



PORT PHILLIP BAY
environmental management
plan: PLAN AND CRITICAL PROGRAMS TO 2003



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This report contains the Environmental Management Plan for Port Phillip Bay. It includes programs, to 2003, to mitigate the risks posed by nutrients and marine pests to Bay management objectives.

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Introduction

Port Phillip Bay is of significant social, economic and environmental value to Victoria. Maintaining the Bay's biodiversity, especially the ecological processes that sustain it, is fundamental both to sustaining the opportunities that the Bay provides for us and for future generations, and to protecting the intrinsic value of its biological systems.

Understanding and improving the Bay's environment has been a long-term concern for the Victorian Government. The most recent major study was the 1991-96 Port Phillip Bay Environmental Study, which was followed by the revision of the Bay's State Environment Protection Policy (SEPP) schedule. The SEPP review recognised the need for development of this Environmental Management Plan (EMP), to outline an overarching framework for managing the Bay's environment. This framework is not intended to review or override all the existing programs relevant to the Bay's environment. Programs and strategies for managing a range of Bay activities, such as the Best Practice Environmental Management Guidelines for Dredging and the Victorian Stormwater Action Program, will continue to be developed. The EMP's purpose is to facilitate, in a structured way, coordination among such planning and resource management activities to target key desired environmental outcomes for the Bay. To do this requires a shared understanding of the environmental objectives for the Bay and of key risks to achieving those objectives, as well as planning and implementation of tasks by the relevant institutions to mitigate the key risks in an integrated way – guided by performance assessment and review processes.

The framework outlined in this EMP draws on characteristics of the international standard ISO 14001 for Environmental Management Systems.

Bay Environmental Management - Applying the Broad Characteristics of an Environmental Management Systems (ISO 14001) Approach:

- *Policy setting, including Bay environmental objectives*
- *Key risks to Bay environmental objectives*
- *Objectives and targets for mitigating key risks*
- *Planned programs to implement policy and address objectives and targets, including accountabilities*
- *Implementation program*
- *Performance monitoring and evaluation*
- *Review and improvement*

While industry and the community play vital roles in Bay environmental management and will be critical to program implementation, the framework focuses on tasks to be lead by Government institutions. An EMP Background Document, containing more detail on the background to the framework, is available from NRE.

Environmental Management Framework

Objectives and Key Risks

The range of uses and values that we as a community want from the Bay has evolved over time. Management priorities for the Bay's environment are set by a policy framework consisting of a range of Government commitments, legislation, strategies, international agreements and, in particular, relevant SEPP schedules. A number of these policy processes have helped establish the key Bay environmental management objectives.

Key Bay Environmental Management Objectives:

- *To conserve biodiversity*
- *To provide recreation and tourism opportunities*
- *To secure production and sustainable use of wild fisheries*
- *To provide for aquaculture*
- *To provide for shipping and boating*
- *To protect cultural heritage*
- *To provide water for industrial purposes*

The Bay is, of course, linked through natural processes and human activities to surrounding environments - particularly the catchment, atmosphere and oceans. This means that environmental risks to these objectives can stem from activities within the Bay or some distance away. Several key environmental risks have been identified through a range of processes.

Key Bay Environmental Risks:

- *Deterioration of water quality*
 - > *Increased nutrient loading and detrimental changes to nutrient cycling*
 - > *Toxicant inputs*
 - > *Increased suspended solids levels*
 - > *Presence of pathogens*
- *Presence of litter*
- *Exotic marine pests*
- *Physical disturbance of habitats*
- *Harvesting activities*

Across the Bay and its linked environments, many Government institutions have management roles and responsibilities that influence the human activities and natural processes affecting these risks - making effective coordination critical.¹

As scientific understanding has grown, two of the key risks - increased nutrients and exotic marine pests - have emerged as particular priorities. These risks can affect ecological processes both Bay-wide and locally and have ecological impacts that are already, or without action could become, irreversible even with the intervention of current technology and science. The impacts of these risks may also have significant adverse long-term flow-on effects on the Bay's social and economic benefits.

Management actions continue to target these two key risks, but they require sustained and long term attention. Mitigating these two risks is the focus of the remainder of this EMP. This will not mean exclusion of action on the other key risks. These risks require ongoing consideration, as they remain important to the Bay management objectives, particularly on regional and local scales. A similar approach to that applied to nutrients and marine pests within this framework may be useful in future for reviewing and refocussing mitigation action for other key risks, or for risks that are more specific, localised or emerging. Such reviews will be implemented progressively. Potential future candidates could, for example, include systems to support cessation of sewage disposal from vessels to Bay waters.

1. See EMP Background Document for further background information

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Critical Programs to Mitigate Key Risks

Critical programs to 2003 for nutrients and marine pests respectively are outlined in Sections 1 and 2 of this EMP. The programs aim to refine risk-mitigation actions, enhance coordinating mechanisms, and consolidate and improve environmental reporting – leading ultimately to better risk management. Current objectives for mitigating each risk are first specified as program objectives followed by a series of contributing sub-program objectives. Where necessary, the rationale underlying the key tasks that will target the sub-program objectives is also summarised. The key tasks are then listed, drawing on existing actions and where necessary addressing management gaps. The tasks range from management planning and implementation to coordination, monitoring and reporting. Responsibilities among Government institutions for leading each task are identified. Key partners are also listed, although it is important to recognise that these institutions may often involve a much wider range of partnerships in delivering their responsibilities. The programs' tasks vary in complexity and specificity. Generally, lead agencies are best placed to identify how their significant tasks will be achieved, and to develop more specific work programs and plans as appropriate.

While many of their component tasks are already underway, the programs will formally commence with publication of this EMP. The first reporting cycle will occur in 2002.

Performance Monitoring and Evaluation

Each program's monitoring, reporting and review tasks are consolidated in Section 3 of this EMP as synthesised frameworks for reporting performance and reviewing progress in reducing each of these risks to the Bay. The programs' scope includes both 'task implementation' and longer term 'environmental' monitoring and reporting. Both monitoring and reporting are integrated with, and build on, on existing systems where possible, but with a strong focus on the objectives of the nutrient and pest programs. There will be three reporting systems.

Reporting Systems for EMP Nutrient and Marine Pest Programs:

- *A (new) Bay Actions Report* - for task implementation reporting relevant to the Bay itself, or to activities or inputs that affect or enter it directly or are transmitted via the oceans. This report will also include longer term environmental reporting, relating to the Bay itself and key inputs, supported by more detailed technical reports as appropriate.
- *A Catchment Actions Report within the Port Phillip and Westernport Catchment and Land Protection (CALP) Board's annual reporting system* - for task implementation reporting relevant to Bay inputs, mainly from catchment sources, that are transmitted via the catchment waterways.
- *The Port Phillip Air Quality Improvement Plan (AQIP) reporting system* - for task implementation reporting relevant to Bay inputs, mainly from catchment sources, that are transmitted via the atmosphere.

