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Department of Environment, Land, Water and Planning
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**Re: PORT PHILLIP BAY Environmental Management Plan 2016**

Port Phillip Conservation Council Inc. is a federation of 14 Member Organisations around Port Phillip Bay, whose aims since 1970 have been to work for better conservation of the waters, beaches, foreshores, sea-bed, tributaries, environs and air above Port Phillip Bay. Our policies can be viewed at http://www.ppcc.org.au/policies.htm

## POLICY SETTING

The Bay is Melbourne's major natural feature, and is a priceless environmental asset and economic resource for the state. Hence its preservation in as natural a state as possible is crucial for humans and other species reliant on it. And, whilst we commend the establishment of a new *Marine and Coastal Act* we contend that legislation that better integrates responsibility for the entire catchment of the Bay, and the Green Wedges within it, is necessary.

It is now well accepted that what occurs across an entire catchment area is critical to the health of the receiving waterway. However the large number[1] of Policy/regulation, advisory and service delivery agencies with responsibilities for the Bay and its catchment must hinder a holistic approach to the management of the Bay, its catchment, and the surrounding Green Wedges. The available notes for the revised EMP do not appear to adequately deal with this reality.

Accordingly, this submission will identify current legislation and practices which should be strengthened and integrated to better protect the Bay, its catchment and coastline. We have identified issues we see as critical for DELWP to address in the revised Port Phillip Bay Environmental Management Plan (EMP), or advocate and lobby for if outside its area of direct responsibility:

1. Melbourne's water catchment
2. Management of coastal land
3. Ecosystem services and economic value
4. Blue Carbon
5. Port operations, shipping movements, dredging and dumping
6. Contaminants and toxic load in the bay
7. Marine pests
8. Air quality
9. Coastal erosion
10. Climate change and sea level rise

[1] PORT PHILLIP BAY ENVIRONMENTAL MANAGEMENT PLAN: Background Document, Department of Natural Resources and Environment, April 2002

## 1. MELBOURNE'S WATER CATCHMENT

To its shame, the Victorian Government via its agency VicForests logs publicly owned land in Melbourne's water catchments. Although VicForests declares that little additional water would be available in water catchments if timber harvesting was to stop immediately and that unharvested trees use more water[2], it fails to acknowledge that logging invariably increases sedimentation and erosion. Thus, water quality flowing to Melbourne's catchment areas is reduced, impacting on all organisms reliant on waterways as they flow to the Bay.

The government sanctioned and taxpayer funded logging activities in Melbourne's catchment areas have impacts on water quality in major waterways, including the Yarra, then ultimately to the Bay.

*Recommendation: Integrated 'Port Phillip Bay Catchment Management' legislation should be enacted to better reflect the inextricable relationship between the Bay and its catchment. A single 'Catchment wide' Environmental Significance Overlay should be applied to all lands and waterways within the catchment - the 75% in Freehold title and the 25% Crown land reserved under the National Parks Act 1975 and the Forests Act 1958. To protect Melbourne's water supply and the resilience of publicly owned waterways and the Bay, the Victorian government should cease all logging activities within Melbourne's water catchment, and direct any lost employment towards restoration of damaged habitats and ecosystems.*

## 2. MANAGEMENT OF COASTAL LAND

Despite the commendable Victorian Coastal Strategy (VCS) and its 'Hierarchy of Principles'[3], we see Port Philip Bay and its coastline suffering from government agencies failing to provide sufficient resources to effectively enforce the VCS principles, thus allowing inappropriate development and exploitation of fragile coastal reserves to occur. Paraphrasing the VCS, developments on coastal land should:

- Fit in with the coastal landscape
- Be coast dependent AND provide significant community benefits
- Maintain important views
- Avoid coastal hazards: erosion, storm surges, sand drifts etc
- Be set back as far as possible from the coast and low lying areas

Contorting these principles in order to assist developers, or by inadequate resource allocation, risks environmental degradation and diminished ecological services that the foreshore naturally provides: maintaining beach profile, protecting dunes and fore dunes etc; degrades its visual amenity, and ultimately its ability to protect the Bay.

It is a common assumption, especially by developers, that developments on coastal Crown land are 'good economics' as the site is free or only subject to a modest Crown land lease. A spurious justification used by decision makers for approving non coast dependent developments on coastal Crown land is that the development would provide 'net community benefit', the assessment of which is unclear. We submit that such assessments do not contain a proper evaluation of the full suite of ecological and economic services provided by the land in its undeveloped state.

Consequently, despite coastal land being some of the most valuable land on the planet in real estate and ecological terms, our Bay's foreshores suffer multiple impacts from inappropriate developments such as skate parks, cafes, car parks, authorised and unauthorised vegetation removal, high density camping, etc.

[2] VicForests Factsheet Native Timber Harvesting in Melbourne's Water Catchments
[3] VCS 2014 Page 29


Mornington Peninsula Shire Council built this skate park on the Rosebud foreshore despite strong community opposition and extremely tenuous compliance with the VCS. Note volumes of litter regularly left there. Clean up of litter and maintenance where vegetation removal has exacerbated sand blow outs, is costly and ongoing. Image: 6th October 2009 © G. Howard.

*Recommendation: The definition of 'net community benefit' and the methodology for establishing it needs to be significantly strengthened.*

*The Coastal Management Act, VCS, and any related new legislation and policy documents should be strengthened to mandate the conservation and restoration of coastal corridors on both public and private coastal land. No further non coast dependent infrastructure development should be approved on coastal Crown land. Freehold development on coastal land should be minimised, via more prescriptive ecological overlays aimed at increasing resilience of the coastal zone to climate change.*

*Opportunities to acquire freehold coastal land for inclusion into coastal reserves should be pursued to facilitate retreat from the coast. Applicants for coastal consent for non coast dependent developments on coastal Crown land should be directed, (rather than with gentle suggestions as is currently the case), to find inland sites for their proposed developments. Progressive removal of non coast dependent uses on Crown land should be prioritised. Current examples of inappropriate and non coast dependent uses on Crown land which should be progressively removed include: Restaurants, Bowling Greens, skate parks.*

## 3. ECOSYSTEM SERVICES AND ECONOMIC VALUE

Substantial academic research now demonstrates the need to value the irreplaceable services provided by Nature and that the services must be accounted for in cost benefit analyses of public projects in order for the analysis to have validity, credibility and public acceptance. It is time that this knowledge be applied to development applications within the Bay and its catchment – and logically Australia wide.

