



Australian Government

Department of the Environment and Water Resources

Assessment of the
Victorian Developmental Jellyfish Fishery

April 2007

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This document is an assessment carried out by the Department of the Environment and Water Resources 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 Water Resources on the fishery in relation to decisions under Part 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 Water Resources or the Australian Government.

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Table 1: Summary of the Victorian Developmental Jellyfish Fishery (VDJF)

Publicly available information relevant to the fishery	<ul style="list-style-type: none"> • Victorian <i>Fisheries Act 1995</i>; • Victorian <i>Fisheries Regulations 1998</i>; • The <i>Developmental Fisheries Management Plan: Jellyfish (Catostylus mosaicus) 2003 – 2005</i>; • Fisheries Victoria’s 2006 submission <i>Statement of Management Arrangements for the Victorian Developmental Jellyfish Fishery</i>; and • Department of the Environment and Water Resources’ (DEW, formerly the Department of the Environment and Heritage) <i>Assessment Report of the Victorian Developmental Jellyfish Fishery 2003</i>.
Area	Port Phillip Bay, Victoria.
Fishery status	Underexploited.
Target Species	Jellyfish (<i>Catostylus mosaicus</i>).
Byproduct Species	Byproduct caught may be retained subject to the quantity of the species not exceeding those limits defined in the <i>Fisheries Regulations 1998</i> . The taking of abalone, rock lobster or syngnathids is prohibited in the VDJF.
Gear	Hand dip-netting from vessels only. Seine nets used for herding and corralling purposes only.
Season	Unrestricted, although the jellyfish season usually occurs between January and June.
Commercial harvest 2005	9,267 kilograms.
Value of commercial harvest	Current wholesale price ranges from \$13,000 to \$16,000 per processed tonne.
Recreational harvest	No significant recreational take of target species due to the specialised processing techniques generally required for jellyfish to be palatable.
Commercial licenses issued	Currently one permit holder.
Management arrangements	<p>Input and output controls including:</p> <ul style="list-style-type: none"> • a restriction to fish Port Phillip Bay only; • a minimum catch requirement of 150 tonnes per annum; • a total allowable catch (TAC) of 1,000 tonnes; • a minimum bell diameter of 23cm; • specification of the maximum length and mesh size of the net to be used (seine net no greater than 250m in length and a mesh size no smaller than 10cm – for herding purposes only); and • the recording of bycatch.
Export	Jellyfish products exported to Asia, particularly Japan.
Bycatch	Considered low. Possibly other jellyfish and fish species.
Interaction with Threatened Species	Uncertain, although thought to be minimal.

Table 2: Progress in implementation of recommendations made in initial assessment of the VDJF

Recommendation	Progress	Recommended Action
<p>1. The review of the ecological sustainability of the fishery to be provided to DEW annually.</p>	<p>Research and progress reports were provided to DEW in 2004 and in 2006, which included Fisheries Victoria's progress in implementing recommendations arising from the first-round assessment.</p>	<p>Fisheries Victoria to inform DEW of any future amendments to the management arrangements, related management documents or managerial commitments made in the 2006 VDJF submission.</p> <p>A condition to the Wildlife Trade Operation (WTO) declaration for the fishery will involve Fisheries Victoria to produce and present annual reports to DEW regarding the status and the performance of the fishery, research undertaken and progress made by Fisheries Victoria in implementing DEW recommendations.</p>
<p>2. From 2003 the review of the ecological sustainability of the fishery is to include:</p> <ul style="list-style-type: none"> • Analysis of any reported interactions, or observances of, protected species in the fishery; and • Information collected by the monitoring and reporting of any bycatch activity by permit holders in the fishery. 	<p>Fisheries Victoria does not currently require fishers in the VDJF to report interactions or observances of protected species in the fishery.</p> <p>At present, Fisheries Victoria and the Department of Sustainability and Environment (DSE) are finalising the details of a general amnesty against prosecutions by DSE under the <i>Wildlife Act 1975</i> of fishermen who may incidentally capture/ injury protected species. This is expected to be operational by April 2007.</p> <p>However, while the amnesty and specific</p>	<p>While interactions with protected species are not currently reported in the VDJF, DEW believes a specific recommendation addressing this issue is not warranted at this stage. The VDJF has only one operator that targets jellyfish in State waters with selective gear (hand dip-netting from vessels with seine nets for herding and corralling purposes only).</p> <p>The Ecological Risk Assessment (Recommendation 1) should assist with determining whether the VDJF impacts on protected species. If it is found that the fishery does interact with protected species, Fisheries Victoria will implement management responses, as appropriate, to address these</p>