This reporting will assist review and improvement of this EMP and also assist with periodic public reports on Bay water quality by the Environment Protection Authority (EPA) associated with the Bay SEPP schedule. Environmental monitoring data will also be published on the existing electronic data warehouse (<http://www.nre.vic.gov.au/vwrnm>) with interpretive reporting at intervals that are technically meaningful to the relevant programs.

Review and Improvement

Mitigating the nutrient and marine pest risks will require long-term programs. Initial progress reviews of the nutrient and pest programs are scheduled for 2003 (interim) and 2006, and will be led by the Central Coastal Board (CCB) in consultation with EPA, NRE, the CALP Board and other relevant parties. Other Bay risks will also be progressively considered. These reporting and review systems will advise the review of the Bay SEPP schedule due in 2007.

1. Nutrient Program

This nutrient program is the nutrient reduction plan referred to in the Bay SEPP schedule. The program focuses on nitrogen, which is the key limiting nutrient for biological processes in the Bay.²

Objective

To protect the Bay's nitrogen cycling processes, predominantly by continuing to reduce nitrogen inputs to achieve a 1000 tonne reduction in annual load by 2006.³

- *particularly focusing reductions, where practically feasible, on reducing loads associated with storm events and delivered through the catchment waterways;*
- *achieving reductions in accordance with the sub-program objectives below, but coordinated with those of other relevant management plans; and*
- *assessing reductions against the nitrogen baseline determined by the EPA.⁴*

Key Sub-Programs and Objectives

1.1 Direct Bay Inputs - Western Treatment Plant (WTP)

To reduce annual load by 500 tonnes by 2006.

1.2 Direct Bay Inputs - Proposals for New or Increased Nitrogen Loads

- (i) To ensure that there are no net additions of nitrogen to the Bay. While a practical mechanism to deliver nitrogen offsets is undergoing detailed consideration (see (ii)), each proposal will be assessed on its merits using the approach outlined in Appendix 1.
- (ii) To investigate in detail, within the next 12 months, the implications of, and technical basis for, the development of a nitrogen offset system. The aim, pending the investigation's results, will be preparation of a guideline outlining a practical mechanism for application to new Bay discharge proposals.

2. While nitrogen is the key limiting element for biological processes in the Bay, the Port Phillip Bay Environmental Study also highlighted the importance of nitrogen-silicate interactions in controlling phytoplankton bloom biomass and composition. See Harris, G. et al. 1996; Murray, A. and Parslow, J. 1997.

3. CSIRO recommended reducing annual Bay nitrogen loads by 1000 tonnes, which was subsequently reflected in the revised Bay SEPP schedule as a statutory policy objective. See Harris, G. et al. 1996.

4. EPA set the nitrogen baseline, as required by the Bay SEPP schedule, using Bay study data. It is based on Bay nitrogen input loads over 1991-95. Further information is available from EPA.

This investigation will be lead by NRE and EPA and involve consultation with Melbourne Water, other relevant agencies and key industry groups. Advice will also be sought from independent economic and scientific experts as appropriate. Key elements of any offset system will include application of best practice waste minimisation and means to defensibly demonstrate the scientific validity of proposed offsets.

Note that, while sewage disposal from vessels to Bay waters is not a major nitrogen source addressed in this sub-program, its cessation as required by the Bay SEPP will also contribute to reducing direct nitrogen inputs.

1.3 Catchment Waterways

To reduce annual catchment waterway load to the Bay by 2006, particularly focusing on storm event loads where practically feasible, as follows:

- *Yarra/Maribyrnong Rivers - 350 tonnes*
- *Other surface waters focusing on the Patterson River system - 150 tonnes*

This will be a challenging task as continued urban development also adds to nitrogen loads entering the Bay through changed catchment conditions. Achieving this reduction target against the nitrogen baseline will therefore also need to involve ongoing efforts to prevent, reduce and/or compensate for these additions. Reducing the amount of nitrogen from urban development requires a combination of retro-fitting existing development to reduce nitrogen discharges and working with the development industry to establish new suburbs that have nitrogen discharges similar to natural catchment conditions. This requires a long term approach.

The Bay study emphasised the priority of controlling 'storm loads' over controlling nutrient loads during base flow conditions in terms of Bay impacts. While it is important to recognise the current technological challenges in reducing major storm event loads using intervention approaches, source control approaches have potential to assist with reducing these nutrient inputs.

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Due to the many and varied activities contributing to waterway nitrogen loads, and range of management agencies involved, the catchment waterways sub-program is based on the following coordinating framework. Coordination will be required primarily across three key management themes outlined below, and across Government institutions with lead responsibility for these themes.

Each lead agency will develop 1–3 year work programs, outlining nitrogen-reduction actions planned within their management theme and, where possible, the action's estimated effect on nitrogen loads. The FILTER model, which has been developed to estimate nutrient and sediment loads from the subcatchments within the Port Phillip catchment, may assist with these estimates.⁵ A range of actions relevant to these management themes have already been investigated and prioritised, such as the FILTER opportunities database (held by Melbourne Water), the Werribee River Catchment Nutrient Management Plan (developed as part of the statewide nutrient management program) and the Yarra Catchment Action Plan 1999.

Depending on key management themes, issues such as key sources, priority setting, cost-sharing, targets, and assessment of effectiveness and outcomes will be important considerations in work program planning.

To facilitate work program development for the rural land management theme, NRE will initially lead an identification of priority land management activities to reduce nitrogen (and phosphorus) inputs to waterways across the Bay's catchment; this will build on, and link across, the FILTER database and Yarra and Werribee plans.

While waterway management is not included among the key management themes for reducing Bay nitrogen inputs, it is both related to the rural land management theme and relevant to managing Bay nitrogen inputs derived from diffuse sources. Opportunities to develop synergies through linked and complementary waterway and rural land management activities should therefore be sought in relevant work program planning.

KEY MANAGEMENT THEME	LEAD AGENCY	KEY PARTNERS
1. Stormwater management	Melbourne Water*	EPA, Local government Oversight - CALP, CCMA
2. Rural land management	NRE	Local government, agricultural industries Oversight - CALP, CCMA
3. Licensed waste discharges including Sewage Treatment Plants	EPA	Melbourne Water, retail water companies Oversight - CALP, CCMA

* Within its drainage area. The predominant stormwater inputs from the Bay's catchment occur within this area.

5. The EMP background document provides further information on the FILTER model and associated work on potential load reduction actions and their cost effectiveness.

The CALP Board will establish interagency coordination mechanisms, involving lead agencies and key partners, to provide for coordinated planning and implementation across the key management themes and work programs. The Board will also liaise with the Corangamite CMA to provide coordinated oversight across the Bay's catchment. The work programs will provide a basis for annual performance reporting.

In future EMP reviews, it may be appropriate to refine this coordinating framework and the key management themes, guided by experience of the relative impacts and cost-effectiveness of implemented actions.

Improved management of domestic wastewater in currently unsewered areas, through approaches such as strategic land use planning consideration, backlog sewerage provision and better septic tank management, can also contribute to reducing catchment nitrogen loads (as well as various other groundwater, waterway and/or Bay management objectives). As the extent of its contribution to Bay nitrogen reduction is at this stage difficult to predict, domestic wastewater management in unsewered areas is not currently recognised as a key management theme above or included in the FILTER opportunities database. Established wider priorities in this area are adoption of an agreed Government program and reform of associated legislation. The 2003 and 2006 reviews of this EMP will provide an opportunity to refine the catchment nutrient sub-program, if appropriate when these significant steps have progressed.