Environmental impacts assessments of proposed developments in the Bay and its catchment have generally failed to quantify the value of 'nature' and its services to well being and liveability which might be lost if the development proceeds. Current EES assessments can estimate value of local economies, fisheries, tourism, etc, which might be impacted by the proposal, however as far as we are aware the accepted assessment methodology still assumes environmental services underpinning these activities are available without cost.

An EES generally uses a traditional cost benefit analysis to assess the economic value a project might realise. This means the costs of losing, damaging or repairing the range of services provided by Nature are excluded from the economic modelling. In traditional C/B analyses, assessed direct benefits generally flow to a small sector of the community, with 'trickle down' economic assumptions[4] used to disperse benefits throughout the community. Post project completion, it appears little attempt is made to measure whether purported direct and indirect benefits have been realised.

This is amply demonstrated in the EES assessment process for the Channel Deepening Project (CDP) which applied a traditional cost benefit approach to assess the economic case for the CDP. However, the CDP was of course imposing a traditional infrastructure project into a complex natural system. PriceWaterhouse Coopers undertook the economic analysis of the Port of Melbourne for the 2004 EES, and repeated much of it in its 2007 analysis.[5] PwC assessed past and projected future economic performance (outputs) of the PoMC, but declined to countenance a corresponding economic analysis of the Bay, and the ecological services used by the PoMC (inputs) to achieve its projected economic performance, claiming it would be too difficult, and that it would be dealt with via the S-EES[6]. It wasn't.

To dismiss environmental assets as too difficult to cost in a cost-benefit analysis, as the PoMC's consultants did, renders their analysis of little value in the real world – a waste of time and taxpayer/investor funds. Perhaps the continued use of traditional cost-benefit analyses of infrastructure projects contributes to why budgets for these large projects invariably seem to 'blow out', as the un-costed environmental and social consequences kick in – as they tend to. The task of costing environmental services may be large but is testament to the fact that the services are complex, intricate and irreplaceable.

In order to protect the irreplaceable services provided within the Bay and its catchment, decision makers must now adopt an assessment methodology based on the growing body of knowledge on how to 'value' environmental services[7]. Until then, the current methodology applied to assessing developments on coastal land and in the Bay is merely a tool for supporting business as usual.

*Recommendation: The EMP should attempt to measure lost ecological services resulting from manmade interventions in the Bay and its catchment. This data should be used to inform monitoring programs, rehabilitation projects, recommend offsets, charges for users etc. DELWP should advocate within government for mandated valuation of environmental services to become essential within an EES.*

## 4. BLUE CARBON

Recent research has identified coastal habitats—seagrasses, salt marshes and mangroves as some of the most effective carbon sinks on the planet. They can bury carbon at a rate 35-57 times faster than tropical rainforests and can store carbon for thousands of years[8]. Port Phillip

[4] The current 'ecobabble' term for trickledown economics is 'growth dividend' http://www.theage.com.au/comment/econobabble-equals-obfuscation-plain-english-clarifies-our-policy-choices-20160212-gmsn6x.html

[5] PwC Economic Analysis of the Port of Melbourne 2007

[6] Pers comm. Jenny Warfe and James Kelly PwC Associate Director Economics July 2006

[7] Such as:
Dr. Robert Costanza, Crawford School of Public Policy ANU *The value of the world's ecosystem services and natural capital* Costanza et al Nature Vol 387 15May 1997, also https://crawford.anu.edu.au/people/academic/robert-costanza
Professor Herman Daly, School of Public Policy, University of Maryland http://steadystate.org/use-and-abuse-of-the-natural-capital-concept
Cutler J Cleveland Professor of Earth and Environment Boston University
https://www.researchgate.net/publication/42761237_The_Relationship_between_Ecosystems_and_Human_Systems_Scale_Challenges_in_Linking_Property_Rights_Systems_and_Natural_Resource_Management

[8] For example: http://www.thebluecarbonproject.com/the-problem-2

and Westernport Bays have been identified as having significant carbon stores[9]. As well as the irreplaceable suite of environmental services these habitats provide- fish nurseries, bird roosting, feeding etc. - their carbon storage ability makes these habitats the obvious choice for carbon offset programs. Ironically these habitats are also some of the most vulnerable to threats from coastal development and port and shipping operations in both Bays.

*Recommendation: Any future development proposals for Port Phillip Bay should assess potential impacts on existing and future carbon storage sites, and include the carbon offset calculations in a comprehensive ecosystem services calculation as part of a 'real world' cost benefit analysis.*

## 5. PORT OPERATIONS: SHIPPING MOVEMENTS, DREDGING AND DUMPING

The Port of Melbourne is located where settlers and their sailing ships identified a tranquil 'place for a village'[10] for their new home. The port is now surrounded by the city of Melbourne, 5 km upstream on the Yarra River, between the Bolte and Westgate Bridges, and around 3 hours steaming from the entrance to the Bay.

The Port of Melbourne now entirely dominates the once shallow estuarine Yarra River. The narrow river location requires large ships to have 2-3 tugs to turn ships in and out of berths. Image: www.amsa.gov.au

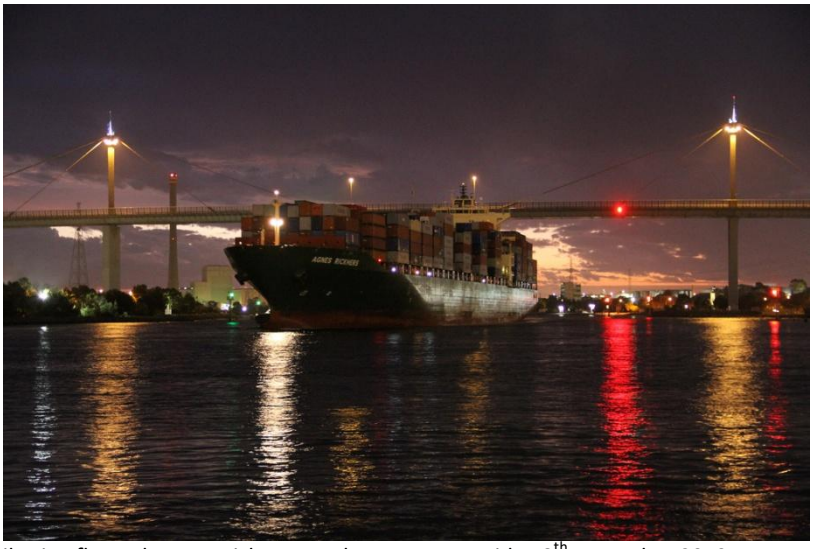
The Port is now substantially constrained by its historic location, and ongoing and expanding operations of a major container and bulk port in a narrow shallow river, in the middle of a major city, is no longer environmentally sustainable.

