to better protect the ecological values of the MPA or of the Province.

In assessing a network of candidate MPAs the Peer Review Panel will make both quantitative and qualitative assessments. The Panel expects to be able to quantitatively measure things such as the representation of key biodiversity features within a candidate network of MPAs in each Province. Some assessments, particularly those related to adequacy, may have to be done qualitatively, but nonetheless will be based on information and scientific opinion provided by the MPA designers.

Overarching considerations for the assessment of a proposed network of MPAs.

The following considerations are those that the Peer Review Panel anticipate will have been contemplated during the design of an MPA network. We understand that there are also policy statements from the Australian Government that relate to the implementation of the NRSMPA that will guide the Government in its design phase. The policy position is provided in Attachment B.

1. **Size and Number**: each Region should include a small number of large MPAs rather than a greater number of small MPAs. This is to assist with (a) minimising edge effects and the influence of off-reserve impacts (b) minimising the risk of failing to include unknown aspects of biotic diversity, and (c) more practical and feasible management arrangements.

2. **Areas protected**: The network should contain appropriate samples of each known conservation feature, community type and physical environment type of each Province in the overall network. This is to ensure that all known features, communities and habitats that exist within a Province, along with areas of geomorphic surrogates (taking account of the uncertainty involved in using surrogates), are included in the MPAs.

3. **Level of protection**: Each Province should include sufficient high-level protection MPA zones, and/or multiple use zoning where risks are appropriately managed, that will satisfy regional and CAR objectives, in a manner consistent with the precautionary principle. This is to ensure that the

size, shape and zoning of MPAs are developed to be most appropriate for achieving conservation outcomes, rather than for logistic or other reasons. "Sufficient" refers to the amount and configuration of high-protection areas and may be different for each Province depending on its characteristics.

4. **Ecological robustness**: Each Province should include MPAs of a size and shape that are ecologically robust in terms of protecting what is known about the conservation values of the Region. This is to ensure that there is a low level of risk that conservation features are not appropriately protected in each Province. Achieving ecological robustness may require 'replication' of features within MPAs across the Province to provide insurance against human or natural impacts at single locations, and to sample gradients within Province-level conservation features.

5. **Physical features:** Where a physical feature is incorporated into the MPA, where practicable the whole feature should be included. Identifiable physical features (such as seamounts, canyons, persistent upwellings) are relatively integral biological units with a high level of connectivity among habitats within them, and risks should be managed to achieve adequate protection of the entire feature by appropriate zoning.

6. **Provide for ecological connectivity**: The network should represent the best possible arrangement of MPAs in terms of spacing and orientation according to what is known about migration patterns, currents, ocean features and connectivity among ecosystems. This is to minimise the risk of failing to include unknown functional relationships that may be important in maintaining the on- and off-reserve biotic diversity. Many processes may create along-slope and cross-slope differences in habitats and communities. This diversity is reflected partly in the distribution of the provincial and finer scale bioregions, but care should be taken to choose highly protected areas that include differences in known community types and habitats that cover along and across-slope ranges.

7. **Provide for reference sites**: The network should contain MPAs in each Province with highly protected areas (IUCN categories I or II) dedicated as scientific reference sites, and to ensure that samples of representative systems are managed in as close to an undisturbed state as possible. This is also to ensure that there are appropriate areas maintained in a condition that will permit effective monitoring and adaptive management to be applied to the network of MPAs across each Province and the Region.

8. **Include biophysically unique sites**: The network should include such biophysically special/unique places that may be identified for each Province. These places might not otherwise be included in the network but will help ensure the network is comprehensive and adequate to protect biodiversity and any known special or unique areas.

9. **Performance assessment**: The regional network should be designed to provide for regular review of the performance effectiveness of the system in achieving biodiversity conservation at the Provincial and Regional level. This is to ensure that the procedures through which the MPA network will be assessed are established in the initial design process, and to enable adaptive improvements to the MPAs.

10. **Complementary management**: The MPA network is designed and reflects, where appropriate, identified threats and risks to achieving the objectives of the MPAs that can be addressed through other management regimes that are in place in the Region, including any existing MPAs, and other sectoral spatial arrangements in the Region. This is to encourage the integration of the MPA network with existing management arrangements in the Region provided they are secure and formalised, and can be verified as supporting the conservation objectives at the Provincial and Regional level.