	<p>protected species reporting forms will be operational in April, it has only been approved for three fisheries (scallop, rock lobster and giant crab) as these have high priority due to current export approval recommendations. After two years, Fisheries Victoria will review the effectiveness of the protected species reporting requirement and will consider expanding it to all Victorian fisheries.</p> <p>Until such time, Fisheries Victoria cannot ask fishers not covered by the amnesty to record this information and leave themselves open to prosecution under the <i>Wildlife Act 1975</i>.</p> <p>Fisheries Victoria requires the permit holder in the VDJF to monitor and report on discarded catch (bycatch). To date, no bycatch has been reported in the VDJF, due to the species-specific method of harvesting.</p>	<p>issues.</p> <p>Bycatch is recorded in logbooks in the VDJF, however to date no bycatch species have been reported. Fisheries Victoria will continue to monitor logbook records from the permit holder to determine if bycatch species are being recorded in the fishery. Recommendation 5 should assist with validating logbook information to ensure bycatch data is recorded.</p>
<p>3. Clearer performance indicators, associated reference points and management responses to be developed and implemented in the fishery within two years.</p>	<p>The main performance indicators as specified by the <i>Developmental Fisheries Management Plan 2003-2005</i> (the plan) for the VDJF were catch and effort, size constancy, economic viability and export/import competition. Catches in the last three years have ranged from zero to less than 10 tonnes, which is less than 1% of the TAC (1,200 tonnes for</p>	<p>A trigger point (TAC is reached) has been developed for management action in Fisheries Victoria's submission <i>Statement of Management Arrangements for the Victorian Developmental Jellyfish Fishery</i>. There is currently no timeframe for the implementation of management responses when a trigger is breached.</p>

	<p>Port Phillip Bay) and, as a result, there has been very little commercial activity and economic indicators have been poor.</p> <p>Due to the lack of progress in the fishery, Fisheries Victoria indicted that further development of performance indicators, reference points and management responses has not been warranted. If catches were to increase to within 20% of the TAC, Fisheries Victoria would review current management arrangements.</p>	<p>While the VDJF currently has a low level of effort and relatively benign fishing methods, DEW considers that Fisheries Victoria needs to develop meaningful performance indicators and trigger points based on the best available information in order to measure performance and progress of this developmental fishery (See Recommendation 3). DEW also recommends Fisheries Victoria to develop time frames for implementation of action following the triggering of a reference point.</p>
<p>4. The management plan to incorporate an aim to minimise the impact on the structure, productivity, function and biological diversity of the ecosystem within the life of the current management plan.</p>	<p>The management arrangements for the VDJF contain aims to ensure the ongoing sustainability of jellyfish (<i>C. mosaicus</i>) stocks in Victoria as the fishery continues to develop.</p> <p>The management arrangements incorporate a section on the impact of commercial fishing on the broader marine environment. As harvesting can only be done with a hand-held dip net and the only species that can be retained is <i>C. mosaicus</i>, there is minimal impact on the environment, little damage to under-size jellyfish and no incidental bycatch as jellyfish swim at the surface, leaving little space for other species. In short, Fishery Victoria regards the fishery as environmentally benign with no major discernible impact upon the</p>	<p>When the fishery was first assessed in 2003, the VDJF was in force under a developmental management plan. This plan has since expired (2005) and the fishery is now managed through permits issued under the <i>Fisheries Act 1995</i>.</p> <p>DEW understands that the VDJF is a small fishery with relatively low impacts on the environment, but considers that research is required on the annual variation, ecosystem role and reproductive biology of <i>C. mosaicus</i> (Recommendation 4). This recommendation, in conjunction with Recommendation 1 should increase Fisheries Victoria's understanding of the importance of jellyfish stocks in the ecosystem and assist with minimising any fishery impacts on the structure, productivity, function and biological diversity of the ecosystem.</p>

