



Australian Government

Department of the Environment and Heritage

Assessment of the
Victorian Scallop Fishery

January 2006

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Assistant Secretary
Marine Environment Branch
Department of the Environment and Heritage
GPO Box 787
Canberra ACT 2601

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This document is an assessment carried out by the Department of the Environment and Heritage of a commercial fishery against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. It forms part of the advice provided to the Minister for the Environment and Heritage on the fishery in relation to decisions under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999*. The views expressed do not necessarily reflect those of the Minister for the Environment and Heritage or the Australian Government.

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Assessment of the ecological sustainability of management arrangements for the Victorian Commercial Scallop Fishery

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EXECUTIVE SUMMARY

Background

The Victorian Department of Primary Industries (DPI) has submitted a document for assessment under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The draft document *Statement of Management Arrangements for the Victorian Commercial Scallop (*Pecten fumatus*) Fishery* (the submission) was received by the Department of the Environment and Heritage (DEH) in October 2005. The submission was released for a thirty-day public comment period that expired on 16 November 2005. Two public comments were received. DPI provided a response to the issues raised but no changes were made to the submission as a result of public comment.

The submission reports on the Victorian Scallop Fishery (VSF) against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. The DEH assessment considers the submission, associated documents, public comments and DPI's response to the comments.

Table 1: Summary of the VSF

Area	The fishery area extends from the high water mark of the coast of Victoria to 20 nautical miles out to sea (includes Commonwealth and State waters).
Fishery status	The target species is currently in a recovery period after being historically overfished.
Target Species	Commercial scallop (<i>Pecten fumatus</i>).
Byproduct Species	In addition to scallops, fishers are permitted to retain not more than 10 kilograms of fish per trip. While permitted byproduct species are not explicitly described, operators are prohibited from retaining abalone, rock lobster, sea urchin, jellyfish or bug, as well as any Commonwealth managed fish listed under Regulation 302 (see below).
Gear	Scallop dredge.
Season	No set season, although fishing usually occurs from May until the end of November.
Commercial harvest 2004	40 tonnes meat weight/261 tonnes shell weight from Lakes Entrance.
Value of commercial harvest	Unknown since catches, and therefore value, fluctuates widely from year to year.
Recreational harvest	Small scale recreational scallop fishery operates in Port Phillip Bay. Take by this sector is unquantified.
Commercial licences issued	94 licences are current in the VSF, although only 12 to 20 are usually active in any particular season.
Management arrangements	Fishery management arrangements include: <ul style="list-style-type: none"> • a Total Allowable Commercial Catch (TACC); • Individual Transferable Quotas (ITQs); • limited entry; • a minimum size limit; and • area closures based on trashing/discard rates or meats per kilogram rate.

	A daily bag limit of 100 scallops applies to the recreational sector.
Export	Where good quality product is harvested, the majority is exported to France.
Bycatch	High bycatch to target species ratio demonstrated, but impacts to the 66 species identified as bycatch considered low given their wide distribution.
Interaction with Threatened Species	Considered low, but potentially greater interactions with syngnathids. Possible minor interactions with seals, sharks, cetaceans and seabirds.

The scallop fishery was once managed as the Bass Strait Scallop Fishery. However, in 1986 an Offshore Constitutional Settlement agreement was implemented and the fishery is now managed as three separate fisheries by Victoria, Tasmania and the Australian Government. The VSF area extends from the high water mark of the coast of Victoria to 20 nautical miles out to sea, and incorporates both State and Commonwealth waters.

The fishery targets the commercial scallop (*Pecten fumatus*). In addition, the Victorian Fisheries Regulation 1998 permits a take of not more than 10 kilograms of fish per trip apart from scallop. While permitted byproduct species are not explicitly described, operators are prohibited from retaining abalone, rock lobster, sea urchin, jellyfish or bug, as well as any Commonwealth managed fish listed under Regulation 302¹.

The commercial scallop occurs along the coast of southeast Australia from coastal New South Wales through Victoria to South Australia and around Tasmania. The species is harvested in southeast Australia in the VSF, the Tasmanian Scallop Fishery (TSF) and the Australian Government Bass Strait Central Zone Scallop Fishery (BSCZSF). Scallops are typically found in soft sediments ranging from mud to coarse sand and usually lie buried with only the flat valve visible. Frequently, scallops are aggregated in beds. They usually occur in water of 10-20 m depth, although they can be found in water deeper than 40 m in Bass Strait.

Scallops typically mature at about 12-18 months of age and fecundity increases with age. Spawning occurs from June to November, although spawning peaks during particular periods, the timing of which varies according to location and environmental conditions. In Tasmanian and Victorian waters, this peak appears to occur in Spring. The fishery is a roe-on fishery and therefore meat yield varies considerably in relation to the reproductive cycle. It is highest immediately prior to spawning.

Investigations into spat settlement have shown that the distribution of larvae is influenced by the strength and direction of winds. In calm summers, scallop beds may be largely self-recruiting, while in windy summers, settling larvae may originate from beds some distance away. This finding is an important consideration in management of scallop fisheries because, as the number of scallop beds is reduced, self-seeding becomes more important as a means of maintaining the viability of individual beds. If high fishing-induced mortality occurs on a scallop bed once it has been fished, the future viability of that bed may be threatened since it cannot be assumed that it will be replenished by settlement of spat from other beds.

Starfish, octopus and whelks appear to be the main predators of scallops, while a number of parasites such as nematodes and bucephalid trematodes have also been reported to cause mortality

¹ Bass, Bass groper, Hapuku, Gemfish, Southern Bluefin Tuna, Northern Bluefin Tuna, Billfish, King dory, Ox-eye oreo, Smooth oreo, Spiky oreo, Warty oreo, Blue grenadier, Black oreo and Orange roughy.

of commercial scallops. The natural mortality rate of commercial scallops has been estimated at 40%. Factors influencing natural mortality include population density and bottom type.

Scallop fishing began in Port Phillip Bay in Victoria in 1963. The fishery expanded over the first few years but collapsed in 1969 due to over-exploitation. The fishery recovered and continued until 1996 when the Government ceased scallop fishing activity in Port Phillip Bay. The Bay was permanently closed to commercial scallop fishing in 1997. Catches from the region varied considerably over the history of the fishery, ranging from 18 to 1655 tonnes between 1970 and 1996, to years when there were too few scallops to support a fishery. The closure of Port Phillip Bay to scallop fishing marked the end of a 30 year old fishery that had been in decline since 1988. At that time, 18 fishers held commercial fishing licences for scallop fishing in the Bay only, while a further 66 held licences for both the Bay and ocean fishing.