The port has been a significant historic contributor to the overall pollution load in Port Phillip Bay, and has been responsible for a regrettable environmental legacy for Victoria. It's ongoing and planned expanded operations in its current location pose unacceptable future risk to the health of the Yarra River and Port Phillip Bay.

[9] *The Distribution and Abundance of 'Blue Carbon' within Port Phillip and Westernport* A report for the Port Phillip & Westernport Catchment Management Authority February 2015 Carnell et al.
[10] John Batman 8 June 1835

Container ship *Theodor Storm* in Yarra River downstream of Port 12th February 2005 ©Blue Wedges

The Westgate Bridge poses access constraints, both in ships "air draught" and water draught impinging on remaining cover of existing essential services (sewer, gas, electricity, and telecommunications) located under the Yarra. The Westgate Bridge has an air draught of 50 metres, which is already too low for some Post Panamax vessels, with some experts predicting it will soon pose problems[11].



The Liberian flagged *Agnes Rickmers* under Westgate Bridge 8th December 2013. Image Flickr

[11] *Port of Melbourne: Ships may soon be too big to pass under West Gate Bridge* The Age September 8, 2015 http://www.theage.com.au/victoria/port-of-melbourne-ships-may-soon-be-too-big-to-pass-under-west-gate-bridge-20150908-gjhkmc.html#ixzz418s54wBn

- **Ships water draught under the Westgate**

Deep draught vessels and/or any further Yarra dredging poses unacceptable risks of a shipping incident threatening the health of Port Phillip Bay and the Yarra.

We reiterate concerns we have raised in various forums, which remain unclear. These issues are:

Extensive dredging has occurred in the vicinity of the Hobson's Bay main sewer under crossing the riverbed near the Westgate Bridge. Due to reduced clearance over the sewer, deeper draught vessels now must be tugged over the sewer.

There appears to be a major discrepancy between the information provided by the PoMC in its S-EES and the remaining depth of riverbed covering the main trunk sewer.

According to the S-EES[12], prior to the CDP, in the vicinity of the sewer the Yarra River channel had declared depth of 13.1 metres, and a cover of riverbed over the Services varying between 2 to 2.7 metres. The S-EES proposed a new declared depth in that section of 15.2 metres[13].

In this location, it was proposed to remove 2.1 metres of riverbed to achieve a declared depth of 15.2 metres, yet according to the S-EES after dredging there will be 1.2 metres of cover[14]

PoMC propose an overlying 0.25 metre thick composite steel and concrete cover over the pipe to protect the sewer in the "unlikely" event of an anchor drop. It further states that (prior to the CDP) *"The cover over the tunnel under the river currently varies from 2 metres to 2.7 metres and will be reduced to 1.2 metres after dredging"[15].* Note this does not refer to a "declared" depth, but the actual depth of cover over the sewer said to be remaining after dredging. Based on these contradictory figures in some areas the Hobson's Bay sewer could have been exposed by 100 mm.

The S-EES also states: *"The sewer will be provided with rock berms to the sides and an overlying 0.25 metre thick composite steel and concrete cover.... This will protect the sewer in the unlikely event of an anchor drop or drag by a commercial vessel."*[16]

Note: In this section of the Yarra River, ships are not permitted to anchor, so an anchor drop or drag would certainly be an "unlikely event". So, rather than a hypothetical anchor drop or drag, the concerning issues are:

- In this section of river, according to the S-EES, deep draught vessels are now routinely tugged over the sewer
- Whilst moving, under its own power a vessel "squats" in the water, increasing its draught by approximately 0.5 metres
- The risk and consequences of a deep draught vessel impacting the sewer whilst being dragged over it does not appear in any risk analysis that we are aware of.

In July 2007, Blue Wedges contacted several of the Service providers whose infrastructure would be affected by the CDP to discuss our concerns about the adequacy of protection of the Hobson's Bay sewer and other services[17]. Melbourne Water, GasNet and WAG all indicated they were not particularly happy about proposed changes to their infrastructure, but as government

[12] CDP S-EES Main Report Volume 1 Chapter 4 Page 7 and 9
[13] CDP S-EES Main Report Volume 1 Chapter 4 Page 7
[14] S-EES Main Report Volume 1 Chapter 4 Page 29
[15] CDP S-EES Chapter 4 Page 29
[16] Ibid
[17] Pers. Comm Mr. Len Warfe 11th July 2007

was promulgating the message of "economic imperative" attached to the CDP, all agencies had agreed to works proceeding.