	functioning of the Port Phillip Bay ecosystem.	
5. DEW to be informed of any changes to the developmental fishery management plan.	Apart from the expiry of the <i>Developmental Fisheries Management Plan 2003-2005</i> , there have been no changes to the VDJF management arrangements that could affect the criteria on which the <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) decisions are based.	A condition to the WTO declaration for the fishery will involve Fisheries Victoria to inform DEW of any amendment to the management arrangements made in the 2006 submission.
6. A mechanism is to be developed to enable the amendment of management arrangements to respond to new information, or future Government plans and policies within the life of the current management plan.	Fisheries Victoria have indicated that the VDJF management arrangements may be amended at any time by variation of permit conditions. Such an amendment has not been necessary to date.	DEW is confident that Fisheries Victoria will amend management arrangements to respond to new information, or future Government plans and relevant policies as they occur.
7. Stock biomass estimates of Western Port Bay, Corner Inlet and Gippsland Lakes to be completed by the end of 2004 and be fed into the adaptive management plan.	Stock biomass estimates were not completed for Western Port Bay, Corner Inlet or Gippsland Lakes however as no fishing occurred in these areas, biomass estimates were not required. As estimating biomass is cost-prohibitive for the single operator, Fisheries Victoria have made the decision to revoke the ability to fish in these areas in the future. Consequently, the permit will only allow the operator to fish in Port Phillip Bay. A survey to estimate the abundance and biomass of <i>C. mosaicus</i> was undertaken	While a survey to estimate the abundance and biomass of <i>C. mosaicus</i> was undertaken in areas of Port Phillip Bay in 2004, jellyfish stocks display a high level of inter-annual variability in Victoria, where <i>C. mosaicus</i> are at the southern end of their range. Because of the short life-span of jellyfish medusa and the high level of inter-annual abundance that they display, the TAC will need to be set anew each year for the Port Phillip Bay area. While Fisheries Victoria have indicated that they will monitor catch rates and make variations to the 2007/08 TAC as necessary,

	<p>in May and June 2004 in Port Phillip Bay. Sampling was carried out throughout Corio Bay, the Geelong Arm and the western and northern shores, areas which previous studies have shown are those where jellyfish are most likely to be found.</p>	<p>further stock assessments for <i>C. mosaicus</i> in Port Phillip Bay need to be conducted in order to estimate the available biomass and inform the TAC setting process (Recommendation 2).</p>
<p>8. Further research into the biology of <i>Catostylus mosaicus</i> to be conducted by 2005. In particular, focus to be given to causes of annual variation, ecosystem role of <i>C. mosaicus</i> and reproductive biology of <i>C. mosaicus</i>.</p>	<p>Research specific to the VDJF has not progressed, primarily because the fishery has not developed and the research is cost-prohibitive for a single operator to fund.</p> <p>Fisheries Victoria have indicated that the ecosystem role and reproductive biology of <i>C. mosaicus</i> has been investigated in other jurisdictions and is likely to be similar for <i>C. mosaicus</i> in Victoria.</p>	<p>While the results of research conducted in other jurisdictions could apply to Victoria in the VDJF, the target species are at the southern most point of their range and results could vary. The factors which influence changes in abundance and the role of <i>C. mosaicus</i> in the marine ecosystems of Victoria are poorly understood. These areas require investigation if there is to be any chance of predicting the likely success of the fishery each year and if the broader ecological consequences of removing jellyfish from the ecosystem are to be understood.</p> <p>A recommendation (Recommendation 4) has been develop by DEW for Fisheries Victoria to develop a research strategy for <i>C. mosaicus</i> within two years and implement once resources allow or when catch or effort levels increases significantly from current levels. Research should focus on the causes of annual variation and the ecosystem role of <i>C. mosaicus</i>.</p>
<p>9. Mortality of the VDJF <i>C. mosaicus</i> stocks due to bycatch in other fisheries is to be</p>	<p>Fisheries Victoria requires all Victorian commercial fishers and permit holders to</p>	<p>Although information on the bycatch of jellyfish in other fisheries is not available,</p>