1.4 Atmosphere

The atmosphere is a significant pathway delivering nitrogen from some catchment activities to the Bay directly, and also back to the catchment from where it can contribute to waterway nitrogen loads (see 1.3). Addressing the main source of this atmospheric nitrogen – emissions from internal combustion engines – will be a significant and long-term challenge addressed through EPA's Air Quality Improvement Plan (AQIP). The objective by 2006 is therefore general:

To stabilise or reduce loads from atmospheric sources.

1.5 Reducing Other Risks to Bay Nitrogen Cycling Processes

The Bay study substantially increased understanding of the Bay's nitrogen cycling processes, but knowledge of these complex systems is far from complete. Input nitrogen loads are a known and significant risk to nitrogen cycling processes. Other Bay activities may also contribute risks, but difficulty in predicting their specific nature provides little basis for specific management targets. Therefore, in addition to the general objective of ecologically sustainable management for all Bay activities and progressively improved scientific understanding, the specific aim is:

To establish a Bay monitoring program addressing the following objective:

To detect, as early as possible with current scientific understanding, detrimental changes to critical elements of Bay nitrogen cycling processes that indicate an increased risk of eutrophication at Bay-wide and regional scales.

This monitoring will provide the basis for the state element of the nutrient program reporting framework (see 1.6). As it will be achieved through a new interagency partnership, this sub-program includes the establishment by NRE of a Bay nutrient monitoring technical coordinating committee.

Complementary 'project-specific' monitoring at relevant spatial scales will also be appropriate for projects and/or programs particularly relevant to nitrogen cycling risk, but will require case-by-case consideration. Such monitoring should be developed through a technically rigorous process, including peer review, in consultation with the above committee.

1.6 Reporting on Progress

- (i) To track and publicly report on progress with implementing key nutrient program tasks, including any more detailed supporting work programs, that contribute to the objectives of the above sub-programs and hence to the overall nutrient program.
- (ii) To, in the longer term and where realistically technically feasible, track and publicly report on the task's effectiveness in addressing these objectives.

The monitoring and reporting tasks from key sub-programs 1.1-1.5 above together form a consolidated performance reporting framework which is synthesised in Section 3. The framework is based on a pressure-state-response approach, with objective (i) above relating to the 'response' element and objective (ii) above relating to 'pressure' and 'state'. The frequency of interpretative reports for the key pressure and state elements (1.1, 1.3, 1.5) will be guided technically, by timeframes that are appropriate for confident data interpretation.

Reporting will be distributed across the three reports discussed on page 5: the (new) Bay Actions report, the Catchment Actions report within the existing CALP Board annual reporting system and the AQIP reporting system. Section 3 includes a summary of the pressure, state and response monitoring tasks involved across sub-programs 1.1-1.5, and where they will be reported.

1.7 Progressively Improving Understanding

To progressively improve scientific and technical understanding across all sub-programs, supporting continual improvement in task implementation and future program reviews.

This sub-program does not contain explicitly defined tasks. Although some of the above sub-programs specify known priority research tasks or directions, this general sub-program is included to recognise the importance of ongoing identification and targeting of knowledge gaps to guide the way that agencies implement tasks across the whole nutrient program.

1.8 Program Review

To review the nutrient program as appropriate in 2003 (interim) and 2006, taking into account reporting results, advances in understanding and the relative cost-effectiveness and practicality of management alternatives.

Key Tasks and Delivery Responsibilities

Over the next two years, delivery of the nutrient program aiming to address the nutrient program objective, and series of contributing sub-program objectives, listed above will require the following key tasks.

There will also be opportunities to improve coordination and integration of current and planned activities to reduce nitrogen inputs to the Bay. For the catchment, oversight responsibility lies with the Port Phillip and Westernport CALP Board in consultation with the Corangamite CMA. For the Bay and foreshore, oversight responsibility lies with the Central Coastal Board. Liaison between these Boards will assist integration across Bay and catchment management.

KEY TASKS	REPORTING	LEAD	KEY PARTNERS
Sub-programs 1.1 & 1.2: Direct Bay Inputs - WTP and Proposals for New or Increased Nitrogen Load Discharges			
- Reduce the load from Western Treatment Plant (WTP) by 500 tonnes by 2006.	- Annually report on actions & predicted load contribution to NRE by August each year for Bay Actions Report.	MW	EPA
- Maintain a monitoring system, in accordance with EPA licence requirements, that enables comparison between the WTP load and baseline.	- Annually provide NRE with weekly concentration and continuous flow data from the above monitoring. - Use WTP concentration and flow data to estimate WTP loads at minimum of 2002, 2004 and 2006. - Prepare a statistically rigorous comparison with WTP baseline in approximately 2010. - Report on the results of this monitoring and interpretation to NRE by August of relevant years for Bay Actions Report.	MW	EPA, NRE
- Ensure that any EPA works approvals and licences issued for new or increased direct Bay nitrogen loads are consistent with the objectives of this nutrient program (see Appendix 1).	- Annually collate relevant works approvals and licence amendments, including predicted load implications, and provide to NRE by August each year for Bay Actions Report.	EPA	NRE
- Ensure that any consents, permits or licences issued under the Coastal Management Act or Fisheries Act involving new or increased direct Bay nitrogen loads are consistent with this nutrient program (see Appendix 1).	- Annually collate relevant consents, including predicted load implications, by August each year as input to Bay Actions Report.	NRE	EPA
- Investigate detailed implications of, and technical basis for, development of a nitrogen offset system. - Review criteria for assessing new or increased nitrogen discharge proposals (see Appendix 1) as appropriate. - Subsequent tasks to be defined once investigation results available.	- Report within 12 months. The goal, subject to the investigations' preliminary results, is development of a guideline outlining a practical mechanism to deliver nitrogen offsets for new Bay discharge proposals.	NRE, EPA	MW, Key industry groups, Independent scientists/ economists

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KEY TASKS	REPORTING	LEAD	KEY PARTNERS
<ul style="list-style-type: none"> - Annually compile key implemented actions affecting direct Bay nitrogen loads (including WTP and any new proposals), including predicted load contributions. - Annually report on key implemented actions. 	<ul style="list-style-type: none"> - Publish in Bay Actions Report by October each year. 	NRE	
Sub-program 1.3: Catchment Surface Waters			
<ul style="list-style-type: none"> - Contribute to reducing the waterway nitrogen load to the Bay by 500 tonnes by working in partnership with agricultural industries to develop and encourage the implementation of sound environmental practices and procedures that will reduce nitrogen inputs to waterways from land used for cropping, grazing and horticulture. 	<ul style="list-style-type: none"> - Identify priority land management activities to reduce nitrogen (and phosphorus) inputs to waterways across the Bay's catchment, building on and linking across the FILTER database and Yarra and Werribee plans, by December 2002. - Annually develop/review a 1-3 year works program of planned actions, including predicted contributions from targeted land uses and, where possible, predicted load reductions from the actions. - Annually report on implemented actions, including predicted load contribution, by July each year for compilation and ultimate input to CALP Board's annual report. 	NRE	Agricultural Industries, Local Govt, CALP
<ul style="list-style-type: none"> - Contribute to reducing the waterway nitrogen load to the Bay by 500 tonnes through targeted stormwater action. 	<ul style="list-style-type: none"> - Annually develop/review a 1-3 year works program of planned actions including, where possible, their predicted load contributions. - Annually report to NRE on implemented actions, including predicted load contribution (including report on uptake of stormwater action plans by relevant local government), by July each year for compilation and ultimate input to CALP Board's annual report. 	MW	EPA, Local Govt