In 1970 scallops were discovered off Lakes Entrance in eastern Victoria, and the majority of fishing effort is now conducted from the ports of Lakes Entrance and Port Welshpool. As with Port Phillip Bay, catches have been highly variable from this region, ranging from 41 to 1419 tonnes meat weight. 94 licences are current in the VSF, although only 12 to 20 are usually active in any particular season.

The fishery uses scallop dredges. Scallops are harvested using a box shaped harvester between 2 and 3.5 metres long. The harvester is dragged or towed along the seabed and the scallops are lifted and caught in the harvester basket. There do not appear to be any limits on the ‘tooth’ length of the harvester or on the spacing required between ‘teeth’. Fishery management arrangements include a TACC, ITQs, limited entry, a minimum size limit and area closures based on trashing/discard rates or meats per kilogram rate (discussed further under Principle 1).

Direct information on bycatch in the fishery is limited, although bycatch monitoring conducted in 2002 demonstrated that approximately 66 species comprised the bycatch taken in the VSF. A high bycatch to target species ratio was shown, although it is not considered that the fishery would have a significant impact on any of the species taken as bycatch given that they are all widely distributed throughout southern Australia. Some species that may be affected by this fishery are currently listed protected species under the Commonwealth EPBC Act. Possible protected species interactions in this fishery would primarily be with syngnathids, which may be taken if dredging occurs in areas outside “clean” scallop grounds. Interactions with cetaceans, seals and seabirds may also occur but are unlikely to result in mortality of these species. Limited evidence to date suggests that interaction with any protected species group is very low. These interactions are assessed under Principle Two of this report.

There is no evidence of Indigenous harvest of scallops by the Indigenous sector within Victorian waters, although some incidental take may occur. A small scale recreational fishery exists in Port Phillip Bay, which is closed to the commercial fishery. A recreational licence is required to harvest scallops and a daily bag limit of 100 scallops applies.

Commercial scallop (*Pecten fumatus*) is a target species for other scallop fisheries in Bass Strait – the Australian Government-managed BSCZSF and the TSF in northern Bass Strait waters. Both of these fisheries are also fished by dredge and all three fisheries target the same scallop stock. The BSCZSF was assessed under the EPBC Act in 2002 and was declared a Wildlife Trade Operation for a period of 3 years. This fishery is now due for reassessment and is classified as ‘overfished’ by the Bureau of Rural Sciences. The TSF is currently being assessed.

The VSF is managed under the Victorian *Fisheries Regulations 1998* and the Victorian *Fisheries Act 1995*. An industry Code of Conduct is also in place for the fishery and this is currently being updated.

Overall assessment

The material submitted by DPI demonstrates that the management arrangements for the VSF meet most of the requirements of the Australian Government *Guidelines for the ecologically sustainable management of fisheries*.

While the fishery is relatively well managed, DEH has identified a number of risks that must be managed to ensure that their impacts are minimised:

- lack of fishery specific objectives and performance measures and indicators;
- inconsistent management arrangements for the shared scallop stock across three jurisdictions;
- lack of current and relevant stock status information on which to base the setting of the TACC;
- need to review the harvesting strategy to ensure it takes into account the biological characteristics and spatial distribution of scallop stocks;
- inadequate protection of juvenile scallop stocks;
- lack of a bycatch monitoring system; and
- need to assess the impacts of the VSF on the wider ecosystem in which it operates.

Recommendations to address these issues have been developed to ensure that the risk of impact is minimised in the longer term. Through the implementation of the recommendations and the continuation of a responsible attitude to the management of the fishery, management arrangements are likely to be sufficiently precautionary and capable of controlling, monitoring and enforcing the level of take from the fishery while ensuring the stocks are fished sustainably.

The management regime aims to ensure that fishing is conducted in a manner that does not lead to over-fishing and for fishing operations to be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem. While scallop stocks have been overfished in the past, the current management regime has ensured that scallop stock is now in a period of recovery. DEH considers there is a high degree of probability that the continuation of the current management regime, along with improvements arising from the recommendations made in this assessment, will ensure that stocks continue to recover into the future. On balance, the fishery is being managed in an ecologically sustainable manner and is working to address existing problems and minimise environmental risks.

The operation of the fishery is consistent with the objects of Part 13A of the EPBC Act. DEH considers that the fishery will not be detrimental to the survival or conservation status of the taxon to which it relates in the short term. Similarly, it is not likely to threaten any relevant ecosystem in the short term. DEH therefore recommends that the fishery be declared an approved Wildlife Trade Operation (WTO) with the actions specified in the recommendations to be undertaken by DPI to contain the environmental risks in the long term. DEH considers that the fishery, as managed in accordance with the management regime is not likely to cause serious or irreversible ecological damage over the period of the export decision. Specifically, the WTO declaration would allow the export of product from the fishery for a period of 3 years. The WTO declaration will require annual reporting on the progress of implementing the recommendations of this report and other managerial commitments. The implementation of the recommendations will be monitored and reviewed as part of the next DEH review of the fishery in 3 years time.

As the official fishery area encompasses Commonwealth as well as State waters, consideration under Part 13 of the EPBC Act is required regarding the impact of the fishery on listed threatened species, listed migratory species, cetaceans and listed marine species.

Protected species occurring in the fishery area include syngnathids, seals, sharks, cetaceans and seabirds. No interactions with protected species have been reported for the VSF, although there is potential for a greater interaction with syngnathids if fishing effort spreads into areas outside the main commercial fishing grounds and into those habitats where syngnathids are found. The actual and potential impact on Part 13 species under the management arrangements is considered low and adequate protection is provided. There are no listed threatened ecological communities in the fishery area.

DEH recommends that the VSF management regime be declared an accredited management plan under Sections 208A, 222A, 245 and 265 of the EPBC Act. In making this judgement, DEH considers that the fishery to which the regime relates does not, or is not likely to, adversely affect the survival in nature of listed threatened species or a population of that species, or the conservation status of a listed migratory species, cetacean species or listed marine species or a population of any of those species. DEH also considers that the management regime requires that all reasonable steps are taken to avoid the killing or injuring of protected species, and the level of interaction under current fishing operations is low. On this basis, DEH considers that an action taken by an individual fisher, acting in accordance with the management regime, would not be expected to have a significant impact on a listed threatened species or listed migratory species protected by the EPBC Act.

The implementation of recommendations and other commitments made by DPI in the submission will be monitored and reviewed as part of the next DEH review of the fishery in 3 years time.