How the Panel will assess Comprehensiveness

The Panel will use the Provinces as described in Attachment B, as the basic spatial unit and framework for the assessment of the network of candidate MPAs in terms of how the network meets the principles of comprehensiveness.

The Panel will consider how a network of MPAs meets the biodiversity conservation objectives of relevant Planning Regions as a first priority and will consider how surrogates for biodiversity have been applied within that Region when assessing the comprehensiveness of a network of MPAs. The Peer Review Panel will expect, for an assessment of comprehensiveness, that each of the Provinces within a Planning Region has MPAs in the network. The Panel will then consider how ecosystems within and across each Province have been included.

The Panel will require documentation of the MPA objectives, what surrogates were used and what data were available and used in the MPA design process. Clearly expressed biodiversity objectives will assist the Peer Review Panel and should include relevant recognised regional values, whilst focussing on achieving biodiversity conservation outcomes for that Region and serving the purposes of C, A and R. The Peer Review Panel anticipates that the data used have been the best available at the time of reserve design, and that referring back to the original data will show that all identified conservation values have been captured within the MPA network.

The Peer Review Panel notes the risk that a lack of information, particularly about fine scale patterns of biodiversity, will make it difficult to deliver an MPA outcome that meets the stated objectives or to assess the likely effectiveness of the MPA outcomes. The Peer Review Panel therefore recommends that future research testing surrogacy assumptions should be an important feature of any on-going monitoring of a network of MPAs with a reassessment of the comprehensiveness of any network of MPAs being conducted as more information becomes available.

List of questions to be considered for assessment of comprehensiveness across a Region.

- What are the biodiversity objectives for the Region as they relate to comprehensiveness?
  - How will these objectives be met through this MPA design?

- What was the design process used to ensure these objectives could be met?

- How have the supplied statements of objectives been focused on delivering the biodiversity conservation outcomes for the Region?

- What geomorphic, oceanographic and biological scientific information has been used in the MPA design process?

  - How has this information been sufficient for the development of the proposed area?

- What process was used to source the required information/datasets?

  - How were data custodians identified and approached to contribute data

  - What information was used, what are the justifications for not using any of the available information?

  - How was this information used in the design process?

  - What are the areas of uncertainty in the required information?

- How do the regional values identified at the outset of the MPA process relate to comprehensiveness?

  - How have these values been addressed?

- What proportion of each Province, biome and significant geomorphic or biodiversity feature is captured? To be presented as tables/maps as appropriate.

  - What are the implications for the non inclusion of any features that have not been represented?

- How has the MPA design process taken into account the uncertainty in input data and knowledge to apply a precautionary approach to the selection of candidate areas in each Province to address comprehensiveness?

How the Panel will assess Adequacy

The adequacy of a network of MPAs will be highly dependant upon the scale and characteristics of the ecosystems being considered, the level of threat present in the Region, and the other management measures existing alongside the network of MPAs. An assessment of the adequacy of a network of MPAs will be based on the regional conservation objectives, information and process used to derive that network. Therefore an assessment of adequacy will be highly specific to each Region and in particular to the threats to biodiversity in that Region.

In assessing adequacy, the Peer Review Panel will consider the reserve design, including the size, shape, replication, level of reservation and connectivity of the network of MPAs, the level of threat to biodiversity in the Region, the level of ecosystem vulnerability and the management of threats within and outside the network of MPAs.

It should be noted that while the size, shape and spacing of a network of MPAs are important determinants of adequacy, an arbitrary percentage target to define adequacy does not take into account threats to biodiversity values, management effectiveness within reserves and complementary management of areas outside of reserves. Given the arbitrary nature of percentage targets, a variety of assessment tools will be used to evaluate the network of MPAs in terms of how they meet the principle of adequacy. The Panel however anticipates that percentage occupancies achieved within the MPA network for each conservation feature will be a key parameter that relates to adequacy. The Panel will expect that an explanation is provided for the proportion of the Province proposed for protection, particularly where the area is outside of a range of 10-50%.

The Peer Review Panel will consider how MPAs may perform their core function of biodiversity conservation in the context of the regional demands placed upon the marine environment, in assessing the likely adequacy of a proposed regional MPA network in protecting biodiversity. The Peer Review Panel will be looking for information to be provided regarding the MPA objectives, known or expected regional ecological processes (eg species, communities, spatial and temporal variation and information on food webs) and the interaction of the candidate MPA network with those identified processes.