KEY TASKS	REPORTING	LEAD	KEY PARTNERS
<ul style="list-style-type: none"> - Contribute to reducing the waterway nitrogen load to the Bay by 500 tonnes through regulation of licensed waste discharges including sewage treatment plants that discharge to catchment waterways. 	<ul style="list-style-type: none"> - Annually develop/review a 1-3 year works program of planned actions including, where possible, their predicted load contributions. - Annually report to NRE on implemented actions, including predicted load contribution (including report on any significant new or increased licensed waterway nitrogen discharges), by July each year for compilation and ultimate input to CALP Board's annual report. 	EPA	MW, Retail water companies
<ul style="list-style-type: none"> - Encourage water sensitive urban design. 		Local Govt, MW	
<ul style="list-style-type: none"> - Consider the long-term risk of Bay nitrogen load in strategic planning processes. 	<ul style="list-style-type: none"> - Strategic planning issues and directions to be outlined in the final Melbourne Metropolitan Strategy. 	DOI	
<ul style="list-style-type: none"> - Annually compile key implemented actions affecting waterway nitrogen load, including predicted load contributions. 	<ul style="list-style-type: none"> - Annually provide to CALP Board by late July each year to support preparation of CALP Board's annual report by August each year. 	NRE	MW, EPA, CALP
<ul style="list-style-type: none"> - Oversee implementation of the Regional Catchment Strategy to achieve the outcome of 'reduced nitrogen input to Port Phillip Bay'. - Coordinate development of, and monitor and report on implementation of, work programs and other relevant action plans, to reduce waterway nitrogen load, particularly for the 3 key management themes. - Report against the Werribee River Catchment Nutrient Management Plan and the Yarra Catchment Action Plan 1999. 	<ul style="list-style-type: none"> - Include in annual reports prepared by August each year a 'Catchment Actions Report' on key actions affecting Bay nitrogen loads from catchment sources. 	CALP	NRE, MW, EPA, Local Govt, CCMA

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KEY TASKS	REPORTING	LEAD	KEY PARTNERS
<ul style="list-style-type: none"> - Liaise to provide a coordinated oversight of programs affecting waterway nitrogen load across the whole catchment. 		CCMA, CALP	
<ul style="list-style-type: none"> - Maintain a monitoring system, including targeted storm-event sampling, that allows comparison between Yarra - Maribyrnong and Patterson - Mordialloc waterway loads and baselines. 	<ul style="list-style-type: none"> - Annually provide relevant concentration and flow data for publication on electronic data warehouse. - Use waterway monitoring data to estimate waterway loads at minimum of 2003 & 2006. - Prepare a statistically rigorous comparison with Yarra - Maribyrnong and Patterson - Mordialloc baseline in approximately 2014 - 2016. - Report on the results of this monitoring and interpretation to NRE by August of relevant years for Bay Actions Report. 	MW	EPA, NRE, CALP
Sub-program 1.4: Atmosphere			
<ul style="list-style-type: none"> - Refine the estimate of atmospheric nitrogen load to the Bay. 	<ul style="list-style-type: none"> - Include results in reporting on the Air Quality Improvement Plan. 	EPA	
<ul style="list-style-type: none"> - Oversee the implementation of the Port Phillip Region Air Quality Improvement Plan. 	<ul style="list-style-type: none"> - Regular reporting as per Air Quality Improvement Plan. 	EPA	
<ul style="list-style-type: none"> - Annually collate significant works approvals and licence amendments relevant to Bay atmospheric nitrogen load, including predicted load implications. 	<ul style="list-style-type: none"> - Report in annual Bay Actions Report &/or reporting on Air Quality Improvement Plan. 	EPA	NRE
Sub-program 1.5: Bay Nitrogen Cycling Processes			
<ul style="list-style-type: none"> - Develop and implement a program to monitor the state of Bay nitrogen cycling. - Establish inter-agency Bay nutrient monitoring technical coordinating committee. - Review Bay nutrient monitoring program in 2004. - Through targeted research, resolve key uncertainties that limit the interpretation of Bay monitoring results. 	<ul style="list-style-type: none"> - Publish agreed program on the electronic data warehouse. - Publish ongoing monitoring data on the electronic data warehouse. 	NRE	MW, EPA

KEY TASKS	REPORTING	LEAD	KEY PARTNERS
<ul style="list-style-type: none"> - Contribute to the integrated Bay nutrient monitoring program by maintaining current, long term monthly nutrient monitoring at existing Bay fixed sites. 	<ul style="list-style-type: none"> - At least annually, publish fixed sites nutrient monitoring data on the electronic data warehouse. - Provide summary reports at technically appropriate timelines to NRE by August of the relevant year for Bay Actions Report. - Publish detailed interpretive reports at technically appropriate timelines. 	EPA	NRE, MW
<ul style="list-style-type: none"> - Review and interpret Bay monitoring data (other than fixed sites nutrient monitoring above). 	<ul style="list-style-type: none"> - Publish summary reports at technically appropriate timeframes for each monitoring component in the relevant year's Bay Actions Report. - Publish detailed interpretive reports in 2004* 	NRE	MW, EPA
<ul style="list-style-type: none"> - Develop and implement defensible, complementary project-specific monitoring at relevant scales for projects and/or programs particularly relevant to nitrogen cycling risk. 	<ul style="list-style-type: none"> - Publicly report on the results of peer-reviewed programs. 	Project and/or Program Proponents	Relevant Govt Agencies
<ul style="list-style-type: none"> - Investigate the impacts of marine pests on Bay nutrient cycling processes. 	<ul style="list-style-type: none"> - Publish summary reports in Bay Actions Report with detailed technical reports and papers at technically appropriate timeframes. 	NRE, Univ of Melb	
<p>Sub-Program 1.6: Reporting on Progress</p> <p>Sub-program 1.6 is listed here for completeness, as it consists of the publication of the reports that will stem from the reporting tasks, as well as the supporting monitoring, collation, compilation and, in some cases, interpretation tasks outlined within each of the above sub-programs. Section 3 summarises these reporting tasks, and the information that they will be based on.</p>			
<p>Sub-Program 1.7: Progressively Improving Understanding</p> <p>Sub-program 1.7 is listed here for completeness; while it does not contain explicitly defined tasks, it is included to emphasise the need to progressively improve understanding in priority areas as an implicit and ongoing consideration in the way that agencies implement tasks across the whole nutrient program.</p>			
<p>Sub-Program 1.8: Review</p>			
<ul style="list-style-type: none"> - Review progress on these critical programs in 2003 (interim) and 2006. 	<ul style="list-style-type: none"> - Publish revised critical programs. 	CCB	NRE, MW, EPA, CALP, interested parties

* Longer-term tasks to be carried over in intervening reviews of the nutrient program

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2. Marine Pest Program

The risk of marine pests to the Bay cannot be managed by just focusing on the Bay itself – some of the vectors that can lead to introduction of pests to the Bay operate at scales far larger than the Bay. Ballast water that is discharged from vessels into the Bay, for example, can be sourced from ports around the world. Consequently, marine pests are most effectively addressed by statewide and national programs. The program outlined below focuses on key Bay-focused tasks, and forms an additional layer to relevant statewide and national programs, most of which are not listed here.