Recommendations

1. DPI to advise DEH of any material change to the Victorian Scallop Fishery's management arrangements that could affect the criteria on which EPBC Act decisions are based, within three months of that change being made.
2. By the end of June 2007, DPI to develop fishery specific objectives linked to performance indicators and performance measures for target, byproduct and protected species and impacts on the ecosystem. DPI to monitor the status of the fishery in relation to the performance measures once developed. Within 3 months of becoming aware of a performance measure not being met, DPI to finalise a clear timetable for the implementation of appropriate management responses.
3. DPI to complete a compliance risk assessment for the Victorian Scallop Fishery for the end of June 2006 and implement a risk-based compliance strategy by September 2007 taking into account risks associated with non-compliance with:
 - minimum size limits;
 - quota limits; and
 - area and fishery closures.
4. From 2006, DPI to report publicly on the status of the fishery on an annual basis, including explicit reporting against each performance measure once developed.
5. DPI to work with the relevant jurisdictions to actively pursue consistent and/or complementary management arrangements for the commercial scallop stock off south-east Australia, where appropriate.

6. Within two years, DPI to review the current logbook recording requirements and ensure that a robust and reliable mechanism for recording byproduct species and discarded target species is included.
7. DPI to develop a research strategy for the fishery that identifies research information needs and priorities to meet the management information, stock assessment and performance measurement needs of the fishery. In the interim, DPI to use the results of relevant research in adjacent scallop fisheries to assess the appropriateness of current management arrangements.
8. DPI to use current and relevant information to perform an assessment of scallop stocks in Victoria for the purpose of determining ecologically sustainable yield limits for scallop and determining the TACC for each fishery season.
9. DPI to review the harvesting strategy employed in the Victorian Scallop Fishery to ensure that it is adequately precautionary in terms of spatial management. DPI should consider the available scientific information regarding maintaining spatially distributed scallop beds and the impacts of fishing on the southeast Australian scallop stock. DPI to also take into account the cumulative impacts of fishing on the entire scallop stock targeted in southeast Australia as relevant information becomes available.
10. Within two years, DPI to develop a means of identifying and protecting areas of juvenile scallop beds to ensure that sufficient spawning biomass is retained.
11. DPI to develop a system for the collection and monitoring of information on bycatch in the Victorian Scallop Fishery sufficient to enable identification of long-term trends in bycatch.
12. Within 12 months, DPI to develop and implement an education program for fishers to promote the importance of protected species protection and accurate incident reporting.
13. Should new information determine that the fishery is having significant interactions with any endangered, threatened or protected species, DPI to develop appropriate measures to mitigate those interactions. Measures should be implemented within 12 months of the information becoming available.
14. DPI to review the current management regime within the Victorian Scallop Fishery to ensure that it takes account of ecosystem impacts, in particular:
 - high risk impacts of fishing identified through ecological risk assessments relevant to the fishery;
 - important juvenile/spawning/refuge grounds identified for byproduct and protected species; and
 - the impacts of fishing on benthic habitats.

During the review DPI is to liaise with the Tasmanian Department of Primary Industries, Water and the Environment and the Australian Fisheries Management Authority and consider information relating to the risk assessment of their respective fisheries.

PART I - MANAGEMENT ARRANGEMENTS

The VSF is managed by the Victorian DPI.

The management regime is described in the following documents, all of which are, or will be publicly available:

- The Victorian *Fisheries Regulation 1998*;
- The Victorian *Fisheries Act 1995*;
- The VSF industry Code of Conduct; and
- Relevant Gazetted notices and licence conditions.

A number of other documents, including research reports, scientific literature and discussion papers are relevant to the management of the fishery.

DEH considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Because of the importance of the management plan and documents referred to above to DEH's assessment of the fishery, an amendment could change the outcomes of the assessment and decisions stemming from it. Decisions resulting from this assessment relate to the arrangements in force at the time of the decision. In order to ensure that these decisions remain valid, DEH needs to be advised of any changes that are made to the management regime and make an assessment that the new arrangements are equivalent or better, in terms of ecological sustainability, than those in place at the time of the original decision.

Recommendation 1: *DPI to advise DEH of any material change to the VSF's management arrangements that could affect the criteria on which EPBC Act decisions are based, within three months of that change being made.*

The management arrangements for the VSF are developed via a consultative process that, to date, has included the scallop industry and the Commercial Scallop Fishery Committee of the Fisheries Co-Management Council (FCC). Public comment received noted that from April 2006, this role will be taken over by the Marine and Estuarine Committee of the FCC. Membership on FCC committees is expertise based and the FCC's role is to provide independent policy advice on fisheries management issues to the Victorian Fisheries Minister. The FCC includes members with a range of expertise, including in conservation and environment issues. Members of the general public are also able to participate in the consultative process, either through the FCC, or directly to the Minister. Overall, DEH considers the level of consultation and expertise to be sound and is confident that the management agency will continue to ensure interested parties are consulted appropriately.

The fishery is managed under the *Fisheries Act 1995*, which contains a number of broad objectives related to the ecologically sustainable harvest of target species and to ecosystem impacts of fishing effort. However, DEH considers that it would be beneficial for fishery specific objectives, performance indicators and measures to be developed. DEH believes that such objectives, indicators and measures for target, byproduct and protected species, and for ecosystem impacts need to be developed to ensure that the performance of the fishery can be measured and management action taken as required. In particular, performance measures should be capable of detecting and responding to changes in stock status. Once developed, they should be regularly reviewed and made publicly available. A clear process for responding to breaches of performance measures is also required to ensure that prompt management action is taken to address any threats to sustainability.

Recommendation 2: *By the end of June 2007, DPI to develop fishery specific objectives linked to performance indicators and performance measures for target, byproduct and protected species and impacts on the ecosystem. DPI to monitor the status of the fishery in relation to the performance measures once developed. Within 3 months of becoming aware of a performance measure not being met, DPI to finalise a clear timetable for the implementation of appropriate management responses.*

Management of the fishery is based on a mixture of input and output controls. Such controls include:

- a TACC and ITQs;
- limited entry;
- gear restrictions;
- a minimum size limit; and
- area closures based on trashing/discard rates or meats per kilogram rate.

Fisheries Victoria is responsible for enforcing compliance in the VSF, and also conducts compliance for both the Australian Government and Tasmania through service agreements since the majority of scallops are landed and processed in Victoria. Compliance activity includes conducting inspections at the wharf and at processor's premises and onboard monitoring. DPI reports that the number of inspections depends on the amount of fishing activity during the fishing season. DEH believes that the ecologically sustainable management of this fishery depends significantly on management's ability to enforce regulations. DEH has some concerns about the potential for the existing compliance arrangements to ensure that the minimum size limit and compliance with quota and area closures are enforced, and considers that these issues should be considered carefully in a compliance risk assessment and development of a compliance strategy for the VSF.

