



FLORA & FAUNA
GUARANTEE

NOMINATION NO. 794
COMM.

FLORA AND FAUNA GUARANTEE - SCIENTIFIC ADVISORY COMMITTEE
PRELIMINARY RECOMMENDATION ON A NOMINATION FOR LISTING

Port Phillip Bay Entrance Deep Canyon marine community

Date of consideration:

11 December 2007, 19 March, 25 June, 1 October 2008

File No.: FF/54/0673

Validity:

The nomination is for a valid item and the prescribed information was provided.

The nominated community is clearly described in such a way as to be distinguished from all other biotic communities. The Port Phillip Bay Entrance Deep Canyon Marine Community is reef community on a mixed substrate of aeolian calcarenite and old basaltic rock characterised by an unusually large number of species of poriferans, hydrozoans, ascidians and bryozoans, many of which are considered rare.

Name of the Nominator is adequately provided.

Name of the Item is adequately provided.

The nominated community is accepted by the Scientific Advisory Committee (SAC) as a valid community because it is adequately defined and described according to accepted practice, and it is described in such a way as to be distinguished from all other communities.

The Deep Canyon Marine Community is described as follows.

A community dominated by sessile invertebrates that is commonly termed 'sponge gardens' after the predominance and variety of sponges present; the community also comprises ascidians, bryozoans, hydroids and corals. The biota is of high diversity as evidenced by both validated taxonomic records and the variety of sponge morphotypes present. The species and diversity of sessile invertebrates at Port Phillip Heads is relatively well documented by comparison with other southeastern Australian deep reef environments.

There have been over 271 validated species of sponges collected from Port Phillip Heads, which is a substantial proportion of the 523 known species from Victoria and the 1416 valid species in the Australian sponge fauna. Importantly, 115 of the sponge species collected at Port Phillip Heads are presently known only from that area. Recent sampling in Australia has not extended the range of species known only from Port Phillip, but rather identified additional areas of high biodiversity and endemism (Ponder *et al.* 2002; Sorokin *et al.* 2005).

Port Phillip Heads is one of the few main collection areas in southern Australia for bryozoans. It is considered to be a place of high bryozoan diversity, with a more diverse bryozoan fauna than Europe (P. Cook, P Bock; cited in Ponder *et al.* 2002). Port Phillip Heads is noted as one of three areas particularly rich in hydroid fauna (Watson 1982; the others being Backstairs Passage in S.A. and Crawfish Rock in Western Port). Port Phillip is the type locality for three ascidian species, one of which is only known from Port Phillip Heads.

Within the community there are a number of assemblages based on species association and abundance, although whether they represent functional, environmental, or merely stochastic, associations is not known. Specific characteristics of the community structures are described by Edmunds *et al.* (2005, 2007). The deep canyon sessile invertebrate biota of Port Phillip Heads is significantly different to all other deep reef communities known from Victoria. Characteristics that distinguish the canyon community from other deep communities in Victoria include: very high abundances of sponges (average of 65% cover); high abundances of the large erect hydroids *Nemertesia procumbens*, *Halopteris glutinosa* and *Halicornopsis elegans*; very low abundance of the gorgonian coral *Pteronisis* spp.; absence of the sea whip coral *Primoella australasiae*; and absence of thallose seaweeds and encrusting coralline algae.

The marine environment at the entrance of Port Phillip Heads consists of banks of intermediate-depth reefs (approximately 17 m deep) with a very deep, steep-sided canyon to depths of 100 m meandering from between the Heads to approximately 1.6 km to the north. The canyon bisects the two flanks (Rip Bank and Nepean Bank) of a shallow, rocky submarine plateau that spans the entrance of Port Phillip Bay. The huge volumes of water ebbing or flooding through the heads cause considerable turbulence, hence this area is called The Rip. The Port Phillip Heads entrance is a unique marine environment in Australia, and this almost certainly influences its biotic distinctiveness. The combination of features that contribute to this uniqueness include: very high current flows (3-8 knots); high exposure to swell; high depth range (14 - 100 m); highly eroded rock faces creating a complex of different substratum structures; high particulate loading in the water column during strong tides and storms; adjacent productivity from seagrass and kelp beds; and fully marine salinity.