<p>estimated and incorporated in the setting of catch limits under the adaptive management plan.</p>	<p>report retained catch but not catch that is discarded at sea (bycatch) with the exception of the VDJF permit which specifically requires reporting of bycatch species.</p> <p>Under the Victorian <i>Fisheries Regulations 1998</i>, commercial fishers are not permitted to retain jellyfish as a byproduct so any jellyfish caught in fisheries other than the VDJF would be discarded and, therefore, not reported. Fisheries Victoria is progressing the issue of reporting bycatch in all fisheries to address this lack of information.</p>	<p>Fisheries Victoria have indicated that there would be no need to attempt to incorporate this mortality into catch limits as the TAC is only 15% of the estimated biomass and current catches account for less than 1% of the TAC.</p> <p>While DEW recognises that the TAC for the VDJF is only a fraction of the estimated biomass and effort in the fishery has been minimal, DEW believes that bycatch in other fisheries should be considered in the management of the fishery, based on the best available information. A recommendation has been developed by DEW for Fisheries Victoria to include the estimated level of bycatch of <i>C. mosaicus</i> from other Port Phillip Bay Fisheries when setting the TAC for each season (Recommendation 2).</p>
<p>10. Department of Primary Industries to develop the adaptive management plan and forward it to the Minister for approval by the end of 2003. The plan should then be implemented for the 2004 season.</p>	<p>Fisheries Victoria stated that the Director of Fisheries, on behalf of the Minister, approved the <i>Developmental Fisheries Management Plan 2003-2005</i> and this was implemented as agreed.</p>	<p>As the VDJF has not developed as a commercial fishery, there has been no need to redraft or revise the Plan.</p> <p>The <i>Developmental Fisheries Management Plan 2003-2005</i> has since expired and Fisheries Victoria have indicated that there is no proposal at this stage for a new developmental fishery management plan.</p> <p>The VDJF is a small, developmental fishery which is now managed under commercial permits issued under the <i>Fisheries Act 1995</i>.</p>
<p>11. The priority research projects identified in the management plan to be completed in</p>	<p>Fisheries Victoria suggests that the very low level of fishing effort in the VDJF</p>	<p>While DEW acknowledges the low level of fishing effort in the VDJF, the ecological</p>

<p>the next three years. These include: the monitoring of bycatch and reporting of other species in areas of conglomeration; investigating the diet of jellyfish and drawing inferences as to the effects of jellyfish removal on populations of prey species; and reproduction and polyp stage dynamics. DEW to be regularly updated on the progress of the research projects.</p>	<p>could not support the proposed research projects, however research has been completed on the same species in other jurisdictions, the results of which could apply to the VDJF.</p>	<p>characteristics of <i>C. mosaicus</i> are poorly understood. In addition, while the results of research conducted in other jurisdictions could apply to Victoria in the VDJF, the target species are at the southern most point of their range and results could vary.</p> <p>Logbook records from the VDJF permit holder and reports from jellyfish fisheries elsewhere in Australia indicate that the harvesting method employed (hand dip-netting, with seine nets for corralling purposes only) is highly selective and does not retain other species or interact with bycatch and protected species.</p> <p>A recommendation (Recommendation 4) has been develop by DEW for Fisheries Victoria to develop a research strategy for <i>C. mosaicus</i> within two years. Research should focus on the causes of annual variation and ecosystem role of <i>C. mosaicus</i>.</p>
<p>12. An investigation of the ecological impact of the fishery to be carried out in 2004.</p>	<p>As the maximum harvest for the previous three years has been less than 1% of the TAC, Fisheries Victoria have indicted that it has not been possible, or necessary, to complete an investigation of the ecological impact of the VDJF.</p> <p>At this stage, costs associated with research are outweighed by the extremely low commercial value of the fishery.</p>	<p>While the impact of the fishery on the ecosystem at this developmental stage is considered minimal, the fishery could potentially become commercially viable within the next three years. Fisheries Victoria has indicated that the current VDJF permit holder has an intention to increase fishing effort in 2006/07. DEW considers that a risk assessment should be conducted, appropriate to the scale of the fishery, and Fisheries Victoria should develop appropriate responses to any high risks identified (Recommendation 1).</p>

Table 3: The DEW assessment of the VDJF against the requirements of the EPBC Act related to decisions made under Parts 13A.