Recommendation 3: *DPI to complete a compliance risk assessment for the Victorian Scallop Fishery for the end of June 2006 and implement a risk-based compliance strategy by September 2007 taking into account risks associated with non-compliance with:*

- *minimum size limits;*
- *quota limits; and*
- *area and fishery closures.*

The submission provided by DPI comprises the policy framework within which the VSF operates. The policy framework for management of scallops in Victoria is reviewed annually, both internally and by the FCC. DEH recognises this, but considers it would be beneficial for the VSF to be reviewed annually against the performance measures and indicators that are to be developed as a part of **Recommendation 2**. DEH also considers that public reporting of performance on a fishery-by-fishery basis would enhance transparency and public accountability. DEH therefore suggests that for each fishery, including the VSF, DPI publicly report against each fishery performance measure on an annual basis.

Recommendation 4: *From 2006, DPI to report publicly on the status of the fishery on an annual basis, including explicit reporting against each performance measure once developed.*

Fishery-dependent data relating to the target species is collected on a regular basis in the fishery. Some fishery independent information is also collected. Discussion of the information collection system can be found in Part II of this report.

An analysis of the fishery's capacity for assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates is contained under Principle Two of this report.

The VSF is one of three fisheries targeting commercial scallops off south-eastern Australia. Under Offshore Constitutional Settlement arrangements, commercial fishing for scallops is divided into the VSF, the Australia Government-managed BSCZSF and the TSF.

On 9 July 2004 the three jurisdictions prepared a joint Options Paper entitled “A review of the Offshore Constitutional Settlement Arrangements for Bass Strait Scallops”. However as yet, no formal changes have been made to the arrangements. DEH notes that DPI holds an observer position on the Management Advisory Committee for the Australian Government-managed BSCZSF and that there is some degree of shared research and consultation on management of the different scallop fisheries between the management agencies. However, DEH also notes that there are significant differences in the management arrangements between the three scallop fisheries, despite the fact that they all target the same stock. DEH considers it vital for DPI to actively participate in Offshore Constitutional Settlement arrangement discussions to ensure the long term sustainability of the shared scallop stock.

Recommendation 5: *DPI to work with the relevant jurisdictions to actively pursue consistent and/or complementary management arrangements for the commercial scallop stock off south-east Australia, where appropriate.*

DEH considers that the current management arrangements comply with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under that policy. DEH expects that DPI will also ensure compliance with any future plans or policies as they are developed.

No regional or international management regimes, to which Australia is a party, are of direct relevance to the fishery. The prime international regime affecting the fishery is the United Nations Convention on the Law of the Sea. The management regime essentially complies with this. Other international regimes are applicable to fisheries management but do not explicitly involve this fishery, for example the 1992 Convention on Biological Diversity and in particular the 1995 Jakarta Mandate requiring that, in relation to the sustainable use of marine and coastal biological diversity, the precautionary principle should apply in efforts to address threats to biodiversity. While these agreements are not specifically addressed in the Submission, the fishery’s compliance with their requirements can be assessed by examination of Part II of this report. The application of the International Convention for the Prevention of Pollution from Ships (MARPOL) to vessels operating in the fishery is addressed under Principle 2, Objective 3.

DEH considers it is incumbent on all authorities to develop a thorough understanding of the framework of national, regional and international agreements and their applicability to export-based fisheries for which they are responsible.

Conclusion

DEH considers that the VSF management regime is documented, publicly available and transparent, and is developed through a consultative process. The management arrangements are adaptable and underpinned by broad objectives for target species and ecosystem impacts. However, fishery specific objectives need to be developed for target, byproduct and protected species and for ecosystem impacts, and more specific performance measures and indicators, by which the effectiveness of management arrangements can be measured and reviewed, also need to be developed for target, byproduct and protected species and for ecosystem impacts.

The management arrangements are capable of controlling the harvest through a combination of input and output controls appropriate to the size of the fishery. DEH has recommended that DPI enhance the periodic review of the fishery, as well as the means of enforcing critical aspects of the management arrangements.

The management regime takes into account arrangements in other jurisdictions, and adheres to arrangements established under Australian laws and international agreements, although DEH has recommended that DPI work more closely with relevant jurisdictions targeting scallop stocks to ensure the shared stock is adequately protected.

DEH considers that there is scope to further refine the management arrangements, both internally in the fishery and across the south-east Australian scallop fisheries, and has provided a number of recommendations for improvements in the longer term.

PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES

Stock Status and Recovery

Principle 1: *‘A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover’*

Maintain ecologically viable stocks

Objective 1: *‘The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability’*

Information requirements

Fishery dependent data are obtained through compulsory logbooks that are submitted on a monthly basis. Data collected from the logbooks includes:

- number of hauls per hour;
- dredging hours;
- bottom type;
- minimum/maximum depth of water fished;
- whether operator was fishing or searching;
- discarded scallop percentage;
- number of scallop bags/bins;
- estimated meat weight of scallops and shell weight; and
- other species collected.

The logbooks are completed for each day of fishing activity, and there appears to be some capacity for catch data to be validated against processor returns. Additional fishery dependent data is obtained from routine monitoring undertaken by scientists and regional fisheries officers. This includes onboard monitoring of scallop size and discard rates, wharf inspections, inspections at fish processor facilities, and monitoring of the catch and effort data provided in logbooks.

DEH notes that fishers are required to record ‘other species’ caught, and this appears to include byproduct species. Given the range of byproduct species permitted to be retained in the VSF, DEH considers that there should be more emphasis placed on recording the amount of these species harvested. In addition, DEH notes that fishers are required to estimate the percentage of catch that is comprised of discarded scallops, but has some concern about the reliability of such an estimate, particularly since the majority of discards are likely to be undersize scallops. A reliable estimate of discarded scallops is important and should be factored into any stock assessments for the fishery. DEH therefore considers that DPI should review their logbook reporting requirements to ensure that a robust mechanism for reporting the amount of other species retained and discarded scallops is included.

Recommendation 6: *Within two years, DPI to review the current logbook recording requirements and ensure that a robust and reliable mechanism for recording byproduct species and discarded target species is included.*

Fishery-independent data collection is limited. Some studies examining the impact of environmental conditions on scallop stocks have been conducted, but these are not specifically

related to the VSF. DEH notes that the TSF is involved in a number of Fisheries Research and Development Corporation (FRDC) funded scallop projects including “Facilitating Industry Self-Management for Spatially Managed Stocks: A scallop case study” and “Juvenile Scallop Trashing Rates and Bed Dynamics: Testing the Management Rules for Scallops in Bass Strait”. Since the VSF and the TSF target the same stock, it is likely that results from these projects will be applicable to the VSF. DEH considers that DPI should work with relevant jurisdictions to develop a research strategy to investigate the impacts of the VSF on scallop stocks and, in the interim, use the results of relevant research in adjacent fisheries to assess the appropriateness of current management arrangements.