The Peer Review Panel, in assessing adequacy, will look at whether the threats to biodiversity of the Region have been identified and reasonably addressed through the design of the network of MPAs. It will also be important for the Peer Review Panel to be given an indication of any on-going performance assessment frameworks planned for the proposed network of MPAs.

The Peer Review Panel anticipates that a precautionary approach to reserve design will be followed and that risks of failing or undermining the adequacy criterion have been considered in the design of the network of MPAs to ensure a high probability that adequacy is achieved in the NRSMPA. The Panel will require a list of values identified for the Region and an assessment of foreseeable risks or threats to those values together with statements of how those risks and threats have been accounted for in the design of the proposed MPA network. An MPA network within a highly threatened environment may require a combination of protection measures, which may include a higher level of protection or larger MPAs than an MPA network within an area of lower risk.

List of questions to be considered for assessment of adequacy across a Region.

- What are the biodiversity objectives for the Region as they relate to adequacy?
  - How will these objectives be met through this MPA design?
  - What was the design process used to ensure these objectives could be met?

- How have the supplied statements of objectives been focused on delivering the biodiversity conservation outcomes for the Region?

- What geomorphic, oceanographic and biological scientific information has been used in the MPA design process?

  – How has this information been sufficient for the development of the proposed area?

  – What information has not been included in this process, and what is the rationale for its exclusion?

  – What (if any) surrogates have been used during the design of the MPAs?

- How has the MPA design process taken into account the uncertainty in input data and knowledge to apply a precautionary approach to the selection of candidate areas in each Province to address adequacy?

- How has the MPA design process taken the general principles of size, shape, connectivity and edge effects into account, to ensure conservation features and values are protected in each Province and across the Region?

  – What ecological features and/or processes have been used in determining the adequacy of the MPA design?

  – What are the recognised values this network is seeking to protect?

  – What scale considerations have been looked at in the design process?

- How has the design process identified and taken into account the threats/risks and management arrangements (for both the MPAs and surrounding areas) present in the Region?

  – What are the current or proposed management regimes for the area, and how have these been deemed to be adequate to address any identified threats or risks?

  – What are the values identified for the Region (*in the case of the South-east it is understood these are primarily geomorphic features and benthic habitats*) and how has an assessment of any foreseeable risks or threats to those values been applied to the design of the proposed MPA network.

- What are the indicative performance assessment frameworks proposed for the MPA network?

  – How have these frameworks been taken into account in the design process?

  – What monitoring regimes are proposed for the proposed MPAs?

  – Have any specific areas of uncertainty or areas requiring research been identified?

  – What is the proposed process for a review of the performance of the MPAs?

- How has the issue of ecological sustainability been considered and addressed in the design phase of the MPAs?

- What whole features have been identified during the design process?

  – How has their inclusion been addressed in the MPA design to ensure the protection of the function of related ecological systems?

  – What are the features identified that have not been included within the MPAs?

  – What justifications are there for their non inclusion?

The Panel notes that some of these questions as they relate to adequacy may be difficult to answer completely. However, it is expected that these things have been at least considered, incorporated into the design process, and at least some level of justification can be provided in response to each question to inform the Panel's assessment of adequacy.

How the Panel will assess Representativeness

In assessing representativeness the Peer Review Panel will consider whether the best available data, at appropriate scales, have been used and all known habitats or conservation features in the Region have been represented in a network of MPAs. It is expected that where practicable entire physical features will be incorporated within an MPA, for example an entire seamount, not just one part of the feature.

The Panel will be looking to see that all the known conservation features and habitats of a region will, as a starting point, be represented within the proposed MPA network at approximately similar levels as they are represented within the Province. The assessment of proportional representation is in addition to assessment of absolute percentage protected under adequacy.

The Peer Review Panel will consider the spatial scale of ecosystem classification, the nature of the data available for the Region, the regional objectives and how knowledge has been used in the MPA design process.

The Panel will consider the issue of data density for a particular area as a part of the determination of representativeness. The Panel will consider the need for, and practicality of, the development of modelled biodiversity data for use in the design process. The Peer Review Panel anticipates that where data densities are low the principle of precaution will have been applied so as to result in a relatively larger MPA with an appropriately higher level of protection that will give the best opportunity for the network of MPAs to capture the expected biotic diversity within the Region.