The environmental conditions in The Rip are not uniform, with a variety of different physical habitats present, varying continuously along gradients or discretely across boundaries in different places. Similarly, the distribution of biota in The Rip

is not uniform, with abundances of species and assemblage structures varying considerably between places. At depths below 20-25 m, the reef surface is dominated by sessile invertebrates.

In summary, Port Phillip Heads is a place of high biodiversity, including many (> 100) species or putative species known only from that location. The structure of the sessile invertebrate assemblage is distinct from other deep reef systems in Victoria, namely The Arches, Twelve Apostles, Point Addis and Wilsons Promontory. This uniqueness is likely to be driven, in part, by the unique physical habitat; in particular, the strong currents and low light levels (from suspended sediments) in which sessile filter feeders usually thrive.

Eligibility for listing as a community under the Flora and Fauna Guarantee

The nominated item satisfies at least one criterion of the set of criteria prepared and maintained under Section 11 of the *Flora and Fauna Guarantee Act 1988*, and stated in Schedule 1 of the *Flora and Fauna Guarantee Regulations 1990*.

Evidence that criteria are satisfied:

Criterion 2.2 *The community is significantly prone to future threats which are likely to result in extinction.*

Evidence:

Any future dredging and maintenance of the shipping channel has the potential to cause significant damage due to erosion of exposed weakly cemented rock, scouring by loose debris, damage by rock-falls into the canyon, and accumulation of debris in the bottom of the canyon. The community is situated adjacent and directly below the main shipping channel to Port Phillip Bay and is vulnerable to shipping accidents. The community is also potentially vulnerable to introductions of marine pests or pathogens as well tidal power and other sub-sea developments.

Sub-criterion 2.2.1 *the community is very rare in terms of the total area it covers or it has a very restricted distribution or it has been recorded from only a few localities.*

Evidence:

The extent of this community at Port Phillip Heads is restricted to only 120 ha. The community is different to those found at all other known deep reef environments in Victoria.

Sub-criterion 2.2.2 *the threat is currently operating and is expected to operate at a level in the future which is likely to result in the extinction of the community.*

Evidence:

Rock dredging occurred at the top of the canyon in August 2005 and from March to September 2008. Recovery from the effects of any rock fall could take up to 30 years, and possibly longer.

The data presented on distribution and abundance of the marine invertebrate fauna are not the result of comprehensive surveys but do cover a broad enough sample of the community's known habitat to indicate strongly that the community is rare in terms of abundance and distribution.

Rationale of SAC in reaching this decision to support a recommendation for listing

There are three key issues the Committee addressed in considering this nomination. These are:

1. Does the Deep Canyon biota constitute a recognisable and definable community?
2. If so, does it meet the criteria for listing? Of the available criteria, the relevant ones are (i) whether it is rare/restricted, (ii) whether it is in decline, or (iii) whether it is prone to current or future threats that have the potential to cause its extinction.
3. How does the SAC evaluate and reconcile the information, the uncertainty, and the expert opinion that is available?

With respect to these three issues, the SAC concludes:

1. Community

- The Port Phillip Heads Deep Canyon biota is clearly a collection of invertebrate taxa coexisting because of their shared ability to exploit that particular environment.
- The 1990 SAC guidance documents indicates that there should be no expectation that taxa within the community have a functional interdependence, only that they exist and can be defined.
- Based on the available data (recent Remote Operated Vehicle data, and old species records), which all commentators consider appropriate and reasonable for such a difficult to sample environment, the assemblage is diverse with respect to both species composition and sponge morphotypes. Even if sponge morphotypes do not reflect absolute taxonomic uniqueness of species, they contribute a further important dimension to the biodiversity.

2. Criteria for listing

The community is rare in terms of both extent and occurrence.

- The extent of this community at Port Phillip Heads is restricted to only 120 ha
- The structure and species composition of the Port Phillip Heads community is clearly different to all other equivalent sites that have been surveyed in southeastern Australia (eg Twelve Apostles, Wilsons Promontory, Point Addis)

There are two threats that are clearly identifiable (one an active threat and one potential); both could severely impact on the community