Recommendation 7: *DPI to develop a research strategy for the fishery that identifies research information needs and priorities to meet the management information, stock assessment and performance measurement needs of the fishery. In the interim, DPI to use the results of relevant research in adjacent scallop fisheries to assess the appropriateness of current management arrangements.*

Overall, given the range of fishery dependent and independent data gathered by DPI and the mechanisms for regularly reviewing the data requirements, DEH considers that there is a reliable information collection system in place appropriate to the scale of the fishery. Continuation of existing data collections and the implementation of research programs, combined with some extension and refinement of such activities will be important for the future management of the fishery.

Assessment

No stock assessment or estimate of potential productivity of the scallop stock in Victoria is performed. One of the main management arrangements for the VSF is a TACC, which is set annually by Fisheries Victoria and the FCC. Once the TACC has been determined, each licence holder is given an equal share of the TACC in the form of quota units, which are currently valued at one kilogram each. These quotas can be transferred throughout the fishing season.

It is likely that the original TACC for the fishery was set too high and contributed to the decline in the scallop stock in the past. The submission claims that the TACC is set at a precautionary level and acts as a catch and effort control. However DEH is concerned that the TACC is only based on previous historical catches, and not on any information regarding the scallop stock status each season. The submission also notes that the TACC can be increased during the season based on information received from the Seafood Industry Victoria, the FCC and fishers. There does not appear to be a corresponding mechanism for lowering the TACC in the event that scallop stocks become threatened. DEH also notes that since 2000, the TACC has been set at a far higher level than the subsequent catch for each year, meaning that the TACC has not effectively limited the catch from the VSF. Given the fact that scallops have been overfished in the past and are now in a recovering state, DEH considers that DPI need to perform appropriate fishery assessments based on current and relevant information prior to determining the TACC each year. An outcome of such a fishery assessment should be the determination of sustainable yield limits for scallops in Victoria, which can then be used to set the TACC at a precautionary level.

Recommendation 8: *DPI to use current and relevant information to perform an assessment of scallop stocks in Victoria for the purpose of determining ecologically sustainable yield limits for scallop and determining the TACC for each fishery season.*

Potential removals of scallops from Victorian waters include direct harvest in the VSF, discarded scallops from the commercial fishery and recreational harvest. Fishers are required to record all

scallops caught and retained, which are then presumably decremented against their unit holdings. Logbook data is able to be validated against processor returns. Thus, DPI has good records of removals in the commercial fishery, which can be taken into account when monitoring target species catch levels. The recreational harvest is thought to be small and discards from this sector are likely to be minimal due to the hand collection (dive) nature of the fishery. Undersized scallops (less than 80 mm shell width) may occur in small numbers in beds targeted by the commercial fishery and mortality is likely to be relatively high given the damage caused by dredging operations. However, it is reported that fishers tend to voluntarily avoid areas found to contain undersized scallops as it is not in their commercial interests to continue fishing these locations. In addition, DEH has recommended that DPI improve the logbook recording requirements to provide a more robust and reliable estimate of the amount of scallop discards (**Recommendation 6**). These measures are likely to reduce the likelihood of the scallop fishing activities adversely affecting undersize scallops.

The submission indicates that byproduct is limited in the VSF. Fishers in the VSF are permitted to retain not more than 10 kilograms of fish per trip, other than scallop, abalone, rock lobster, sea urchin, jellyfish, bug, or any species listed under Regulation 302 of the Victorian *Fisheries Regulation 1998*. All retained species must be recorded in the 'other species' section of the compulsory logbooks. DEH concurs with DPIWE's assessment that byproduct levels in the fishery appear to low, and notes that the improved recording of byproduct species required under **Recommendation 6** will help to confirm this assessment.

Management response

The current VSF management regime aims to maintain ecologically viable stock levels through a range of input and output controls. These measures are outlined in Table 1 and Part I of this report.

DEH considers that the combination of the input controls should ensure adequate protection of the target stocks, but notes that this is contingent upon the TACC being set at a sustainable level based on the status of the scallop stocks each season. DEH has recommended that DPI use current and relevant information to perform an assessment of scallop stocks in Victoria for the purpose of determining ecologically sustainable yield limits for scallop and determining the TACC for each fishery season (**Recommendation 8**).

It is not evident that the management arrangements for the VSF take into account the distribution and spatial structure of the scallop stocks. While the area of the fishery is quite extensive, fishing effort is mainly concentrated in only a small area around Lakes Entrance. Investigations into spat settlement have shown that the distribution of larvae is influenced by the strength and direction of winds. In calm summers, scallop beds may be largely self-recruiting, while in windy summers, settling larvae may originate from beds some distance away. This finding is an important consideration in management of scallop fisheries because, as the number of scallop beds is reduced, self-seeding becomes more important as a means of maintaining the viability of individual beds. If high fishing-induced mortality occurs on a scallop bed once it has been fished, the future viability of that bed may be threatened since it cannot be assumed that it will be replenished by settlement of spat from other beds. DPI needs to take account of these factors in management of the fishery by considering the proximity of unfished and fished scallop beds, the amount of scallop that can be sustainably harvested from each scallop bed, and the amount that can be harvested whilst ensuring adequate density remains for spawning and recruitment in the fished and nearby scallop beds. DEH notes that the outcomes of the FRDC project "Juvenile Scallop Trashing Rates and Bed Dynamics: Testing the Management Rules for Scallops in Bass Strait", is likely to provide results that could be used by DPI to improve the management arrangements.

Recommendation 9: *DPI to review the harvesting strategy employed in the VSF to ensure that it is adequately precautionary in terms of spatial management. DPI should consider the available scientific information regarding maintaining spatially distributed scallop beds and the impacts of fishing on the southeast Australian scallop stock. DPI to also take into account the cumulative impacts of fishing on the entire scallop stock targeted in southeast Australia as relevant information becomes available.*

DEH is also concerned that the current management arrangements provide limited protection to juvenile scallop stocks. DEH recognises that a minimum size limit of 80 mm is implemented in the VSF for the purpose of allowing scallops the chance to spawn before becoming susceptible to harvest by the commercial fishery. However, DEH notes that this size limit is less than that employed in both the Australian Government-managed BSCZSF and the TSF (90 mm). DEH has recommended that DPI work with both these jurisdictions to pursue consistent management measures for the shared scallop stocks in southeast Australia (**Recommendation 5**) and notes that a revision of the current size limit in the VSF will be discussed at the beginning of the fishing season on 1 May 2006.