Objective

Continue to improve the management of vectors that lead to the introduction of marine pests to the Bay, reduce the impact from introductions through early detection and rapid response action where possible, and reduce the impact on the Bay from established pest populations where technically feasible.

This program is largely developmental in nature, reflecting reform of marine pest management arrangements in Australia. The reform process is intended to be completed in 2003, when initial progress reviews of this EMP's nutrient and pest programs are scheduled.

Key Sub-Programs and Objectives

2.1 Vector Management - Ballast Water

To improve ballast water management to reduce the risks of introduction and dispersal of marine pests.

2.2 Vector Management - Fouling of Large Ships

To improve management of biotic fouling of large ships and associated infrastructure to reduce the risks of introduction and dispersal of marine pests.

2.3 Vector Management - Fouling of Small Vessels

To improve management of biotic fouling of small vessels to reduce the risks of introduction and dispersal of marine pests.

2.4 Vector Management - Aquaculture

To improve management of aquaculture to reduce the risks of introduction and dispersal of marine pests.

2.5 Early Detection

To monitor priority locations within the Bay for new marine pest introductions.

Monitoring will focus on areas that are high-risk locations for primary introductions to the Bay. It will address two more specific monitoring objectives:

(i) To maintain the currency of information on marine pest status that is used to assess the risk of 'target-species' being introduced to the Bay by the above vectors.

(ii) To provide an early warning of new marine pest introductions, in order to provide maximum flexibility in choosing between rapid-response options, where these may be effective.

The first step will be to identify an appropriate and practically feasible monitoring approach.

2.6 Mitigate Impacts of Introductions

To respond rapidly to new introductions of marine pests and reduce the impact of established populations on the Bay's management objectives, as feasible technically and beneficial environmentally, socially and economically.

Decisions on response and mitigation options to both new and established populations will be guided by assessments of likely technical and practical feasibility and effectiveness, along with consideration of environmental, social and economic costs and benefits. Approaches for assessing the performance of implemented actions will be developed on a case-by-case basis.

Among established Bay pest populations, the Northern Pacific Seastar (*Asterias amurensis*) is the current focus of attention because of its likely impact as a predator. As concern about *Asterias* is not restricted to the Bay, management of its risks and impacts is guided by the *Asterias* National Control Plan, <http://www.ea.gov.au/coasts/imps/>. Investigating the impacts of a range of established marine pests on Bay nutrient cycling processes, along with options to address potentially adverse impacts, will also receive priority.

2.7 Reporting on Progress

The objectives of this sub-program are similar to those for nutrient reporting (see sub-program 1.6):

- (i) To track and publicly report on progress with implementing key tasks, including any more detailed supporting work programs, that contribute to the objectives of the above sub-programs and hence to the overall pest program.
- (ii) To, in the longer term and where realistically technically feasible, track and publicly report on the task's effectiveness in addressing these objectives.

The monitoring and reporting tasks from key sub-programs 2.1–2.6 above form the framework for this performance reporting, which is synthesised in Section 3. As is clear from this framework, reporting for pests is developmental. Reporting to address objective (i) above will occur across all pest sub-programs, but for objective (ii) the initial focus will be on identifying appropriate reporting approaches and indicators.

Reporting will occur through the (new) Bay Actions report. Section 3 includes a summary of the monitoring tasks involved across sub-programs 2.1–2.6.

2.8 Progressively Improving Understanding

To progressively improve scientific and technical understanding across all sub-programs, supporting continual improvement in task implementation and future program reviews.

This sub-program does not contain explicitly defined tasks. Although some of the above sub-programs specify known priority research tasks or directions, this general sub-program is included to recognise the importance of ongoing identification and targeting of knowledge gaps to guide the way that agencies implement tasks across the whole marine pest program.

2.9 Program review

To review the pest program as appropriate in 2003 (interim) and 2006, taking into account reporting results, advances in understanding and the relative cost-effectiveness and practicality of management alternatives.

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Key Tasks and Delivery Responsibilities

Over the next two years, delivery of the marine pests program aiming to address the marine pest program objective, and series of contributing sub-program objectives, listed above, will require the following key tasks.

KEY TASKS	REPORTING	LEAD	KEY PARTNERS
Sub-program 2.1: Vector Management – Ballast Water			
- Establish a ballast water management regime that reduces risks from internationally and domestically sourced ballast water that is proposed to be discharged to the Bay.	- Annually collate progress and provide to NRE by August each year for Bay Actions Report.	EPA	DOI, VCA, NRE
- Consider the risk of marine pests in long-term strategic planning processes affecting port development and shipping patterns in the Bay.		DOI	EPA, NRE, VCA
- Advocate action by port and ship managers that helps reduce the risk posed by marine pests.		DOI	EPA, NRE, VCA
- Finalise and implement an environmental management plan to address risks associated with marine pests arising from the operation of the Port of Geelong.	- Publish plan (and associated periodic reports on the implementation of the plan and its effectiveness).	DOI	EPA, NRE, VCA
- Finalise and implement an environmental management plan to address risks associated with marine pests arising from the operation of the Port of Melbourne.	- Publish plan (and associated periodic reports on the implementation of the plan and its effectiveness).	MPC	EPA, NRE, VCA
- Investigate and trial appropriate and cost-effective indicators and approaches for monitoring the effectiveness of these tasks at improving management of ballast water.	- Annually report on progress in Bay Actions Report.	NRE	EPA
Sub-program 2.2: Vector Management – Fouling of Large Ships			
- Assess the feasibility of establishing a hull fouling management regime.	- Report on the assessment, including provision of a summary to NRE for Bay Actions Report.	EPA	DOI, VCA, NRE