Part 13A

Section 303DC Minister may amend list	DEW assessment of the VDJF
<p>Minister may, by instrument published in the Gazette, amend the list referred to in section 303DB (list of exempt native specimens) by:</p> <p>(a) including items in the list;</p>	
<p>In deciding whether to amend the list referred to in section 303DB (list of exempt native specimens) to include a specimen derived from a commercial fishery, the Minister must rely primarily on the outcomes of any assessment in relation to the fishery carried out for the purposes of Division 1 or 2 of Part 10.</p>	<p>No assessment of the VDJF has been carried out under Part 10 of the EPBC Act.</p>
<p>The above does not limit the matters that may be taken into account in deciding whether to amend the list referred to in section 303DB (list of exempt native specimens) to include a specimen derived from a commercial fishery.</p>	<p>It is not possible to list exhaustively the factors that you may take into account in amending the List of Exempt Native Specimens (LENS). The objects of Part 13A of the EPBC Act, which are set out below this table, provide general guidance in determining factors that might be taken into account. A matter that is relevant to determining whether an amendment to the list is consistent with those objects is likely to be a relevant factor.</p> <p>DEW considers that the amendment of the LENS to include product taken in the VDJF would be consistent with the provisions of Part 13A of the EPBC Act as:</p> <ul style="list-style-type: none"> ▪ the fishery will not harvest any Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) listed species; ▪ there are management arrangements in place to ensure that the resource is being managed in an ecologically sustainable way (see

	<p>Table 1).</p> <ul style="list-style-type: none"> ▪ the operation of the VDJF is unlikely to be unsustainable and threaten biodiversity within the next 3 years; and ▪ the EPBC Regulations 2000 do not specify fish as a class of animal in relation to the welfare of live specimens.
<p>Before amending the list referred to in section 303DB (list of exempt native specimens), the Minister:</p> <ul style="list-style-type: none"> (a) must consult such other Minister or Ministers as the Minister considers appropriate; and (b) must consult such other Minister or Ministers of each State and self-governing Territory as the Minister considers appropriate; and (c) may consult such other persons and organisations as the Minister considers appropriate. 	<p>The public comment period on Fisheries Victoria's <i>Statement of Management Arrangements for the Victorian Developmental Jellyfish Fishery</i> (the submission) sought comment on the submission and provided sufficient opportunity for consultation with other persons and organisations.</p> <p>A letter to the Hon Joe Helper MP, Minister for Agriculture advises him of the intention to declare the fishery a Wildlife Trade Operation (WTO) under Part 13A of the EPBC Act.</p>

Section 303FR Public consultation	DEW assessment of the VDJF
<p>Before making a declaration under section 303FN, the Minister must cause to be published on the Internet a notice:</p> <ul style="list-style-type: none"> (a) setting out the proposal to make the declaration; and (b) setting out sufficient information to enable persons and organisations to consider adequately the merits of the proposal; and (c) inviting persons and organisations to give the Minister, within the period specified in the notice, written comments about the proposal. 	<p>A public notice, which set out the proposal to grant export approval to the VDJF and included the submission, was released for public comment which closed on 10 November 2006 with no submissions received.</p>
<p>A period specified in the notice must not be shorter than 20 business days after the date on which the notice was published on the Internet.</p>	<p>A public notice, which set out the proposal to grant export approval to the VDJF and included the submission, was released for public comment on 6 October 2006 and closed on 10 November 2006, a total of 26 business days.</p>
<p>In making a decision about whether to make a declaration under section 303FN, the Minister must consider any comments about the proposal to make the declaration that were given in response to the invitation in the notice.</p>	<p>No public comments about the proposal were received.</p>