List of questions to be considered for assessment of representativeness across a Region.

- What are the biodiversity objectives for the Region as they relate to representativeness?

  – How will these objectives be met through this MPA design?

  – What was the design process used to ensure these objectives could be met?

- How have the supplied statements of objectives been focused on delivering the biodiversity conservation outcomes for the Region?

- What geomorphic, oceanographic and biological scientific information been used in the MPA design process?

  – At what scales is this information, and how was this determined to be sufficient for the design process?

- What are the known habitats and conservation features present within this Region?

  – How have these been represented within the MPA design?

  – What is the proportion of each mapped conservation feature as it appears in the MPAs compared to area of occupancy? Any extremes of proportional representation within the MPAs should be explained.

- What ecologically special areas have been identified in this Region?

  – What consideration has been given to these known ecologically special areas in the design process?

  – Have these areas been included in the proposed MPAs?

  – What justifications are there for any non inclusions?

- How has the MPA design process taken into account the uncertainty in input data and knowledge to apply a precautionary approach to the selection of candidate areas in each Province to address representativeness?

Conclusions

The development of the NRSMPA in Australia's marine environment is one of the mechanisms being employed by the Australian Government in achieving the goals of Australia's Oceans Policy in relation to the protection of our marine environment.

The development of a NRSMPA is considered to be one of the most effective mechanisms for achieving biodiversity conservation in the marine environment, when used in combination with other appropriate conservation and management regimes. The NRSMPA forms a part of an integrated strategy for marine conservation and management under regional marine planning, with a primary goal of biodiversity conservation.

The Australian Government has tasked the Peer Review Panel to undertake a process of assessment of the likely effectiveness of biodiversity conservation, as delivered through the principles of comprehensiveness, adequacy and representativeness, in the MPA network proposals for each Region. After considering the results of the assessment against these principles and refining proposals as appropriate, the Government can be confident in the design of the final MPAs, ensuring that they will significantly contribute to the protection of Australia's marine environment.

In undertaking its review function, the Peer Review Panel will be assessing the proposed areas for inclusion to the NRSMPA based on information provided to it by the Australian Government, drawing on local expertise such as the Scientific Reference Panels established for each Planning Region. This information will be required by the Peer Review Panel to detail the approach taken, objectives of the proposed area, the data used in determining the proposed areas, and the management regime(s) within which these areas exist, including the provision of performance assessment programs for the proposed MPAs. Issues of threats and risks will also need to be addressed in this documentation to ensure that the Panel can judge the likely adequacy of a proposal to minimise those threats to the conservation of the biodiversity values, and overall ecological functionality of the network of MPAs. The Panel will require justifications to be made within the supporting documentation, especially where any assumptions have been made because of uncertainties and knowledge gaps, so as to be assured that the proposed areas are suitable to achieve the goals of the NRSMPA.

In developing and assessing these proposed networks of MPAs, the Peer Review Panel acknowledges that there are data limitations within Australia's marine environment, and that proposals will be based on the best information available at the time. The Panel considers that a systematic MPA design approach that involves the principles of precaution in the designation of proposed areas, and a subsequent adaptive management framework employed in the area will be important in the long term implementation and development of the NRSMPA. This can ensure the best possible outcome for the conservation of our marine resources, biodiversity and ecosystems.

Definitions

Adequate: can be defined as the maintenance of ecological viability and integrity of populations, species and communities.

Comprehensive: This principle requires that a reserve system samples the full range of ecosystems across the network of MPAs. Due to the wide variation in ecosystems around the continent it can be difficult to make effective consideration of comprehensiveness on a continental scale. Smaller and more manageable regional units (provinces) are therefore necessary as a basis for consideration of comprehensiveness.

Representative: This principle is designed to ensure that the diversity within each recognised ecosystem is sampled within the reserve system. Using best available species distributions alone will not guarantee the inclusion of all elements of biodiversity. However, using these distributions together with surrogates of species diversity and distribution can increase confidence that the reserve system does cover the full range of biodiversity.

Adaptive management: Adaptive management allows changes to be made as new information becomes available about impacts and potential measures to promote biodiversity conservation. Adaptive management is best practice management that integrates research and action designed to illicit information that improves understanding about how systems work and their responses to specific management measures.