- Any future dredging and maintenance of the shipping channel (currently operating and likely to operate in the future); resultant threats from erosion, scouring and accumulation of debris.
- The community is situated adjacent to and directly below the main shipping channel to Port Phillip Bay and is vulnerable to a significant shipping accident/incident.
- The area is proposed for major subsea tidal generator installations and is vulnerable to environmental impacts from other such seabed installations.
- The definition of extinction with respect to a community is ambiguous, but it could reasonably be interpreted to mean a significant and unnatural change in the extent, structure or composition of that community.
- Any threat to a community of only 120 ha is a serious threat that needs to be identified and managed

3. Reconciling information and uncertainty

- There is some uncertainty concerning the exact and complete species identification within the community; however, this does not preclude a nomination, nor is it of great concern to any of the experts that have commented on the community
- The greatest uncertainty concerns the distribution of marine invertebrate communities elsewhere in Victorian waters (which are less well investigated), and thus the true uniqueness of the assemblage at Port Phillip Heads. However, the potentially similar environments that have been assessed in detail (eg Twelve Apostles, Wilsons Promontory) are demonstrably different.
- The 1990 documents that guide SAC decision-making provide clear guidance on how to handle various types of uncertainty in various situations, and the issues concerning the Deep Canyon community fall well within them. In all cases the advice is to invoke the precautionary principal and support listing.

Expert Evidence

- A vast amount of expert opinion was considered by the Committee, including expert opinion especially solicited by the SAC, and information on the public record as a result of the Port Phillip Bay Channel Deepening EES. The Committee concluded that the 'Joint Experts' Statement on Canyon Communities (Chidgey, Edmunds and Lincoln-Smith 2007)' to the *Channel Deepening Project-Panel of Enquiry Hearing* provides the most relevant and concise summary of the critical issues in a clear and unambiguous manner, and that the key points agreed by those experts provide a sufficient basis for the SAC to support listing. The other expert opinion and information provided valuable information and context. The key passages from the Joint Experts' Statement are quoted below.

"The field methods used for describing the biota of the canyon were considered by all participants to be appropriate, especially given the difficult working conditions experienced in the Entrance and canyon depths."

"There is some distinct small scale patchiness in species composition and abundance. Some patches of biota may comprise species present elsewhere but the combinations of particular species abundances result in different assemblages. Existing knowledge indicates that these assemblages may have different ecological functions, such as provision of habitat for other species. This patchiness and diversity of species and assemblages contributes to biodiversity within the canyon, which is further discussed in the regional context below."

"The participants agreed that the canyon has a different combination of species and morphotypes to other areas studied along the Victorian coastline, such as Wilson's Promontory, Point Addis, Twelve Apostles and The Arches at Port Campbell. Hence, the canyon contributes substantially to biodiversity values of sponge dominated communities in the region."

"... the participants agreed that the canyon contains a large number of sponge (and other invertebrate) taxa that have not been recorded elsewhere."

"All participants agreed that the canyon is a large scale, identifiable environment that contributes substantially to Victoria's marine biodiversity."

Documentation

The published information and research data provided to the SAC have been assessed. The weight of the evidence presented leads the SAC to support the claim that the community is unique.

SAC's Preliminary Recommendation

The Scientific Advisory Committee concludes that on the evidence available the nominated item is eligible for listing in accordance with Section 11(1) of the Act because primary criterion 2.2 is satisfied. The SAC also concludes that sub-criteria 2.2.1 and 2.2.2 have also been satisfied and that no evidence exists to suggest that primary criterion 2.2 cannot be satisfied as a consequence of sub-criteria 2.2.1 and 2.2.2 being satisfied.

The Scientific Advisory Committee makes a preliminary recommendation that the nominated item be supported for listing on Schedule 2 of the *Flora and Fauna Guarantee Act 1988*.