A number of trigger points are used in the VSF to protect undersize scallops. The first relates to trashing/discard rates, where an area may be closed to fishing if more than 20% of scallops in the catch are below the minimum size limit. The second relates to 'meats per kilogram', where management responses (such as a fishery closure) may be implemented if more than 100 split individual fish are required to make up one kilogram of meat. DEH recognises the value of these triggers, but has some concern as to how any breaches of these triggers would be detected, since DPI relies on fisher's logbooks to provide information on scallop stocks. DEH considers that better protection of juvenile scallop beds should be implemented prior to a fishing season, especially since it is unknown what level of mortality would be experienced by discarded undersized scallops. The amount of discarded undersize scallops in the VSF is likely to be high at the beginning of the fishing season since there is no mechanism to identify areas containing juvenile scallops prior to the fishing season. DEH notes that pre-season surveys are undertaken in the TSF to identify areas containing undersized scallop beds, which are subsequently closed to fishing activity until they reach the legal size limit, and considers this to be a highly precautionary measure that ensures adequate protection of juvenile scallop beds.

Recommendation 10: *Within two years, DPI to develop a means of identifying and protecting areas of juvenile scallop beds to ensure that sufficient spawning biomass is retained.*

Apart from the trigger points discussed above, there is little performance criteria employed in the VSF. DEH recognises that the high variability of scallop stocks makes it difficult to establish meaningful performance measures and trigger points, but considers that, although the establishment of meaningful performance measures and trigger points for the fishery may be difficult, their formal inclusion in management arrangements is necessary to maximise the likelihood of the continued sustainability of the fishery.

DEH has recommended that DPI develop performance indicators and measures for target species to ensure that the objectives for management of the fishery can be met, performance of the fishery can be measured and management action taken as required (**Recommendation 2**). DEH has also recommended that DPI monitor the status of the fishery in relation to these performance measures and, in the event that a trigger point is breached, respond appropriately in a timely manner. While recognising the current low take of byproduct species, DEH has also recommended that a precautionary harvesting objective be developed for byproduct species, along with associated performance measures and indicators.

Conclusion

DEH considers that the management regime in the VSF is appropriately precautionary and provides for the fishery to be conducted in a manner that does not lead to over-fishing. DEH considers that the information collection system and stock assessment and management arrangements generally are sufficient to ensure that the fishery is conducted at catch levels that maintain ecologically viable stock levels with acceptable levels of probability.

DEH considers that there is scope to further refine some of the existing information collection, assessment and management responses and has provided a number of recommendations for improvements in the longer term.

Promote recovery to ecologically viable stock levels

Objective 2: *‘Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes’*

It is generally accepted that Bass Strait scallop stocks were overfished in the past. There are now signs of recovery of scallop stocks in the VSF and DEH considers that, overall, stocks are in a period of recovery. While it appears that the TACC was historically set too high, and pressure on the stocks may have been exacerbated by dredging operations in areas with significant numbers of undersized scallops, DPI has been able to aid the recovery through past fishery closures, limiting entry to the fishery and setting the TACC at a more appropriate level.

DEH believes it is crucial that management continues to focus on the recovery of the scallop stock to ecologically viable levels. A major aspect of this recovery is the protection of sufficient parental biomass of commercial scallops within the fishery, and protection of juvenile scallop beds to avoid recruitment failure. The retention of sufficient parental biomass in scallop beds adjacent to beds that are still depleted from historical overfishing should be inherent in determining a harvest strategy and DEH has recommended that DPI consider such biological requirements and past fishing effort within particular areas when reviewing the harvesting strategy employed in the fishery (**Recommendation 9**). DEH has also recommended that DPI develop a means of identifying and protecting juvenile scallop beds (**Recommendation 10**).

The effectiveness of the current management strategies is not yet proven, although DEH notes that DPI are able to introduce management measures such as total fishery closures if necessary. DEH is confident that, through DPI’s responsible approach to management of the fishery and the implementation of the recommendations made in this report, the scallop populations within its jurisdiction can be recovered to ecologically viable stock levels and these levels can be maintained through precautionary management measures.

Conclusion

The recognition that commercial scallops were historically overfished is being addressed through the current and proposed management arrangements for the fishery. DEH considers that there is a high probability that the stocks will recover if DPI continues to implement and further refine its management regime in line with its commitments and the recommendations in this assessment.

Ecosystem impacts

Principle 2: *'Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem'*

Bycatch protection

Objective 1: *'The fishery is conducted in a manner that does not threaten bycatch species'*

Information requirements

Fishers are required to record 'other species' in the compulsory VSF logbooks, and DEH has made a recommendation that the logbook reporting requirements be improved to allow a better estimate of bycatch (**Recommendation 6**).

Additional information on bycatch in the VSF has been gathered during monitoring undertaken in the 2002 fishing season. Some additional monitoring was also undertaken during exploratory cruises to examine scallop condition during January and February 2003. On these surveys, scientists from Primary Industry Research Victoria acted as observers on commercial scallop boats during the scallop fishing season. Bycatch species were identified during the cruises, or taken back to the laboratory and identified where immediate identification was difficult. The surveys have provided information on the relative species composition of bycatch, except for species that occurred in small numbers, which were counted. Given that they were carried out around Lakes Entrance, where the majority of commercial fishing now occurs, DEH considers that the surveys have provided a realistic indication on the type and amount of bycatch taken in the VSF. However, DEH considers that DPI needs to implement an ongoing bycatch monitoring program to ensure that any significant changes in the abundance and/or composition of bycatch can be detected and responded to.

Recommendation 11: *DPI to develop a system for the collection and monitoring of information on bycatch in the VSF sufficient to enable identification of long-term trends in bycatch.*

Assessment

No formal risk assessment has been conducted for bycatch species taken in the VSF, although DPI considers that the risk to bycatch species is low given their wide distribution in southern Australia. DEH concurs with this assessment. The bycatch surveys that were performed in 2002 and 2003 showed that 66 species typically comprised bycatch, although this figure is actually a little higher since sponges were collected but not identified to the species level (Coleman, 2004). Of these, the predominant species were sponge, starfish and doughboy scallops. It was found that the percentage composition of samples varied considerably from haul to haul, but on average, live bycatch accounted for about 13-40%, while commercial scallops accounted for about 10-25% by volume. Dead shell and rock also comprised a significant proportion of the bycatch (Coleman, 2004).