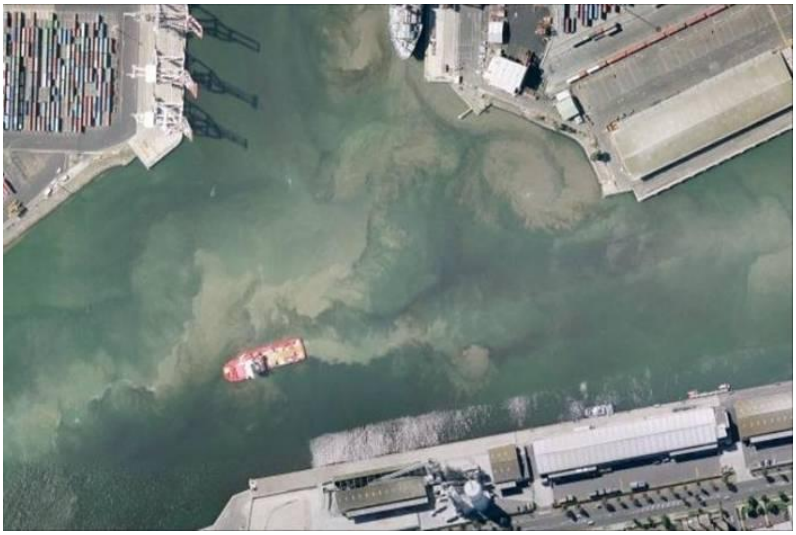
Mr. Eamonn Kelly, then General Manager Infrastructure, Melbourne Water, verbally confirmed our concerns that the proposed steel and concrete cover would NOT stand the impact from the keel of a 100,000 DWT vessel making contact with it[18]. After the S-EES Inquiry had closed, Mr. Kelly subsequently wrote to Mr. Warfe on 3rd August 2007. He confirmed that the PoMC would build a protective cover over the sewer, and that the dredging would leave a 400 mm cover over the sewer. Thus, PoMC's claim in the S-EES that 1.2 metres of cover would remain over the sewer is false, and the sewer is significantly less protected than the public has been advised via the S-EES.

In relation to managing exposure to risk, it is noteworthy that the much smaller and less significant sewer pipe on a private property requires 300 mm minimum cover if not subject to traffic. If the sewer runs under a driveway, the minimum cover required is 450 mm. In public thoroughfares, rights of way and other areas subject to heavy vehicular traffic the minimum required cover is 750 mm. However, the main trunk sewer, carrying almost 50 per cent of Melbourne's sewage waste is now subject to ships crossing it with a dead weight tonnage of up to 100,000 tonnes – with a mere 400 mm cover – despite knowledge that the protective structure over the Hobson's Bay sewer would not stand the impact of a 100,000 tone DWT vessel impact.

The sewer RL depths are known and there is no excuse for the mistaken calculations in the S-EES. In our view, it was irresponsible for those agencies and personnel in charge of protecting our essential services, especially Melbourne Water, to so readily agree to these extensive, expensive works which have so clearly compromised safety and increased risks of potentially catastrophic impacts, especially to Melbourne's main trunk sewer, and then to the Yarra and Bay waters.

- **Port water quality**

Everyday ship operations create turbid plumes, mobilising recently deposited contaminated and non contaminated sediments. Maintenance and capital dredging of the port, then spoil dumping in the Bay, re-mobilises contaminants and toxicants and is an ongoing threat to the health of the river and Bay.



Everyday port operations create a constant turbid plume in the Yarra. Image: Google. Tug in Yarra River turbid plume alongside Swanson dock to the north and 506 Lorimer St. Fishermens Bend to the south.

[18] Ibid

Likewise, the health of the Maribyrnong River, flowing into the Yarra, then to Port Phillip Bay must be addressed. We are unsure of the current status of the former Pivot site adjacent to the Maribyrnong River and previously owned by the PoMC; however its history as one of the most contaminated pieces of real estate in Victoria[19] indicates that it, and other former industrial sites abutting the Yarra and Maribyrnong rivers, should be re-assessed as part of the EMP review.

The site, formerly a fertiliser factory, was purchased by the PoMC in 2001. In 2005, its contaminated status was revealed in an investigative report in The Age[20], which stated:

*"The Port Of Melbourne has for 4 years allowed water contaminated with massive levels of cancer-causing arsenic to leach from one of its properties into the Maribyrnong River.*

*Ground water leaching into the Maribyrnong River contains:*

> *ARSENIC up to 20,000 times the safe environmental limit*
> *COPPER up to 154,000 times the safe environmental limit*
> *ZINC up to 5000 times the safe environmental limit*
> *LEAD up to 5000 times the safe environmental limit*
> *AMMONIA up to 33,500 times safe level for human contact."*

In 2007, future clean up costs were estimated to be $6 – 70 million[21]. We were unable to find any public records of a final clean up for the site, but would appreciate being provided with evidence.

(Following an Auditor General's investigation, the PoMC subsequently sold the site at a substantial loss for taxpayers.)

*Recommendation: Whilst we certainly do not advocate for any new port developments either in Port Phillip or Westernport Bays, we contend that ongoing port operations and further port expansion in the centre of Melbourne has well exceeded its social licence to operate, and poses an ongoing intractable threat to the health of the Bay, its inhabitants and users.*

*At the very least, dredging and spoil disposal methodology must be reviewed. More modern disposal methods including treatment on land and recovery of valuable elements should be implemented.*
*An urgent review of the amount of, and suitability of, protective cover over the essential services crossing the riverbed is required.*

*Realistically, a suite of logistics solutions is required which uses a mix of transport options which does not concentrate the movement of goods through the centre of Melbourne and does not remain reliant on a narrow, shallow river port. Options include off loading of some containers at existing deep water ports for transfer to interstate rail or coastal shipping, port rail shuttle to inland freight distribution centres etc.*

*However, to achieve what is required to protect and rehabilitate the Yarra and protect the Bay and its catchment, we must move away from the outmoded Business As Usual mindset currently dominating our planning processes. BAU economics only remains viable by ascribing no value to services delivered by the environmental, or to the costs of environmental rehabilitation.*

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[19] *Arsenic leaked into river* Melissa Fyfe Environment Reporter The Age August 22nd 2005, See: http://www.theage.com.au/news/national/arsenic-leaked-into-river/2005/08/21/1124562751554.html
[20] Ibid
[21] http://hansard.parliament.vic.gov.au/isysquery/d7ef7fbd-e2e6-4d44-bed0-3533adc5d08b/1/doc/

## 6. CONTAMINANTS AND TOXIC LOAD IN THE BAY

Threats posed by contaminated and toxic sediment re-suspension and dispersal in the Bay, potentially including radionuclides, has received insufficient attention for many years. This serious omission must be addressed.

Since the last iteration of the EMP, the Channel Deepening Project (CDP) has been completed, and a regular maintenance dredging (and dumping) program has commenced. Whilst the current EMP makes some mention of dredging as a potential source of re-suspension of sediment and increased Nitrogen load, it appears silent on the contribution dredging has already made to re-suspension and dispersal of contaminated and toxic sediments, and which remains as a future threat.