KEY TASKS	REPORTING	LEAD	KEY PARTNERS
- Investigate and trial appropriate and cost-effective indicators and approaches for monitoring the effectiveness of these tasks at improving management of fouling of large ships.	- Annually report on progress in Bay Actions Report.	NRE	EPA
Sub-Program 2.3: Vector Management – Fouling of Small Vessels			
- Establish a management regime to reduce the risk that small vessels and their associated gear introduce marine pests to and transfer them within the Bay.	- Annually report on progress in Bay Actions Report.	NRE	
- Investigate and trial appropriate and cost-effective indicators and approaches for monitoring the effectiveness of these tasks at improving management of fouling of small vessels.	- Annually report on progress in Bay Actions Report.	NRE	
Sub-Program 2.4: Vector Management – Aquaculture			
- Ensure that the aquaculture of translocated aquatic biota within the Bay conforms to Victoria's translocation policy.	- Annually report on relevant consents issued, including relevant conditions and compliance, in Bay Actions Report.	NRE	
- Ensure that marine farming equipment introduced to the Bay from other marine areas is treated to ensure that it is free of marine pests.	- Annually report on relevant consents issued, including relevant conditions and compliance, in Bay Actions Report.	NRE	
- Investigate and trial appropriate and cost-effective indicators and approaches for monitoring the effectiveness of these tasks at improving management of aquaculture.	- Annually report on progress in Bay Actions Report.	NRE	
Sub-Program 2.5: Early Detection			
- Design and trial a monitoring system that maintains the currency of information on the status of 'target-species'. This information is used to assess the risk of ballast water proposed for discharge to the Bay and provides an early warning in the event of an introduction of a 'target-species'.	- Annually report on progress with program development and detection of new 'target-species' and new exotic species in Bay Actions Report.	NRE	EPA, VCA, MPC

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KEY TASKS	REPORTING	LEAD	KEY PARTNERS
Sub-Program 2.6: Mitigate Effects of Introductions			
<ul style="list-style-type: none"> - Mount rapid response to the introduction of new pest species to the Bay where feasible technically and beneficial environmentally, economically and socially. 	<ul style="list-style-type: none"> - Annually report on action taken, including any performance indicators identified on a project-specific basis, in Bay Actions Report. 	NRE	EPA, VCA, MPC
<ul style="list-style-type: none"> - Implement and support targeted research to better understand existing pest populations, with the aim of mitigating their impacts in the longer term where feasible technically and beneficial environmentally, economically and socially. - In particular, investigate the impacts of pests on Bay nutrient cycling processes. 	<ul style="list-style-type: none"> - Annually review existing program and modify as necessary. - Publish summaries of relevant research implemented in Bay Actions Report with detailed reports and papers as technically appropriate. 	NRE, Univ of Melb	
<ul style="list-style-type: none"> - Implement actions to mitigate the impact of established pests in the longer term where feasible technically and beneficial environmentally, economically and socially. 	<ul style="list-style-type: none"> - Annually report on action taken, including any performance indicators identified on a project-specific basis, in Bay Actions Report. 	NRE	
Sub-Program 2.7: Reporting on Progress			
<p><i>Sub-program 2.7 is listed here for completeness, as it consists of the publication of the reports that will stem from the reporting tasks, as well as the supporting monitoring, collation, compilation and, in some cases, interpretation tasks outlined within each of the above sub-programs. Section 3 summarises these reporting tasks, and the information that they will be based on.</i></p>			
Sub-Program 2.8: Progressively Improving Understanding			
<p><i>Sub-program 2.8 is listed here for completeness; while it does not contain explicitly defined tasks, it is included to emphasise the need to progressively improve understanding in priority areas as an implicit and ongoing consideration in the way that agencies implement tasks across the whole pest program.</i></p>			
Sub-Program 2.9: Program Review			
<ul style="list-style-type: none"> - Review progress on these critical programs in 2003 (interim) and 2006. 	<ul style="list-style-type: none"> - Publish revised critical programs. 	CCB	NRE, EPA, DOI, VCA, interested parties

3. Performance Reports Frameworks

The nutrient and pest programs include monitoring and reporting tasks. The performance reporting frameworks below summarise the relationships between these tasks, clarifying how they will together provide coordinated reporting on progress relevant to sub-program objectives and, as a result, to overall program objectives. This reporting will provide a basis for review of these programs and, in the longer term, for review of the Bay SEPP schedule.

Nutrient Reporting Framework

The nutrient reporting framework is based broadly on a pressure-state-response approach to monitoring and reporting (see Figure 3.1). Table 3.1 illustrates how the nutrient program's tasks contribute to each of these reporting elements, and where they will be reported.

Indicators and performance assessment for the response element will be based on extent of implementation of key tasks and associated work programs, including monitoring. Those for pressure and state elements will mainly be based on quantitative interpretation of environmental monitoring results. More detail on monitoring approaches for pressure and state elements can be found in separate technical reports.⁶

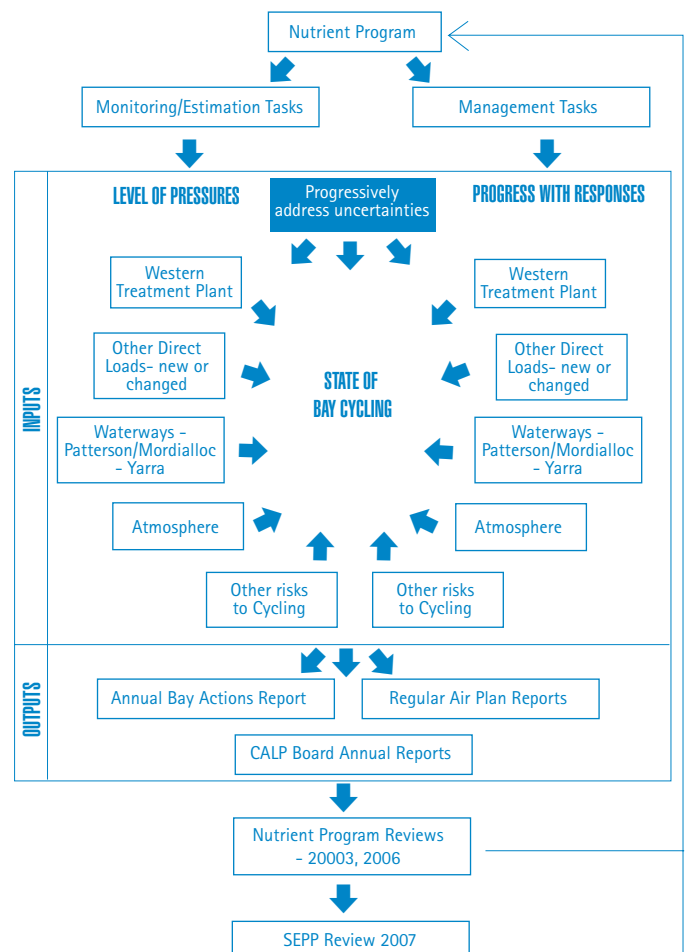
In time, interpretation across all three monitoring and reporting elements will contribute to integrated assessments of progress with mitigating Bay nutrient risk. These assessments will in turn feed into future reviews of the nutrient program.