Selected references:Deep reef biology – Port Phillip Heads

- Chidgey, S., Edmunds, M. & Lincoln-Smith, M. (2007) *Port Phillip Channel Deepening Project Supplementary Environmental Effects Statement Panel Hearing. Joint Experts' Statement on Canyon Communities*. Port of Melbourne Corporation Panel Submission. Melbourne.
- Edmunds, M., Gilmour, P., Power, B., Shimeta, J., Pickett, P., Judd, A., Baker, K., Sams, M., Wassnig, M., Williams, J., Crozier, J., Stewart, K. & Monk, J. (2006) *Port Phillip Bay Channel Deepening Project. Supplementary Environmental Effects Statement – Marine Ecology Specialist Studies. Volume 8: Deep Reef Biota*. Australian Marine Ecology Report 357. Channel Deepening Project Supplementary Environmental Effects Statement Appendix 47. Port of Melbourne Corporation, Melbourne.
- Edmunds, M., Gilmour, P., Power, B., Shimeta, J., Pickett, P., Judd, A., Baker, K., Sams, M., Wassnig, M., Williams, J., Crozier, J., Stewart, K. & Monk, J. (2007) *Supplementary Environmental Effects Statement Volume 9 Deep Reefs Appendix D. Population Distributions*. Australian Marine Ecology Report 361.
- Edmunds, M., Shimeta, J., Judd, A. & Baker, K. (2007) *Port Phillip Bay Channel Deepening Project Supplementary Environmental Effects Statement – Rock Fall Impact Assessment*. Australian Marine Ecology Report 374. Channel Deepening Project Supplementary Environmental Effects Statement, Appendix 54. Port of Melbourne Corporation, Melbourne.
- Elias, J., Edmunds, M. & Hart, S. (2004) *Port Phillip Bay Channel Deepening Environmental Effects Statement – Marine Ecology Specialist Studies. Volume 7: Deep Reef Habitat Study*. Australian Marine Ecology Report 164. Channel Deepening EES Volume 3 A1. Port of Melbourne Corporation. Melbourne.

Biota of deep reef communities

- Bock, P. E. (1982) Bryozoans (Phylum Bryozoa). In: (Shepherd, S.A. and Thomas, I.M. eds) *Marine Invertebrates of Southern Australia. Part I*. Handbook of the Flora and Fauna of South Australia, Government Printer, South Australia.
- Davis, A. R., Roberts, D. & Ayre, D. J. (1999) *Conservation of sessile marine invertebrates: you do not know what you have got until it is gone*. pp: 325-329 In: 'The Other 99%. The Conservation and Biodiversity of Invertebrates' Winston Ponder and Daniel Lunney [Eds]. Transactions of the Royal Zoological Society of New South Wales, Mosman 2088.
- Dendy, A. (1897) Catalogue of non-calcareous sponges collected by J. Bracebridge Wilson, Esq., M.A., in the neighborhood of Port Phillip Heads. Part 3. *Proceedings of the Royal Society of Victoria (ns) 9*: 230-259.
- Gordon, D. P. (1999) Bryozoan diversity in New Zealand and Australia. In: 'The Other 99%. The Conservation and Biodiversity of Invertebrates' Winston Ponder and Daniel Lunney [Eds]. Transactions of the Royal Zoological Society of New South Wales, Mosman 2088.
- Ponder, W., Hutchings, P. & Chapman, R. (2002) *Overview of the Conservation of Australian Marine Invertebrates*. A Report for Environment Australia. Australian Museum, Sydney.
- Sorokin, S. J., Currie, D. R. & Ward, T. M. (2005) *Sponges from the Great Australian Bight Marine Park* (Benthic Protection Zone). Report to Wildlife Conservation Fund for the Wildlife Advisory Committee, South Australian National Parks & Wildlife Council. SA Research and Development Institute (Aquatic Sciences): Henley Beach, SDA.
- Watson, J. E. (1982) Hydroids (Class Hydrozoa). In: Shepherd, S.A. and Thomas, I.M. (eds) *Marine Invertebrates of Southern Australia. Part I*. Handbook of the Flora and Fauna of South Australia, Government Printer, South Australia.
- Weidenmayer, F. (1989) Demospongiae Porifera from the northern Bass Strait, southern Australia. *Memoirs of the Museum of Victoria 50*: 1-242.
- Wiedenmayer, F. & Hooper, J.N.A. (1994) Porifera. pp. 1-620 in Wells, A. (ed.) *Zoological Catalogue of Australia*. Vol. 12. Melbourne: CSIRO Australia.
- Wilson, R. S., Poore, G. C. B. & Gomon, M. F. (1983) *Marine Habitats at Wilsons Promontory and the Bunurong Coast, Victoria: Report on a Survey, 1982*. Marine Science Laboratories Report No. 73.

Species specific details

Australian Faunal Directory -> <http://www.environment.gov.au/biodiversity/abrs/online-resources/fauna/afd/index.html>

Endorsement by the Convenor of the Scientific Advisory CommitteeDate


27/x/2008

Prof Tim New
Convenor