Dredging and disposal of an estimated 3 million $m^3$ of contaminated and toxic sediments from the bed of the Yarra River and Northern channels during the CDP has serious implications for the marine food chain, social impacts, and human health. Furthermore, the PoMC's EES assessments relating to contaminated and toxic sediments was seriously flawed, exposing the Bay, its inhabitants and human users to health risks.

The 2005 Channel Deepening Planning Panel Report noted the failure of Port of Melbourne Corporation (PoMC) to present a key report on toxicity in the Yarra sediments to be a significant procedural defect. Consequently, this issue was required to be addressed by further studies in the Channel Deepening Supplementary Environment Effects Statement (S-EES).

Dredged sediments were dumped in the Bay in the PoMC's Northern Dredged Material Ground (DMG), a 6 sq. km clay sided underwater facility. By some quirk of legislation, unlike toxic waste facilities on land, the Northern DMG has no limits on its life span, volumes dumped, or indeed what can be dumped there. The CDP EMP requires it has an annual visual inspection, but assessment for possible leaking or spread of dumped material is not required.

The *Goomai* bucket dredge loading dredging Yarra sediments onto the barge *Endeavour* for disposal in Northern DMG
2nd May 2008 © Neil Blake

The EES and S-EES detailed a range of contaminants and toxicants present in dredged sediments, including lead, mercury, arsenic, cadmium, TBT, DDT, PAHs etc. The S-EES analysis[22] revealed contamination of sediments including:

- **Polycyclic Aromatic Hydrocarbons 10,000 times** acceptable screening levels
- **Deildren 22,000 times** acceptable screening levels
- **Arsenic 66** times screening levels
- **DDT** concentration **17** times screening values

**PAHs** have been found to be carcinogenic, mutagenic and teratogenic[23].
**Deildren** is linked to Parkinson's Disease, breast cancer and immune diseases[24]
**Arsenic** is an especially potent carcinogenic poison[25]
**DDT** is a hormone disrupter, and suspected carcinogen[26]

Despite the numerous contaminants and toxicants that exceeded screening levels which were to be dredged and dumped in the Bay, the CDP S-EES risk assessment revealed that if 10 people develop cancer, the consequence is "minor", but if Port closed for one month, the consequence is MAJOR[27]. What's more, the S-EES released for public comment in March 2007 omitted some existing key documents relating to water quality issues and how contaminated sediments in the Yarra were measured.

These key documents contain instances where elevated levels of toxins are overlooked and data is collected and interpreted in a way that casts an unjustifiably positive light on the CDP – surely a potential threat to the health of the Bay, its inhabitants and the public. The failure to release these documents meant the public was denied the opportunity to critique these reports in submissions to the Public Inquiry.
Community group Blue Wedges prepared a detailed analysis of these key documents, in its paper *'Review of Documents (not released in the S-EES) which relate to contaminated sediments'* 12th August 2007 At Attachment 1.

We urge you to ensure the revised EMP takes account of the evidence presented in these documents.

- **Additional concerns of potential radionuclide load in dredged sediments**

During 1941 to 1965 projects involving involved separation and concentration of radioactive ores containing uranium and thorium were carried out by the CSIRO (formerly CSIR) at its Fishermen's Bend property, at 506 Lorimer St (adjacent to the Yarra River). The uranium and thorium ore was transported from Radium Hill in SA and Rum Jungle in the NT. The ores arrived by cargo ship, and were unloaded at the wharf adjacent to the Lorimer St. site.

It was suspected that radioactive waste products from these research projects, and possibly those from subsequent projects, had been disposed of on the property. More than two decades after the projects ceased the site was eventually decontaminated in 1990. The site is now the DSTO Aeronautical and Maritime Research Laboratory.

Although community groups suspected there could be radionuclides in Yarra sediments, it wasn't until CDP Yarra dredging was completed that evidence emerged. A former employee of

[22] Channel Deepening Project S-EES Technical Appendix 37
[23] *Luch, A. (2005). The Carcinogenic Effects of Polycyclic Aromatic Hydrocarbons. London: Imperial College Press. ISBN 1-86094-417-5.*
[24] http://archive.sph.harvard.edu/press-releases/2006-releases/press06262006.html
[25] The Agency for Toxic Substances and Disease Registry (2009)
[26] *Endocrine Disruptors" National Institute of Environmental Health Sciences. February 2007*
[27] Channel Deepening Project S-EES Technical Appendix 60 Human Health Risk Assessment. Head Technical Report January 2007 Golder Assoc. Pty. Ltd. for Maunsell Australia Pty. Ltd. (page 66)

CSIRO at 506 Lorimer Street Fishermans Bend, who had worked on experiments with radionuclides there, alerted community groups to the site's history of contamination.

The site was investigated in 1989[28] and decontaminated in 1990[29]. It was found to have radioactive contaminants throughout the buildings and grounds; and in a 380mm pipe leading to the Yarra. Thousands of tonnes of contaminated soil were removed but no investigation or treatment of the sediments in the Yarra was done. The decontamination reports reveal that radioactive materials were found buried onsite, and a pipe which may have led to the river, was discovered partly filled with contaminated waste. Some 9,700 200 litre drums of radioactive waste were produced from the site, some of it highly contaminated. By 2009 the waste still accounted for more than 50% of all radioactive waste in containment facilities within Australia. The reports also reveal that some contamination remains on the site, located under existing structures.

A 2009 report in the Sydney Morning Herald and Age revealed 10,000 barrels of contaminated waste were contentiously moved interstate, first to NSW where it was rejected, then on to South Australia. See: http://www.smh.com.au/national/dangerous-waste-to-be-moved-20090925-g6d2.html

Notably, the first Channel Deepening EES Panel Hearing in 2004 (Panel Report 2005) recommended that the CDP should not proceed unless a long list of issues were addressed, and was highly critical of the PoMC's science, especially in relation to the Yarra sediment analysis. The 2005 Panel Report had stated it was *"essential to carry out historical research to disclose locations of potential contamination in the Yarra sediments, to guide the selection of contaminants to be investigated, sampling design and the location of potential 'hotspots'"*.

But, inexplicably and inexcusably, although historical research was done for the 2007 S-EES, it failed to identify the publicly available records of contamination and the 20 year history of radionuclide processing at the CSIRO site on the banks of the Yarra, opposite Swanson Dock, where substantial dredging would be undertaken.