Elements of nutrient monitoring and reporting approach:

- pressure = contributors to the risk
- state = condition of Bay nitrogen cycling process
- response = implementation of management tasks

Understanding of Bay nutrient cycling processes is by no means complete and overall interpretation of these results will be complex. It will also require assessment at several timescales, and will therefore develop with time. Not all indicators will be amenable to sensible interpretation in the initial reporting cycles. For example, we already know that performance assessments for some pressure indicators (such as confidently assessing achievement of nitrogen load reduction objectives against the baseline) will require long data series given inherent background variability levels.⁷ In the meantime, reporting will focus on response and state elements. For the state element, monitoring and reporting will themselves occur at several timescales. This monitoring, which aims to detect detrimental changes to the state of nitrogen cycling processes as early as current scientific understanding allows, involves approaches ranging from frequent metered monitoring to assessment of long term trends.⁸

Figure 3.1 Nutrient Program - Reporting and Review System



6. See: Parslow, J., Sokolov, S., and Murray, S. 1999; Longmore, A. R. 2000; Longmore, A. R. and Gason, A. 2001
 7. See Parslow, J., Sokolov, S., and Murray, S. 1999.

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Table 3.1 Relationships Among Nutrient Monitoring and Reporting Tasks

SUB-PROGRAM	PRESSURE	RESPONSE	STATE
Sub-Program 2.6: Mitigate Effects of Introductions			
1.1 WTP	Input: <ul style="list-style-type: none"> environmental monitoring of flow & nitrogen <ul style="list-style-type: none"> - annual (to EPA, NRE) compilation of load estimates <ul style="list-style-type: none"> - 2002, 2004, 2006 interpretation of change from baseline <ul style="list-style-type: none"> - 2010 	Input: <ul style="list-style-type: none"> actions implemented to reduce loads and predicted load implication <ul style="list-style-type: none"> - annual 	Input: Environmental monitoring of indicators of Bay cycling processes <ul style="list-style-type: none"> - ongoing (on data warehouse) - annual summary of results - interpretation with timing as technically appropriate for individual monitoring elements
	Output: Bay Actions Report	Output: Bay Actions Report	
1.2 New Direct Loads	Input: <ul style="list-style-type: none"> predicted load implication of any approved proposals <ul style="list-style-type: none"> - annual 	Input: <ul style="list-style-type: none"> relevant 'permits' issued and predicted load implication <ul style="list-style-type: none"> - annual progress with investigation of offset measures <ul style="list-style-type: none"> - 2002 	
	Output: Bay Actions Report	Output: Bay Actions Report	
1.3 Catchment Waterways	Input: <ul style="list-style-type: none"> environmental monitoring of flow & nitrogen, including targeted storm-event sampling <ul style="list-style-type: none"> - ongoing (on data warehouse) compilation of load estimates <ul style="list-style-type: none"> - 2003 & 2006 interpretation of change from baseline <ul style="list-style-type: none"> - 2014-2016 	Input: <ul style="list-style-type: none"> actions implemented to reduce loads and predicted load implication <ul style="list-style-type: none"> - annual any significant new waterway loads licensed <ul style="list-style-type: none"> - annual mechanism established for coordinated implementation <ul style="list-style-type: none"> - annual long term nitrogen load risk considered in strategic planning <ul style="list-style-type: none"> - in finalised Metro Strategy 	Output: Bay Actions Report
	Output: Bay Actions Report	Output: Catchment Actions Report in CALP Board Annual Report	

SUB-PROGRAM	PRESSURE	RESPONSE	STATE
Sub-Program 2.6: Mitigate Effects of Introductions			
1.4 Atmosphere	Input: <ul style="list-style-type: none"> refined load estimate and regularly updated air inventory - regular as per AQIP 	Input: <ul style="list-style-type: none"> AQIP actions relevant to long term load reduction implemented - regular as per AQIP any significant new atmospheric loads licensed - annual (Bay Actions Report) 	
	Output: AQIP Regular Reporting	Output: AQIP Regular Reporting	
1.5 Other Risks to Cycling	Input: <ul style="list-style-type: none"> project-specific environmental monitoring - effects of key relevant projects on cycling processes - annual summary of any key results research to progressively reduce uncertainty - annual summary of any key results 	Input: <ul style="list-style-type: none"> monitoring state of Bay cycling processes implemented (see 'state') - annual monitoring program reviewed - 2004 	
	Output: Bay Actions Report	Output: Bay Actions Report	

Marine Pest Reporting Framework

The reporting framework for the marine pest program is largely developmental, and will be enhanced by the implementation of various tasks within the current program. Consequently, much of the reporting will initially focus on progress with implementation of tasks, including those relating to identification of appropriate monitoring indicators, approaches and performance measures (ie: as for the 'response element' of the nutrient reporting framework), rather than focusing on monitoring results that provide for assessment of program effectiveness. Based on the results of these tasks, we aim to significantly update the marine pest reporting framework in 2003.

Table 3.2 illustrates how the marine pest program's tasks contribute to reporting on the 'response element' and to reporting on the results of tasks to develop indicators of program effectiveness.

As for nutrients, this reporting will contribute to two audit and review processes: reviews of the EMP in 2003 (interim) and 2006, and review of the Bay SEPP schedule in 2007.

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Table 3.2 Relationships Among Marine Pest Monitoring and Reporting Tasks

SUB-PROGRAM	RESPONSE	EFFECTIVENESS (DEVELOPMENT OF INDICATORS)
2.1 - 2.4 Vector management - ballast, fouling & aquaculture	<p>Input:</p> <ul style="list-style-type: none"> actions implemented to improve vector management - annual actions implemented to investigate and trial indicators and approaches for assessing management effectiveness - annual relevant consents issued for aquaculture of translocated biota and use of aquaculture equipment imported to the Bay - annual 	<p>Input:</p> <ul style="list-style-type: none"> results of investigation of indicators and monitoring approaches for each vector types - annual results of monitoring trial and implementation, including trends - in the longer term
	Output: Bay Actions Report	Output: Bay Actions Report
2.5 Early detection	<p>Input:</p> <ul style="list-style-type: none"> actions implemented to investigate and trial monitoring system for detecting new pest species - annual 	<p>Input:</p> <ul style="list-style-type: none"> results of investigation of monitoring system - annual results of monitoring trial and implementation, including trends - in the longer term
	Output: Bay Actions Report	Output: Bay Actions Report
2.6 Mitigate effects of introductions	<p>Input:</p> <ul style="list-style-type: none"> actions implemented in response to new introductions - annual summary research implemented or supported to help identify long term mitigation options - annual summary actions implemented to mitigate impacts of established pests - in the longer term 	<p>Input:</p> <ul style="list-style-type: none"> results of performance assessments for response/mitigation actions implemented (indicators and approaches to be identified on a case-by-case basis) - annual summary
	Output: Bay Actions Report and more detailed technical reports/papers as appropriate	Output: Bay Actions Report and more detailed technical reports/papers as appropriate

Appendix 1 - Proposals Involving New or Increased Bay Nitrogen Inputs

Proposals may arise involving nitrogen discharges to new locations in the Bay, or increases to existing discharges. These may include:

- *land-based activities for which effluent discharge to the Bay is environmentally preferable to either discharge to sewer or to land; or*
- *activities in the Bay itself, such as some types of aquaculture.*

In Victoria, disposal to the environment is the lowest preference in the hierarchy of waste management options, to be considered only after opportunities for waste avoidance and reuse have been fully explored.⁹ Consistent with this policy has been an overall program, over the last decade, towards reducing licensed waste discharges to the environment including the Bay. However, there has recently been increased interest in new proposals regarding nitrogen discharge to the Bay, particularly associated with aquaculture developments.