Section 391 Minister must consider precautionary principle in making decisions	DEW assessment of the VDJF
<p>The Minister must take account of the precautionary principle in making a decision under section 303DC and/or section 303FN, to the extent he or she can do so consistently with the other provisions of this Act.</p>	<p>You must consider the precautionary principle when making a decision to include specimens on the LENS.</p>
<p>The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.</p>	

Objects of Part 13A

- (a) to ensure that Australia complies with its obligations under CITES and the Biodiversity Convention;
- (b) to protect wildlife that may be adversely affected by trade;
- (c) to promote the conservation of biodiversity in Australia and other countries;
- (d) to ensure that any commercial utilisation of Australian native wildlife for the purposes of export is managed in an ecologically sustainable way;
- (e) to promote the humane treatment of wildlife;
- (f) to ensure ethical conduct during any research associated with the utilisation of wildlife;
- (h) to ensure the precautionary principle is taken into account in making decisions relating to the utilisation of wildlife.

Final recommendations to Fisheries Victoria for the VDJF

The material submitted by Fisheries Victoria demonstrates that the management arrangements for the VDJF continue to meet most of the requirements of the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. The VDJF is relatively well-managed, with a range of management measures in place to promote the ecologically sustainable harvesting of species from the fishery. These measures include: a restriction to fish Port Phillip Bay only; a TAC of 1,000 tonnes; a minimum bell diameter of 23cm; gear restrictions; and the recording of all catch, including bycatch.

While the fishery is relatively well-managed, DEW has identified a number of risks and uncertainties that must be managed to ensure that their impacts are minimised. These are:

- the need for current stock assessments of *C. mosaicus* in Port Phillip Bay in order to estimate the available biomass and inform the TAC setting;
- a lack of specific research and monitoring;
- a lack of monitoring and validation of jellyfish bycatch in other Victorian commercial fisheries;
- the need to monitor general ecosystem impacts; and
- a lack of data validation.

On balance, DEW is satisfied 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. To contain and minimise the risks in the longer term the recommendations listed below have been made. DEW therefore recommends that the fishery be declared an approved WTO for a period of three years with the actions specified in the recommendations to be undertaken by Fisheries Victoria to contain the environmental risks in the long term. Such a declaration would enable Fisheries Victoria to address some of the uncertainties in the fishery, monitor progress of the fishery, incorporate any new information into management, formalise management of the fishery and allow DEW to review progress on addressing the conditions and recommendations on an annual basis. DEW is satisfied 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.

Recommendations are provided below with a brief explanation of the related issue/intent. Unless a specific time frame is provided in the recommendation each recommendation must be addressed before the end of the fishery's declaration (3 years).

Table 4: VDJF assessment– Summary of Issues and Recommendations March, 2007

	Issue	Recommendation
1	<p><u>Ecological impacts</u></p> <p>In the previous assessment of the VDJF in 2003, a recommendation was developed for Fisheries Victoria to investigate the ecological impact of the fishery, to further inform management. As the maximum harvest for the previous three years has been less than 1% of the TAC, Fisheries Victoria indicated that it was not possible, or necessary, to complete an investigation into the ecological impacts of the VDJF.</p> <p>There is currently no specific information regarding the role of <i>C. mosaicus</i> in Victorian waters or the effect of their removal on the ecosystem. While the potential for the VDJF to impact unacceptably and unsustainably on the environment generally is considered low (due to the size and highly selective nature of harvest in the fishery), uncertainties still exist.</p> <p>Turtles (particularly leatherback turtles) and sunfish are known to eat jellyfish but these species do not regularly occur in Victorian waters. Several species of leatherjackets are also said to feed on <i>C. mosaicus</i>, as do other jellyfish, sea anemones, cephalopods and crustaceans. It is also generally believed that the species, when aggregated, provides protection to a range of fish and invertebrate species.</p> <p>While the impact of the fishery on the ecosystem at this developmental stage is considered minimal, the fishery could potentially become commercially viable within the next three years. DEW considers that a risk assessment should be conducted, appropriate to the scale of the fishery and Fisheries Victoria should develop appropriate responses to any high risks identified. The risk assessment should use available information on the fishery, to identify and respond to any significant risks caused by the fishery to ecological communities and habitats.</p>	<p>Recommendation 1: <i>Within two years, Fisheries Victoria to conduct an Ecological Risk Assessment (ERA), appropriate to the scale of the fishery, and develop appropriate responses to any high risks identified. Fisheries Victoria to also review the ERA in the event that catch or effort levels increase significantly from current levels and to address any new high risks identified.</i></p>