Mr. Neil Blake, a member of Blue Wedges and the PoMC's Channel Deepening Community Liaison Group, repeatedly asked the PoMC to test Yarra sediments to assess human health and environmental risk. The government appointed Office of Environmental monitor (OEM), advising the PoMC, claimed that if radioactive contaminants had entered the river they would already have been dredged and dumped in the Bay -alarming in itself. And, no scientific studies or reference documents were made available to support this assumption. Mr. Blake then prepared an analysis of the OEM's responses to his concerns. See Attachment 2

In our view, disturbing known toxic sediments with crude mechanical devices as used during the CDP, then depositing the spoil in the same waterway is a gross breach of the trust the community has put in Responsible Authorities to protect the environment. It is a practice that should never again be repeated in Victoria.

*Recommendation: In order to properly protect the Bay and its users and inhabitants, the new Port Phillip Bay EMP must undertake a detailed assessment of the threats posed by previous dredging and dumping of contaminated and toxic materials in the Bay; the contamination profile in Yarra sediments in situ and in sediments already relocated to the PoMC's Northern DMG.*

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[28] Radiation survey of the CSIRO Applied Organic Chemistry Division, Lorimer Street, Fishermens Bend, Melbourne 1989. http://www.worldcat.org/title/radiation-survey-of-the-csiro-applied-organic-chemistry-division-lorimer-street-fishermens-bend-melbourne/oclc/223402503

[29] Radioactive Decontamination of the former CSIRO Applied Organic Chemistry Division Lorimer Street Fishermens Bend. 29 March 1990 Author Owen J Wilson. http://arpansa.gov.au/pubs/technicalreports/arl_ap_organic_chem_mar90.pdf

*Contaminated and toxic sediments at the Northern DMG should be removed to land for decontamination and reclamation of recyclable elements.*

*No further capital dredging and Bay dumping of contaminated Yarra and northern channel sediments should be approved.*

*Any future Yarra and Northern channel maintenance dredging should employ more refined and targeted technology than used in the CDP. Contaminated spoil resulting from maintenance dredging should not be disposed of within Port Phillip Bay.*

*The ability for government to hold entities responsible for misleading the public during an EES/Public Inquiry process should be substantially strengthened.*

## 7. MARINE PESTS

The relationship between shipping, ballast water and marine pest invasions is well established worldwide. Direct and indirect health effects of invasive species are becoming increasingly serious and the damage to the environment is often irreversible[30]. Furthermore, the rate of invasion is continuing to increase with new areas being invaded all the time[31].

The UN International Maritime Organisation (IMO) observes that the spread of invasive species is now acknowledged to be one of the greatest threats to the ecological and the economic well being of the planet, leading the IMO to propose an internationally agreed Ballast Water Management (BWM) Convention[32]. In his opening address to the 2004 Conference the Secretary-General of IMO stated that the new Convention will represent a significant step towards protecting the marine environment for this and future generations. *"Our duty to our children and their children cannot be over-stated. I am sure we would all wish them to inherit a world with clean, productive, safe and secure seas – and the outcome of this Conference, by staving off an increasingly serious threat, will be essential to ensuring this is so"*[33].

So, it is to the world's shame that despite being adopted in 2004, the Convention is yet to put into force[34]. Furthermore, it was only ratified by 30 nation states, representing 35 per cent of world merchant shipping tonnage[35], suggesting that, as well as its failure to yet be in force; compliance could be a significant issue.

Although Australia and Victoria has mandated ballast water management, the arrival of new marine pest species continues, most notably in ports with high levels of international shipping. We also understand that the process of monitoring and enforcement of ballast exchange is variable, and is understandably difficult to achieve full compliance. Already, vast areas of Port Phillip Bay are dominated by exotics, including the European Fan Worm, and the Northern Pacific Sea Star. These and many other invasive species are directly attributable to international ship movements. Following the arrival of the NP Sea Star in 1996, by 2003 fish stocks in the Bay had dropped by 40%.[36]

We understand that Port Phillip Bay has the largest number of invasive species of any waterway in Australia, and notably the Victoria government is also proud that the Port of Melbourne is the largest, busiest container port in Australia, boasting over 3,000 ship visits per year[37]. Nor can

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[30] http://www.imo.org/en/OurWork/Environment/BallastWaterManagement/Pages/Default.aspx
[31] Ibid
[32] http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships'-Ballast-Water-and-Sediments-%28BWM%29.aspx
[33] http://www.imo.org/en/OurWork/Environment/BallastWaterManagement/Documents/INF-8.pdf
[34] http://www.imo.org/en/About/Conventions/StatusOfConventions/Pages/Default.aspx
[35] http://www.imo.org/en/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships'-Ballast-Water-and-Sediments-%28BWM%29.aspx
[36] Dept. Primary Industries study reported in '***Sea stars plundering the bay***' The Age 20th December 2003
[37] http://www.portofmelbourne.com/about-the-port/quick-facts

we influence ballast water compliance or hull fouling on those ships when they are in other international zones. Logically, if ship visits increase into the Port of Melbourne and/or the proposed 'BayWest' location, as the current economic model advocates, the risk of new pest species arrivals increases further.

A notable incident traced to ballast water discharge is the 1991 cholera outbreak in Peru. Cholera is one of the 'Ten most unwanted' organisms being carried around the world by ships[38]. The cholera organism was noted to be a distinctive strain, not previously known in Peru, and was eventually traced to Bangladesh, where ship's ballast from a polluted waterway had been taken on, then discharged in Peru. The cholera entered shellfish beds, people ate the shellfish and one million people became infected. More than 10,000 people died[39] - compelling evidence that the voluntary system, still to achieve international compliance, and which is being strenuously resisted by many shipping lines, cannot adequately protect our waterways and reliant communities.

As the IMO estimates ballast water invaders are costing the world tens of billions of dollars every year[40], we consider the potential impact of temporary interruption to trade revenue resulting from strict application of the Convention to be secondary, and recoverable – unlike most marine pest invasions.