Area of Occupancy: the percentage of a Province occupied by a feature.

Biome: A major regional ecological community of plants and animals extending over large natural areas. In the benthic bioregionalisation, biomes are biogeographic units based on primary bathymetric units (eg shelf, slope and abyss) and faunal communities that are nested within provinces.

Bioregion: Assemblages of flora, fauna and the supporting geophysical environment contained within distinct but dynamic spatial boundaries. Biogeographic regions vary in size, with larger regions found where areas have more subdued environmental gradients.

Bioregionalisation: A regionalisation that includes biological as well as physical data in analyses to define regions for administrative purposes.

Geomorphic Unit: A group of geomorphic features that represent areas of similar geomorphology

Geomorphic Feature: A distinct element of the seabed such as a seamount, canyon, basin, reef or plateau.

Large marine domain: Area in the order of > 200 000 km^2 characterised by distinct bathymetry, hydrography, productivity, species composition and trophically inter-dependent populations.

Province: A large-scale biogeographic unit derived from evolutionary processes in which suites of endemics co-exist. Defined here for Australia's EEZ as the 41 Provinces established within the NMB and IMCRA (see attachment B).

Precautionary approach:

1. the precautionary principle can be characterized this way: "when an activity raises threats of serious or irreversible harm to human health or the environment, preventative or corrective measures should be taken even if some cause and effect relationships are not fully established scientifically"

2. Lack of full knowledge should not be an excuse for postponing action to conserve biological diversity.

Region: Planning Region, in Commonwealth waters beyond 3nm, as defined by the Australian Government in the regional marine planning process.

Regionalisation: The process and output of identifying and mapping broad spatial patterns based on their physical and/or biological attributes for planning and management purposes.

Surrogate: One that takes the place of another; a substitute. For example, it is often known that different seabed or topographic features (e.g., shallow rocky reefs) tend to be characterised by particular suites of biological features, meaning that knowledge of the distribution of the physical features can be used to infer the presence of that suite of biological features. In benthic regionalisations, physical characteristics of the seabed (e.g. geomorphic features or sediment types) are often used to infer bioregions in the absence of direct biological information. Or, in ecological terms, an assemblage of organisms may be used as a substitute for more detailed knowledge of biotic diversity of those organisms. The use of surrogates carries with it the risk that the surrogate may not faithfully represent the feature of the primary attribute that the surrogate has been chosen to represent. For an MPA network, all surrogates are intended to reflect some aspect of biotic diversity.

ATTACHMENT A

Terms of Reference – Scientific Peer Review Panel

The Scientific Peer Review Panel will provide scientific advice on the extent to which the proposed network of representative MPAs meets system-wide objectives, particularly in relation to comprehensiveness, adequacy and representativeness. The Panel will undertake this assessment initially for the proposed network of MPAs in the South-east Region, with the expectation that this role may continue in other regions as Regional Marine Planning unfolds around Australia.

The peer review will be undertaken within the context of the policy framework described in Attachment B. The National Marine Bioregionalisation will provide a broad scale spatial framework for further development of the National Representative System of Marine Protected Areas (NRSMPA). The review should be mindful that the network of representative MPAs builds upon a framework of existing MPAs as well as other national, state, and territory management conservation tools.

In the South-east Region the Panel will:

1. Provide advice on the extent to which the network of candidate MPAs is likely to meet the NRSMPA principles of comprehensiveness, adequacy and representativeness at a system-wide level.

2. Provide advice on the key issues for the long-term maintenance and performance of the network of MPAs in the South-east Region.

3. Review the effectiveness of the User's Guide and its associated specifications as the tool for designing a comprehensive, adequate and representative network of MPAs in the South-east in conjunction with IMCRA 3.3 and the Interim Bioregionalisation of the South-East Marine Region.

Following a review of the role of the Peer Review Panel, it is anticipated that the Panel would provide advice in other regions (initially the North and South-west). In other regions it is anticipated that the Panel would

1. Once candidate MPAs are developed, provide advice on the extent to which the network of candidate MPAs is likely to meet the NRSMPA principles of comprehensiveness, adequacy and representativeness at a system-wide level.