Overall, the surveys found that the weight of bycatch collected was 3.4 times the weight of scallops collected. This result suggests that the use of dredging gear is relatively inefficient and can result in large amounts of bycatch (Coleman, 2004). However, as noted above, the majority of bycatch consists of dead shell and rock, which is likely to have significantly contributed to the overall weight of bycatch, and therefore to have inflated the bycatch : target species ratio.

DEH notes that bycatch abundance can depend on the density of scallop beds, with bycatch from densely populated scallop beds being relatively low compared to more sparse beds. For example, the surveys demonstrated that bycatch species comprised between 2-6% (by number) in areas where scallops were most abundant, but in areas where scallops were low in abundance, bycatch species

were up to 34 times more numerous than scallops (Coleman, 2004). DEH therefore considers that it would be in the interest of the VSF, both ecologically and economically, for DPI to develop a means of identifying scallop beds that are most densely populated, and encourages DPI to consider this as a part of the review of the harvesting strategy required under **Recommendation 9**.

Management response

Few management measures are in place in the VSF specifically to limit impacts to bycatch species, although a number of measures do act to minimise such impacts. For example, the dredge gear used in the VSF has a specified mesh size and is typically 2-3.5 metres wide. The bycatch surveys found that, based on an average tow speed of 4 knots, a tow duration of 15 minutes and a dredge width of 3.3 m, the total area covered by all hauls made during a season would be 121 km² (Coleman, 2004). The area of one catch and effort cell (10 x 10 nautical miles) is 343 km². Consequently, the total area directly impacted by the VSF is likely to be only a fraction of the area of one catch and effort cell, which is likely to significantly reduce the impact to bycatch species.

In addition, the draft Code of Conduct that is being developed for the VSF proposes that fishers only perform short shots to limit the amount of catch overflowing from the harvester. Such a practice is also likely to result in less mortality to any bycatch that is incidentally caught since it would spend only a short amount of time in the gear and could be returned close to the area that it was caught.

No specific group of indicator species has been identified or is being monitored. DEH has recommended that DPI develop a system that allows for the ongoing monitoring of bycatch species in the VSF (**Recommendation 11**), and considers that, as information from this system becomes available, DPI will be able to effectively monitor the composition and abundance of bycatch in the VSF. DEH expects that DPI would implement appropriate management responses in the event that bycatch species were found to be significantly impacted by the VSF.

Conclusion

DEH considers that there is a high likelihood that the fishery is conducted in a manner that does not threaten bycatch species. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that DPIWE would undertake appropriate actions to ensure that bycatch species are not threatened by this fishery.

A recommendation has been developed to ensure that the risk of unacceptable impact on bycatch species is detected and minimised in the longer term.

Protected species and threatened ecological community protection

Objective 2: *'The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities'*

Information requirements

There is no mechanism for fishers to record interactions with protected species in the compulsory VSF logbooks, although DEH recognises that this is probably a result of the limited potential for the fishery to interact with protected species. No other information on protected species interactions

has been collected for the VSF. DEH has recommended that DPI review the logbook reporting requirements (**Recommendation 6**), and considers that as part of this process, consideration should be given to facilitating the recording of protected species interactions.

DEH notes that information on protected species handling is available from the 'Protected Species Handling Manual' available from Ocean Watch Australia. However, DEH considers that a targeted education program is necessary to make fishers in the VSF aware of the importance of reporting protected species interactions, and to ensure that such reports can be made at an appropriate level of accuracy.

Recommendation 12: *Within 12 months, DPI to develop and implement an education program for fishers to promote the importance of protected species protection and accurate incident reporting.*

Assessment

Protected species occurring in the area of the VSF include seals, sharks, cetaceans, seabirds and syngnathids. Interactions with cetaceans, seals, seabirds and shark species are likely to be minimal given the slow movement of dredge gear, which provides an opportunity for protected species to escape capture. Any impacts would likely relate to general shipping activities (eg presence of vessel causing animals to veer from previous course, collisions with vessel, effects of lighting on seabirds). The impacts on these species should be better quantified with the introduction of a mechanism to better facilitate the reporting of protected species interactions, supported by the education program required under **Recommendation 12**.

Syngnathids are likely to be at greater risk of capture, although no interactions with these species in the VSF have been reported to date. DEH notes that syngnathids have been taken in dredges during surveys in Bass Strait, and considers it likely that they could also be taken during routine fishing activities in the VSF. However, the wide distribution of syngnathids compared to the limited area of the fishery is likely to reduce this risk.

No threatened ecological communities have been identified in the area of the fishery and therefore no assessments are being performed.

While DEH considers interactions with protected species in this fishery to be minimal, should this situation change, or a risk assessment process indicate otherwise, DEH expects that appropriate actions will be undertaken to ensure the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

Recommendation 13: *Should new information determine that the fishery is having significant interactions with any endangered, threatened or protected species, DPI to develop appropriate measures to mitigate those interactions. Measures should be implemented within 12 months of the information becoming available.*

Management response

No management measures have been introduced into the fishery specifically to minimise impacts with protected species, given that the risk to this group is low. However, the nature of the current management arrangements ensures that impacts are minimised. In particular, the small area in which the fishery operates, the slow movement of the dredge gear and the short dredge tows are likely to minimise interactions. DEH has encouraged DPI to facilitate a mechanism for the reporting of protected species interactions as part of the review of reporting requirements under

Recommendation 6). DEH has also recommended that this recording system be supported by an education program to ensure that reports are accurate (**Recommendation 12**).

DPIWE states that, should the ongoing monitoring and assessments identify significant risks associated with particular areas or species, then appropriate mitigation measures will be considered at that time. In this event, DEH has recommended that such mitigation measures be implemented within 12 months (**Recommendation 13**). DEH has also recommended that an objective and associated performance measures and indicators be developed for protected species interactions (**Recommendation 2**).

Conclusion

DEH notes that interactions with protected species in this fishery are currently minimal and considers that the fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that appropriate actions will be undertaken to ensure the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

Recommendations have been developed to ensure that the risk of unacceptable impact on protected species is minimised in the longer term.

Minimising ecological impacts of fishing operations

Objective 3: *'The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally'*

Information requirements

Limited fishery dependent information is collected on ecosystem impacts. DEH notes that some research is being conducted by the Tasmanian Aquaculture and Fisheries Institute and the FRDC for the TSF. For example, the FRDC project "Juvenile Scallop Trashing Rates and Bed Dynamics: Testing the Management Rules for Scallops in Bass Strait", is studying the bed dynamics and impact of fishing on scallop beds and aims to determine the impact of fishing on different size classes of scallops, the major bycatch species taken with commercial scallop dredging gear, and the effects of scallop dredging on benthic fauna. It is likely that the results of this project will be somewhat applicable to the VSF and DEH encourages DPI to take account of such research when assessing impacts from the VSF on the general ecosystem.