*Recommendation: That state and Federal governments lobby for immediate adoption of IMO regulations on Ballast Water Management, and that the proposed procedures are mandated to all ballast carrying international vessels in all countries. Shipping arrivals from countries that have not adopted the BWM procedure should be refused entry to Australian ports.*

## 8. AIR QUALITY

Shipping is a major contributor to air pollution – for both climate change and health impacts. If global shipping was a country, it would be the sixth largest producer of GHG emissions. Only the US, China, Russia, India and Japan emit more $CO_2$ than the world's shipping fleet. However, $CO_2$ emissions from shipping are immune from regulation[41]

Health impacts from shipping have been largely overlooked in Australia, to the detriment of the community and the health of waterways that host shipping. Given the numbers of commercial ships that use Port Phillip Bay, this is a major issue which the EMP must address. The world's 90,000+ cargo ships account for 9% of global sulphur oxide pollution and 30% of global nitrogen oxide pollution[42].

Sulphur and nitrogen emissions from land-based transport in the past 20 years has been mandated, but the shipping industry has avoided any tightening of standards, despite highly effective technology and alternative operation methods solutions being available[43]. The world's largest ships' diesel engines which typically operate for about 280 days a year generate roughly 5,200 tonnes of SOx[44].

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[38] http://globallast.imo.org/wp-content/uploads/2015/01/TenMostWanted_English.pdf

[39] National Oceanic and Atmospheric Administration (NOAA) Fact sheet: at: http://www.nmfs.noaa.gov/stories/2012/02/docs/ballast_water_factsheet.pdf , and Dr. Tim Low, Invasive Species Council, ABC Radio *Earthbeat* Sept. 2003

[40] Ibid

[41] http://oceana.org/reports/shipping-solutions-technological-and-operational-methods-available-reduce-co2

[42] *Health risks of shipping pollution have been underestimated'* UK Guardian 9th April 2009 reporting on **US National Oceanic and Atmospheric Administration Report February 2009** http://www.theguardian.com/environment/2009/apr/09/shipping-pollution

[43] *Shipping Solutions -Technological And Operational Methods Available To Reduce Co2* (Page 3) at: http://oceana.org/sites/default/files/reports/Shipping_report_2010.pdf

[44] http://www.theguardian.com/environment/2009/apr/09/shipping-pollution

US academic research[45] found that pollution from the 90,000 cargo ships has led to 60,000 deaths per year, costing up to $330 billion per year in health costs from lung and heart diseases. These finding led the US EPA to impose a strict 230-mile buffer zone along the entire US coast in which ships are required to burn cleaner fuel. Canada is expected to follow suit. The US EPA estimates this will save more than 8,000 lives a year with new air quality standards cutting sulphur in fuel by 98%, particulate matter by 85% and nitrogen oxide emissions by 80%.

A Danish government environmental agency study also found that shipping emissions cost the Danish health service almost £5bn a year, mainly treating cancers and heart problems. A previous study estimated that 1,000 Danish people die prematurely each year because of shipping pollution[46].

Every day in Port Phillip Bay and in the Port of Melbourne, cargo ships emit pollution from burning fuel which cannot be used legally on land. Residents in numerous coastal towns and millions of Melbourne residents are likely exposed to this pollution. Obviously, in the absence of action, ongoing port expansion plans entrench the problem.

As far as we are aware, no comprehensive research has been carried out on the health effects on Australian coastal communities[47]. It seems clear that a significant number of deaths would be directly attributable to shipping emissions, and that this significant pollution will also be affecting the Bay's ecosystems.

*High Courage* ©P. Crotty
In the Port of Melbourne - Under Westgate Bridge, 3000+ ship visits per year[1]
Burning the cheapest, dirtiest, high-sulphur fuel that no-one on land is allowed to use.

[45] Ibid
[46] Ibid
[47] 2012 Australian Maritime College announced preliminary study to start - No results reported yet
https://www.amc.edu.au/sites/default/files/Research_report_web_1.pdf

South Channel Port Phillip Bay. ©J. Warfe

Off McCrae most days ©J. Warfe

*Recommendation: DELWP should lobby Federal government to ensure that Australia adopts compulsory coastal exclusion zones requiring all cargo and passenger shipping to switch to cleaner fuels. DELWP should raise community awareness of the health threats posed to humans by exposure to shipping emissions in and around Port Phillip Bay and the Yarra River/Port of Melbourne. DELWP should investigate possible health impacts on marine species and water quality in the Bay resulting from exposure to current pollution load delivered from shipping.*

## 9. COASTAL EROSION POST CDP

Whilst not necessarily the single cause, by increasing tide heights the CDP has undeniably added another variable to likely reasons for beach erosion.

Much of the shoreline of Port Phillip including the Southern Peninsula is low lying land. The swift arrival of more water in the Bay post channel deepening must augment the expected gradual global warming induced Sea Level (SL) rise impacts on coastline around the Bay.

In its 2004 EES, PoMC predicted an approximate 1 cm increase in tide height and up to 1 cm increase in SL resulting from deepening at The Heads (Entrance). PoMC's expert witness[48]

[48] Dr. David Provis, evidence to EES 2004, and in various pers comms.

submitted that such changes would be imperceptible. Data we have analysed however suggests that changes to tide heights post CDP within the Bay, compared to outside it, may be significantly greater[49].

It is generally accepted that beaches are in a constant state of change as sand comes and goes with the seasons and storms. However, there has been recent powerful evidence that additional water levels in the Bay resulting from the CDP, along with storm surges, is impacting on the coastline in ways never before seen. As well as causing coastal instability and damage to coastal vegetation and Aboriginal middens, storm surges are damaging valuable infrastructure. It appears storm surges in the Bay have increased in height and thus have become more erosive in recent years. This is presumably due to either global sea level rise, unprecedented weather conditions, the CDP (2008–9) or some combination of these factors.

The most obvious erosion post CDP is at Portsea front beach where ocean type swell regularly pounds the beach on incoming tides. However there is also significant dune erosion and loss of vegetation in the Point Nepean National Park, and several other southern Bay beaches.

Portsea beach has varied in width over the last century, but has always been a safe swimming beach with a significant sandy shore capable of accommodating hundreds of visitors. Photographic records over the last Century confirm this[50]. However, by 2009 the beach and mature backing vegetation disappeared dramatically and swiftly and has not returned, and the beach is no longer safe for swimming.

The now defunct Office of the Environmental Monitor (2011) found it *'implausible that the erosion of Portsea beach has resulted from increased wave energy due to the [CDP] project'*.