2. Provide advice on the key issues for the long-term maintenance and performance of the network of MPAs in each Region.

The Panel's advice, together with the results of public consultation and the Department's assessment of socio-economic impacts, will form the basis of recommendations, through the Commonwealth Marine Protected Areas Committee, to the Minister for the Environment and Heritage and the National Oceans Ministerial Board.

MEMBERSHIP

The Peer Review Panel members and their affiliations

Dr Ian Poiner (chair)	CEO, Australian Institute of Marine Science (AIMS)
Mr Peter Farrell	Principal, Macro-Environmental Environment and Resource Consultants
Professor Bruce Mapstone	Director, ACE CRC Faculty of Science, Engineering and Technology, University of Tasmania
Dr Keith Sainsbury	Senior Principal Research Scientist, CSIRO Marine Research
Dr James Stoddart	Adjunct Associate Professor Marine Science, School of Plant Biology, University of Western Australia
Dr Trevor Ward	Adjunct Senior Research Fellow, School of Earth and Geographical Sciences, University of Western Australia

ATTACHMENT B

The Australian Government: Statements relating to MPA Development

Background: ANZECC Guidelines

In 1998 Australian governments, through the then ANZECC, committed to developing a NRSMPA. In 2001 ANZECC was replaced by the Natural Resource Management Ministerial Council.

The primary goal of the NRSMPA is to establish and manage a comprehensive, adequate and representative network of MPAs to contribute to the long-term ecological viability of marine and estuarine systems, to maintain ecological processes and systems, and to protect Australia's biological diversity at all levels. Further information about the NRSMPA, including secondary goals and principles underlying the development of the NRSMPA, are detailed in the S*trategic Plan of Action for the NRSMPA*[5].

ANZECC developed *Guidelines for Establishing the National Representative System of Marine Protected Areas*[6] (the Guidelines) to assist government agencies in the development of the NRSMPA and to assist stakeholders in understanding this process. The Guidelines set out criteria for the identification and selection of MPAs, with biodiversity conservation criteria being the primary drivers for the identification of candidate areas. The agreed approach to developing the NRSMPA emphasises the use of scientific data and stakeholder consultation in the classification and identification of areas.

The ANZECC guidelines assist governments to develop a NRSMPA that will be:

> Comprehensive: include MPAs that sample the full range of Australia's ecosystems;

> Adequate: include MPAs of appropriate size and configuration to ensure the conservation of marine biodiversity and integrity of ecological processes; and

> Representative: include MPAs that reflect the marine life and habitats of the areas they are chosen to represent.

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[5] Australia and New Zealand Environment and Conservation Council (1999) Strategic Plan of Action for the National Representative System of Marine Protected Areas : A guide for Action by Australian Governments, Commonwealth of Australia July.
http://www.deh.gov.au/coasts/mpa/nrsmpa/index.html

[6] Australian and New Zealand Environment and Conservation Council Taskforce on Marine Protected Areas (1998) *Guidelines for Establishing the National Representative System of Marine Protected Areas*, December, Commonwealth of Australia

Together these principles are called the 'CAR principles'. While the satisfaction of all three CAR principles is important for the development of an effective network of MPAs, lack of information, especially in deepwater areas, makes practical assessment of these principles difficult. These challenges are not resolved in the ANZECC Guidelines or in other literature.

The ANZECC documents recognize that governments will interpret the Guidelines so that they are effectively integrated with existing processes and legislation in each jurisdiction. The publication: *Australia's South-east Marine Region: a User's Guide for Identifying Candidate Areas for a Regional Representative System of Marine Protected Areas* (the User's Guide)[7] is the Australian Government's first attempt to interpret and apply the Guidelines at a regional level in Commonwealth waters (predominantly offshore marine environments). The User's Guide interprets the Guidelines within the context of limited data and Australian Government policy on MPA development.

Policy Context

In 1998 the Australian Government released its Oceans Policy. One of the undertakings of this policy is to ensure that there is development of a high level of understanding of the marine environment, including the interaction of human activities with biological resources and the ecologically sustainable use of the marine environment.

Regional Marine Planning (RMP) is a key tool, adopted by the Australian Government in implementing Oceans Policy, which seeks to integrate the use, management and conservation of the marine environment at the broad ecosystem level. The Regional Marine Plans are based on large marine areas that are ecologically similar that have been defined through a process of compilation and interpretation of existing marine science data.