<p>2 <u>Abundance and biomass estimates</u></p> <p>In the previous assessment of the VDJF in 2003, DEW expressed concern over whether management arrangements had been accurately informed through stock biomass estimates for all bays and inlets of the fishery. A recommendation was therefore made in 2003 for Fisheries Victoria to complete stock biomass estimates for <i>C. mosaicus</i> for these areas. While a survey to estimate the abundance and biomass of <i>C. mosaicus</i> was undertaken in areas of Port Phillip Bay in May and June 2004, stock biomass estimates were not completed for the remaining areas.</p> <p>DEW understands that no fishing occurred in the Western Port Bay, Corner Inlet and the Gippsland Lakes areas from 2003 to 2005. As such, biomass estimates for these areas were not a priority. Consequently, Fisheries Victoria made the decision to revoke the ability to fish for <i>C. mosaicus</i> in these areas from 2006.</p> <p>While a survey to estimate the abundance and biomass of <i>C. mosaicus</i> was undertaken in areas of Port Phillip Bay in 2004, jellyfish stocks display a high level of inter-annual variability in Victoria, where <i>C. mosaicus</i> are at the southern end of their range. Because of the short life-span of jellyfish medusa and the high level of inter-annual abundance that they display, the TAC will need to be set anew each year for the Port Phillip Bay area. It is important to note that populations in various individual embayments and estuaries within its range are considered as separate stock units.</p> <p>While Fisheries Victoria have indicated that they will monitor catch rates through the 2006/07 season and make variations to the 2007/08 TAC as necessary, further stock assessments for <i>C. mosaicus</i> in Port Phillip Bay need to be conducted in order to estimate the available biomass and inform the TAC setting. DEW suggests that consideration should also be given to including the estimated level of bycatch of <i>C. mosaicus</i> from other fisheries when setting the TAC each season.</p>	<p>Recommendation 2: <i>Estimates of abundance and biomass for C. mosaicus in Port Phillip Bay to be completed annually and be used to inform management arrangements, particularly with regards to setting the annual TAC. Estimates should take into account variability of jellyfish stocks and where appropriate, the overall bycatch of C. mosaicus in other Port Phillip Bay fisheries.</i></p>
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3	<p><u>Management measures</u></p> <p>When the fishery was first assessed by DEW in 2003, performance indicators specified in the developmental management plan were broad and did not contain associated reference points, management responses or timeframes. A recommendation was consequently developed by DEW for Fisheries Victoria to develop and implement clearer performance indicators, associated reference points and management responses in the fishery. Fisheries Victoria contends that they were unable to meet this recommendation due to minimal catches and a lack of commercial activity in the fishery over the last three years.</p> <p>While DEW acknowledges that it is difficult for Fisheries Victoria to develop meaningful performance indicators and measures due to the lack of fishing activity in the VDJF, Fisheries Victoria will need to develop these, should the fishery move away from its developmental status. While a performance indicator is included under the current VDJF management arrangements, the ability to achieve the total allowable catch is, in itself, a reference point for management action in a fishery but does not effectively monitor changes in the status of the fishery. Furthermore, management arrangements for the VDJF do not include performance indicators relating to bycatch and discards or impacts on the ecosystem. However, as more catch and effort information is gathered in the VDJF over the period of the WTO declaration, the data, on which to inform decision-making on, will become more meaningful.</p> <p>While the VDJF currently has a low level of effort and relatively benign fishing methods, DEW considers that Fisheries Victoria needs to develop meaningful performance indicators and trigger points based on the best available information in order to measure performance and progress of this developmental fishery. DEW also recommends Fisheries Victoria to develop time frames for implementation of action following the triggering of a reference point.</p>	<p>Recommendation 3: <i>Within one year following an Ecological Risk Assessment, Fisheries Victoria to develop meaningful performance indicators and trigger points, based on the best available information for the VDJF. Within 3 months of becoming aware of a performance indicator being triggered, Fisheries Victoria to develop a clear timetable for the implementation of appropriate management responses.</i></p>