DEH notes the relative lack of information collection and research covering the fisheries impact on the ecosystem and environment generally. However, DEH understands that this lack of information is the case across a range of Australian and international fisheries and, until appropriate research techniques and programs are developed and implemented, this will continue to be the case. DEH strongly supports research in this area.

Assessment

No risk assessment of the impacts of the VSF on the ecosystem has been conducted. However, DEH notes that the Tasmanian Department of Primary Industries, Water and Environment

(DPIWE) conducted an ecological risk assessment of the TSF in 2003. It is likely that the risks to the ecosystem from the VSF would be similar to those identified for the TSF.

DPIWE's risk assessment found that there was a moderate risk from the fishery on benthic biota in the sand dynamic area of the fishery, which would clearly be a result of the dredge, which digs into bottom sediment and disturbs the benthic ecosystem. This risk would be even greater if dredging occurred on sensitive benthic ecosystems such as seagrass or sponge communities.

Impacts of the fishery on trophic levels and prey species are considered to be low. Scallops are unlikely to comprise the sole food source of any prey species, particularly since scallop populations fluctuate widely, even in unfished populations. Due to this variability species that prey on scallops would need to be highly adaptable and thus the harvest of scallops from a small area is unlikely to have a significant impact on these species. Scallops are filter feeders and therefore are at the lower end of the food chain.

Potential exists for fishing activities to facilitate the spread of marine pests. The draft Code of Conduct that is being developed for the VSF encourages fishers to clean the deck and all gear of plant and animal material when moving between fishing areas and to and from port. It also encourages fishers to dispose of plant and animal material in rubbish bins if cleaning gear in port. These practices are likely to minimise the risk of the VSF contributing to the spread of marine pests.

Impacts to water quality are also likely to be low. Dredging for scallops tends to occur in open-ocean high energy sandy substrates and the VSF is unlikely to cause significant further impacts to water quality. MARPOL applies to all fisheries and compliance is generally achieved through industry education programs and codes of conduct. The draft Code of Conduct for the VSF makes specific reference to MARPOL and outlines fisher's responsibilities under this policy.

DEH recognises the relatively low impact that the VSF has on the general ecosystem, but considers that there is scope for DPI to take more account of the impacts of the fishery on the wider ecosystem in which it operates. This is particularly important given that the scallop stocks targeted in the fishery are still recovering after being overfished historically, and the risk assessment conducted by DPIWE identified the TSF as having a moderate risk on the benthic biota (which is also likely to apply to the VSF). DEH notes that the Australian Fisheries Management Authority has commissioned the Commonwealth Scientific and Industrial Research Organisation to conduct an ecological risk assessment for the BSCZSF, which is adjacent to the VSF. While the results of this assessment are not yet available, it is possible that it may raise issues relevant to the VSF, given that both fisheries target the same stock and are likely to have similar ecosystem impacts. DEH considers that DPI should take into account the results from this, or other, ecological risk assessments, once available, and implement management responses where necessary. DEH notes that the implementation of a precautionary spatial management regime would be a key component of the revised precautionary harvesting strategy recommended under **Recommendation 9**.

Recommendation 14: *DPI to review the current management regime within the VSF to ensure that it takes account of ecosystem impacts, in particular:*

- *high risk impacts of fishing identified through ecological risk assessments relevant to the fishery;*
- *important juvenile/spawning/refuge grounds identified for byproduct and protected species; and*
- *the impacts of fishing on benthic habitats.*

During the review DPI is to liaise with the DPIWE and the Australian Fisheries Management Authority and consider information relating to the risk assessment of their respective fisheries.

Management response

DPI uses a range of management measures to minimise impacts on the ecosystem from the VSF. This includes a series of area closures in the form of 13 Marine Protected Areas and 11 smaller Marine Sanctuaries in Victorian waters. Approximately 5.35% of Victoria's coastal waters are now protected and commercial and recreational fishing has been banned in all of these areas since 1 April 2004. In addition, the limited entry to the fishery helps to protect the general ecosystem in which the fishery operates by limiting the number of boats and therefore dredge gear. While these measures were not introduced for the purpose of reducing impacts to the ecosystem, they still achieve this purpose.

DEH has recommended that DPI review the current management regime in the VSF and assess likely impacts on the ecosystem (**Recommendation 14**). DEH expects that, if significant impacts to the ecosystem are found, DPI would implement appropriate management responses. In this regard, DEH has recommended that DPI develop an objective and associated performance measures and indicators for ecosystem impacts (**Recommendation 2**) which will enable DPI to monitor the performance of the fishery and its impact on the ecosystem and to respond in a timely manner.

The Marine Division of DEH is currently leading a bioregional marine planning process in the area of the fishery. The planning process, as specified in the South East Regional Marine Plan, aims to ensure the ecologically sustainable use of the resources in the planning area and will help to integrate management across jurisdictions and sectors. The Marine Division is also in the process of identifying potential candidate areas for the National Representative System of Marine Protected Areas as part of the bioregional planning process. The bioregional planning process is a potential vehicle for pursuing sustainable fisheries objectives, particularly where cross sectoral or cross jurisdictional approaches are required. DPI should continue to engage in the process as far as practical. More information is available at www.oceans.gov.au.

Conclusion

DEH considers that the fishery is conducted in a sufficiently precautionary manner to minimise the impact of fishing operations on the ecosystem generally. Recommendations have been developed to ensure that the risk of significant impact by the fishery on the marine environment generally is minimised in the longer term.

REFERENCES

Coleman, N. (2004) *Bycatch Monitoring for the Victorian Ocean Zone Scallop Fishery in 2002*. Research Report Series No. 11, Fisheries Victoria, Australia.

LIST OF ACRONYMS

BSCZSF	Bass Strait Central Zone Scallop Fishery
DEH	Department of the Environment and Heritage
DPI	(Victorian) Department of Primary Industries
DPIWE	(Tasmanian) Department of Primary Industries, Water and Environment
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
FCC	Fisheries Co-management Council
FRDC	Fisheries Research and Development Corporation
ITQ	Individual Transferable Quota
MARPOL	International Convention for the Prevention of Pollution from Ships
TACC	Total Allowable Commercial Catch
TSF	Tasmanian Scallop Fishery
VSF	Victorian Scallop Fishery
WTO	Wildlife Trade Operation