Under RMP, MPAs are one of the tools available to achieve the goals of biodiversity conservation. MPAs are not regarded as the only effective tool to address marine biodiversity conservation issues. Examples of other conservation measures include the restrictions placed on various fishing gears to manage interactions with protected species such as turtles, seabirds and seals; species recovery plans; threat abatement plans; and guidelines on interaction with whales.

The Australian Government is committed through Australia's Oceans Policy to delivering the NRSMPA through regional marine planning. Within each of the regional planning areas a series of Provinces have been defined largely based on areas of endemism for demersal fish (see Regionalisations below). Some of these Provinces already have MPAs represented in the NRSMPA through the establishment of Australian Government and/or state marine

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[7] Department of Environment and Heritage, CSIRO Marine Research and National Oceans Office (2003), *Australia's South-east Marine Region: A User's Guide to Identifying Candidate Areas for a Regional Representative System of Marine Protected Areas*. August, Canberra, Australia. http://www.deh.gov.au/coasts/mpa/southeast/index.html

protected areas. The priority for the Australian Government is to establish MPAs in those Provinces not already included in the NRSMPA.

In developing MPAs the Government will identify the relevant information that is available for use in the selection process. Ideally, planning and management for the NRSMPA will be based around a detailed understanding of all ecosystems and processes, but it is recognised that this understanding is limited. While there is good information about the geomorphology of Australia's seafloor, biological information is patchy and incomplete, particularly in the deep offshore environments (where, for example, there is limited information on species distribution and ecological processes).

It is the Government's policy that in the absence of sufficient information about species, habitats and their conservation requirements, decisions about MPA size and management/zoning will be made on a precautionary basis. Where there is limited information for a Region the Government's approach is to seek large IUCN category VI protected areas initially with a view to adapting zoning and management prescriptions over time as additional information becomes available. This approach is consistent with the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act), under which the MPAs will be declared, whereby management plans will be reviewed every 7 years to continuously improve information on conservation values and the adequacy of arrangements to protect these values.

While the primary aim is biodiversity conservation, the Government's policy is to make every effort to minimise unnecessary socio-economic impacts when developing MPAs. Socio-economic and cultural considerations, as well as issues of management practicality and feasibility, will influence the boundaries and the number of individual MPAs and the design of the system as whole.

Regionalisations

Regionalisations provide spatial frameworks that have applications for many aspects of environmental management. They are based on collated data and inferred patterns in the distributions of plants, animals and environmental features across a variety of spatial scales. Regionalisations are an accepted tool to assist in the description of ecosystem boundaries for planning and management in the natural environment.

Regionalisations contribute to an understanding of the wide variety of marine environments and form an important input to planning and management decisions that may be made at different spatial scales.

Current knowledge of the ecological structure of Commonwealth waters is included in two core regional data sets:

- The Interim Marine and Coastal Regionalisation for Australia[8] (IMCRA) for areas on the continental shelf to the 200 metre isobath

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[8] Interim Marine and Coastal Regionalisation for Australia Technical Group. 1998. *Interim Marine and Coastal Regionalisation for Australia: an ecosystem-based classification for marine and coastal environments. Version 3.3.* Environment Australia, Commonwealth Department of the Environment. Canberra.

- The National Marine Bioregionalisation (NMB) developed by the Australian Government for the deepwater areas outside the continental shelf.

The Australian Government will use the NMB and IMCRA regionalisations as a framework for the development of the NRSMPA. These regionalisations represent a synthesis of key biological, geological and oceanographic data to provide a spatial framework for classifying Australia's marine environment into areas that make sense ecologically, given information available at the time of analysis[9], and are at a scale useful for regional planning and subsequent finer levels of planning and management. An outline of the broad scale Regions defined in the NMB is provided in Table 1. The two regionalisations contain benthic and pelagic components. The benthic regionalisation is being used as the framework for the development of NRSMPA in Commonwealth waters. Both regionalisations were based on the best information available at the time of their development.

It is the policy of the Australian Government to use the 41 benthic provincial bioregions (Provinces – see figure 1) described in these frameworks as the primary regionalisation for the development of the NRSMPA in Commonwealth waters, refined through inclusion of finer scale data where available within Provinces. Finer scale ecosystem detail is also included in the NMB, which describes biomes that are nested within Provinces in areas of continental slope. Geomorphic units, clusters of geomorphic features, have also been used to help derive the boundaries of the Provinces in areas lacking robust biological data.