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4	<p>Research</p> <p>When the fishery was first assessed in 2003, DEW had concerns with the lack of information on the biology of <i>C. mosaicus</i> in which to develop appropriate management arrangements. DEW therefore made a recommendation for Fisheries Victoria to undertake further research into the biology of <i>C. mosaicus</i>, particularly in reference to causes of annual variation, the ecosystem role of the species and reproductive biology.</p> <p>While research has been conducted in New South Wales on environmental factors that influence variation of <i>C. mosaicus</i>, Fisheries Victoria have indicated that they were unable to meet this recommendation, mainly due to the fishery not developing and research being cost-prohibitive for a single operator to fund.</p> <p>While the results of research conducted in other jurisdictions could apply to Victoria in the VDJF, the target species are at the southern most point of their range and results could vary. The factors which influence changes in abundance and the role of <i>C. mosaicus</i> in the marine ecosystems of Victoria are poorly understood. Coleman (2003) states that both of these areas require investigation if there is to be any chance of predicting the likely success of the fishery each year and if the broader ecological consequences of removing jellyfish from the ecosystem are to be understood.</p> <p>DEW understands that the VDJF is a small fishery with relatively low impacts on the environment, but considers that research is required on the annual variation, ecosystem role and reproductive biology of <i>C. mosaicus</i> to underpin stock assessments and TAC setting. While this research should be conducted soon, DEW accepts that the research is cost-prohibitive for one operator to fund. DEW therefore recommends that Fisheries Victoria develop a research strategy for <i>C. mosaicus</i> and implement once resources allow or when catch or effort levels increases significantly from current catch and effort levels. The research strategy should take account of similar research conducted in other jurisdictions.</p>	<p>Recommendation 4: <i>Fisheries Victoria to develop a research strategy for C. mosaicus within two years and implement once resources allow or when catch or effort levels increases significantly from current levels. Research should focus on the causes of annual variation and ecosystem role of C. mosaicus.</i></p>
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5	<p><u>Data validation</u></p> <p>Monthly records from logbooks are required to be submitted to Primary Industries Research Victoria as per the permit conditions. Validation of logbook data is not currently conducted in the VDJF, however Fisheries Victoria indicate that a proposal for an observer program to include a broad range of fisheries/species is currently being discussed. It is not known whether this program will include jellyfish.</p> <p>While DEW understands that there is currently only one permit holder in the VDJF and that effort has been minimal, records from the VDJF are the only source of catch information on <i>C. mosaicus</i> - no other Victorian fisheries are permitted to retain jellyfish and bycatch reporting is not required in Victorian fisheries. In addition, it appears that the permit holder in the VDJF is also the processor. Consequently, fishing logbooks can not be adequately cross-checked with processor records. It is therefore important that logbooks are accurately completed to give meaning to performance indicators and performance measures. In addition, there is an indication from Fisheries Victoria that the current permit holder plans to increase fishing effort in 2006, placing more emphasis on accurate catch reporting.</p> <p>Given the uncertainty of stock status and the developing nature of the fishery, there is an ongoing need for sound fishery dependent catch and effort data.</p>	<p>Recommendation 5: <i>Fisheries Victoria to develop and implement a robust system, appropriate to the scale of the fishery, to validate commercial logbook reporting of catch and effort in the VDJF.</i></p>
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References

Coleman, N. (2003) Jellyfish Fishery Development and Assessment. FRDC Report 1999/138.

Acronyms

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
DEW	Department of the Environment and Water Resources
DSE	Department of Sustainability and Environment
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
LENS	List of Exempt Native Specimens
TAC	Total Allowable Catch
VDJF	Victorian Developmental Jellyfish Fishery
WTO	Wildlife Trade Operation