Potential proposals for new or increased Bay nitrogen discharges must be considered in light of the relevant natural resource and environmental policy framework for the Bay. This includes the statutory 1000 tonne reduction target for net annual Bay nitrogen loads established in the Bay SEPP schedule. More broadly, any proposal must be consistent with protecting and restoring the Bay's environmental quality.

Scientific understanding of the Bay is still growing. Nitrogen cycling processes are not fully understood and risks may emerge beyond those currently predicted. It would therefore be wise also to maintain sufficient reserve capacity to allow:

- *the future load increases expected to result from population growth, as difficult-to-treat diffuse sources, to be offset; and*
- *social and economic impacts to be minimised if reductions beyond those currently planned are required in future.*

Given these circumstances, the preference is that there be no net nitrogen additions to the Bay. It is recognised, however, that nitrogen discharge proposals may arise with significant social and economic benefits. A nitrogen offset system provides one potential future option for considering appropriate such proposals in a way that does not compromise progress toward achieving the 1000 tonne nitrogen load reduction target. Such a system would need to operate within Victoria's framework of statutory and policy priorities that includes both the nitrogen reduction target and the hierarchy of waste management preferences.⁹

Development of an offset system is under consideration, and its implications and technical basis will be examined in detail within the next 12 months. The goal of this assessment will be to develop a guideline outlining a practical mechanism to deliver nitrogen offsets for appropriate new Bay discharge proposals. The assessment will be lead by NRE and EPA in consultation with Melbourne Water, other relevant agencies and key industry groups. Advice will also be sought from independent economic and scientific experts as appropriate. An important context for the assessment will be the recent amendments of the Environment Protection Act 1970 relating to the use of economic measures, including offsets, as a means of achieving cost effective environmental protection or regulation. Key elements of any offset system implemented will include application of best practice waste minimisation and means to defensibly demonstrate the scientific validity of offset proposals.

9. See Environment Protection Act 1970.

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In the interim, the criteria outlined below will be used for assessing proposals' environmental risks, and consistency with achieving the net nitrogen reduction target and managing risks to nitrogen cycling. This will occur within existing processes for assessing proposals' consistency with relevant statutory and policy objectives for activities or areas in or around the Bay. The criteria will be reviewed in the light of the offset assessment. It would therefore be prudent for any approvals issued in the interim to take into account the prospective introduction of a nitrogen offset system, subject to the results of this assessment.

Interim Criteria for Assessing Proposals:

1. Proposals must clearly establish their expected Bay nitrogen load, including its specific location, timing and any seasonal variation.

Load estimates must be conservative and based on scientifically credible methods. Any net load estimates that involve offsets among activities occurring within the Bay, such as different types of aquaculture, must be supported by evidence of the effectiveness of the offset mechanism either through peer reviewed scientific research or as demonstrated during application elsewhere. Implications to both net nitrogen discharge and key nitrogen cycling processes, such as denitrification, must also be considered. Any geographic differences between the proposed input and any proposed offset mechanism must be clearly specified, and further considered within the proposal consistent with criterion 4 below.

2. Proposals must provide a convincing case as to why they need to discharge nitrogen to the Bay and why this is the only option.

Each proposal must include a thorough assessment of its environmental, social and economic costs and benefits, including particularly those associated with its proposed Bay nitrogen discharge. This assessment must include a thorough review of alternatives to Bay nitrogen discharge, including the extent to which use of other waste management options could eliminate or reduce the need to discharge waste to the environment (links with criterion 3 below) initially and/or within a framework of continual improvement in environmental performance. Each proposal must be assessed on its merits.

3. Proposals must conform with Industrial Waste Management Policy (Waste Minimisation).

Both the Environment Protection Act 1970 and statutory Industrial Waste Management Policy (Waste Minimisation) establish disposal to the environment as the least preferred option for waste management in Victoria. More highly ranked options, in order of preference, are waste avoidance, reuse, recycling and reclamation, treatment and containment. The Industrial Waste Management Policy also emphasises the need to consider waste minimisation options as early as possible, preferably during planning and design.

Polluter pays and user pays principles apply to funding waste management. Polluter pays requires waste generators, treaters or users to take responsibility for the costs of avoiding environmental damage resulting from their activities and for the costs of repairing any current or future environmental degradation. User pays involves, to the extent practicable, full recovery of both fixed and variable costs incurred in the receipt, conveyance, treatment and disposal of waste.

For the Bay, in addition to minimising waste discharge in general, there will be a particular emphasis on minimising nitrogen discharge loads. For this reason, proposals involving disposal to the Bay of effluent containing nitrogen must thoroughly assess and document options to minimise nitrogen loads, including best available technology.

4. Proposals must assess and address local risks.

Proposals must thoroughly assess potential impacts due to local elevation in nitrogen concentrations at the discharge location. The likely significance of any additional impacts on key cycling processes such as denitrification must also be considered. The assessment must include an assessment of consistency with State Environment Protection Policy, including protection of designated beneficial uses for the relevant Bay environmental segments. Relevant considerations include:

- *water circulation pattern;*
- *sensitivity of the area to both the incremental and cumulative impact of elevated nitrogen levels;*
- *ecological significance of the area, including its significance to wider ecological processes (eg fish spawning) and linkages to other significant areas; and*
- *consistency with local/regional Bay management objectives.*

Feasible options to mitigate impacts identified through this assessment, and their costs and benefits, should be documented and thoroughly investigated.

Where the significance of potential impacts on key processes such as denitrification is difficult to predict with current scientific understanding, the proposal must include a commitment to a defensible assessment and/or monitoring program, and associated adaptive management considerations as appropriate. Monitoring should, where sensible and practical, complement the Bay nutrient monitoring program.

Administrative arrangements

New proposals will be assessed by NRE and EPA through existing statutory mechanisms including consents, works approvals and / or licences issued under the Environment Protection Act 1970, Coastal Management Act 1995 (to use or develop coastal crown land) or the Fisheries Act 1995 (to use, form or create habitat). NRE's role in this matter does not affect the statutory responsibilities of other agencies, including EPA's regulatory responsibility under the Environment Protection Act 1970 with regard to any activity that causes or is likely to cause pollution.

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Glossary Including Abbreviations

AQIP	Port Phillip Air Quality Improvement Plan
CALP	Port Phillip and Westernport Catchment and Land Protection Board
CCB	Central Coastal Board
CCMA	Corangamite Catchment Management Authority
DOI	Department of Infrastructure
EMP	Environmental Management Plan
EPA	Environment Protection Authority
Local Govt	Relevant Local Government Municipalities
MPC	Melbourne Ports Corporation
MW	Melbourne Water
NRE	Department of Natural Resources and Environment
SEPP	State Environment Protection Policy
VCA	Victorian Channels Authority
Univ of Melb	University of Melbourne
WTP	Western Treatment Plant

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