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[9] The IMCRAv3.3. regionalisation was last reviewed and updated in 1998. The NMB was based on data available in 2004.
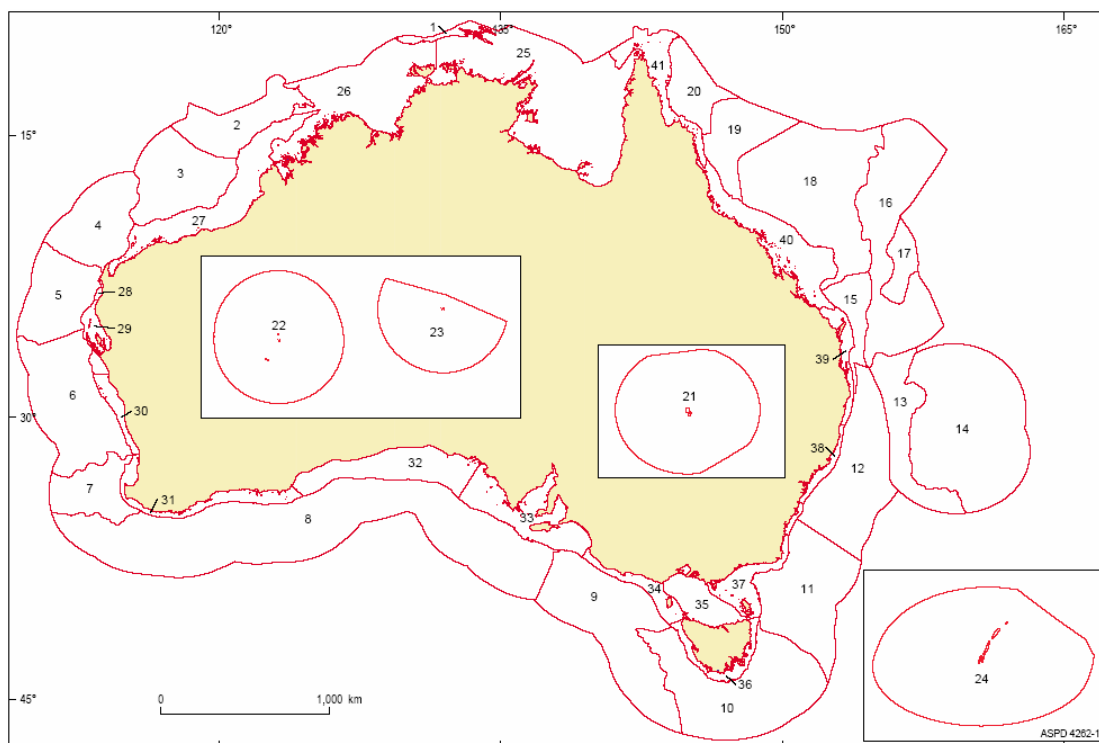
Figure 1. Provinces of Australia's EEZ. Provinces 1-24 are the off-shelf provinces derived from the NMB. Provinces 25-41 are the shelf provinces derived from IMCRAv3.3. Insets numbered 21-24 are the provinces described for Australia's offshore territories of Norfolk Island, Cocos (Keeling) Island, Christmas Island and Macquarie Island.

Table 1. Levels of the NMB benthic bioregionalisation.

Name	Description	Indicative Area
Ocean Basins	Regions of the seabed between the continental landmasses including their associated physical features and biota.	Greater than 100 000 km^2
Ocean Climate Zones	Capture the broad differences in water masses as defined by physical properties (eg temperature, salinity and nutrients).	Greater than 100 000 km^2
Primary Bathymetric Units	Major benthic sub-divisions at a national scale consisting of continental shelf, slope, rise and abyssal plain.	Greater than 100 000 km^2
Provincial bioregions	Large biogeographic regions based principally on the broad-	10 000–100 000 km^2

(Provinces)	scale distribution of fish, and large scale geomorphic features below 2,000m.	
Biomes (continental slope only)	Biogeographic regions based on depth ranges of fish communities. These units have only been defined on the slope due to data availability. Biomes are nested within Provinces.	Less than 1000–10 000 km^2
Geomorphic Units	Areas of similar geomorphology.	Less than 1000 – greater than 100 000 km^2