However, the Water Technology Report[51] (March 2013) model estimated that the CDP dredging has produced *'significant' local increases in significant wave height of 7–10% and wave energy density of 15–20% at Portsea Front Beach'*. CSIRO (April 2013) found it is *'conceivable that the CDP may have increased the height of waves impacting the beach at Portsea and therefore some degree of attribution to the CDP is possible. It is also conceivable that the CDP may have not only contributed to the erosion that has been observed, it may have impeded subsequent recovery of the beach'*[52].

We also note the following:

- The Bruun Rule - Broadly, a 1 cm rise in sea level erodes beaches about 1 metre horizontally, as per CSIRO[53] and others
- Recent acknowledgement that around 600 metres of Portsea Front Beach and foreshore are being affected by swell waves, resulting in an estimated 25 to 30 metres of severe beach and foreshore erosion near the Portsea Pier[54]
- To our knowledge, other than the recent studies commissioned especially for managing Portsea beach erosion, the additional risk posed by CDP related tide heights changes has not been included in any coastal vulnerability assessments for Port Phillip Bay
- The EES and S-EES did not model for and did not predict any increase in ocean swell entering the Bay
- "Confluence of events" – the concurrent, cumulative and synergistic effects of gradual Climate Change related SL rise: changed tide, weather and storm regimes, interacting

[49] http://www.bom.gov.au/oceanography/projects/ntc/monthly/index.shtml
[50] See historic images in *Changes on the Coastline of Port Phillip Bay* Eric Bird March 2011 Page 51
[51] 'Review of Wave Transformation Processes Through Port Phillip Heads' March 2013
[52] Review of OEM assessment of potential causes of beach erosion at Portsea CSIRO April 2013
[53] http://www.cmar.csiro.au/sealevel/sl_drives_short.html and http://www.smh.com.au/environment/climate-change/between-denial-and-the-deep-blue-rising-sea-20101015-16nkq.html The Age October 16th 2010
[54] DELWP REQUEST FOR QUOTATION AND PROJECT SPECIFICATION For Portsea Front Beach Long Term Options Assessment January 2016 V4

with the more sudden Channel Deepening related changes have not been appropriately modelled

- In its OzCoast coastal modelling, the Australian government uses three sea level rise scenarios: low sea level rise (0.5m), medium sea level rise (0.8m) and high sea level rise (1.1m). It states the low scenario represents SL rise that is likely to be unavoidable. The medium scenario is in line with recent global emissions and observations of SL rise.[55]
- PoMC SL rise predictions of a mere 0.3 and 0.5 metres above existing levels were inadequate. At the very least, 0.5 and 0.8 metres SL rise should have been modelled
- Our analysis of PoMC's modelling for the S-EES[56] identifies fundamental flaws in the hydrodynamics and sediment transport models. See: Attachment 3
- La Nina, dominant since 2010[57], was not predicted or included in PoMC models. A pronounced La Nina also contributes to higher sea levels
- Other Climate Change related variables (wind/storms/tides) and ocean swell were not appropriately included in PoMC's modelling.

Some PoMC consultants used an 'after-the-fact' approach, as follows:

*"In order to assess the effects (of climate change and sea level rise) on the predicted impacts of the CDP, the 2D model of the whole Bay was run for a one month simulation with mean sea level set at 0.3m and 0.5m above existing levels for both the existing bathymetry and that after the completion of the project".*[58]

So, although some extra SL was added onto existing modelled data for a one month simulation, this does not adequately reproduce possible synergistic impacts of increased SL and other Climate Change related variables – such as storms, wind and swell. Nor over longer time periods – such as the "life" of the project and longer. Various other consultants confined their comments to the "effects of the project" only.

The EES/S-EES modelling could not have reliably informed other studies undertaken as part of the S-EES, including marine ecology, aquaculture and fisheries, nutrient cycling, seabirds and terrestrial ecology, economic effects, property damage, penguins, Aboriginal and non-Aboriginal heritage. Consequently, PoMC's hydrodynamic and sediment transport modelling has proved inadequate to predict changes in a complex dynamic natural environment, and the health of the Bay has been compromised.

*Recommendation: All these matters require renewed attention in the revised EMP. Any future modelling for hydrodynamic impacts arising from proposed dredging/developments within Port Phillip Bay should adopt more rigorous, finer grid, models.*

*Further studies of changes to tide heights, extreme highs and lows, should be pursued to inform management of the coastline and its critical habitats.*

## 10.CLIMATE CHANGE AND SEA LEVEL RISE

Although climate change is a national and global issue, with impacts well beyond Port Phillip Bay, we contend that planning for its local impacts should have featured in the previous iterations of the EMP, and most certainly should in the revised EMP.

[55] http://www.ozcoasts.gov.au/climate/sd_visual.jsp

[56] See additional paper provided: *Analysis of Channel Deepening Hydrodynamics and Sediment-Transport Modelling Deficiencies,* Neil Blake Port Phillip Bay Keeper 28th October 2007

[57] http://www.guardian.co.uk/environment/2011/jan/11/australia-floods-la-nina and http://www.bom.gov.au/lam/climate/levelthree/c20thc/flood.htm

[58] Cardno Lawson and Treloar (CLT) Jan 2007. Hydrodynamics and Coastal Processes Head Technical Report (p.85)

The 2002 'PORT PHILLIP BAY ENVIRONMENTAL MANAGEMENT PLAN: Background Document' identifies a suite of Environmental Risks Posed to the Bay, being:

- Nutrient loading and detrimental changes to nutrient cycling
- Toxicant inputs
- Increased suspended solids levels
- Pathogens
- Presence of Litter
- Exotic marine organisms
- Physical disturbance of habitats
- Harvesting activities

However, we were only able to find one reference to climate change in the 2002 Background Document which stated: *Some risks arise from activities that occur beyond the Bay and its catchment, such as those associated with climate change. While the abatement of impact from such risks will be an immediate issue for Bay managers, action to deal with a risk at its source is developed through national and international arrangements*[59].

This approach is unhelpful, as climate change and sea level rise may well impact on all of these environmental risks for Port Phillip Bay, so should be investigated. We are surprised that there appeared to be no consideration of possible interactive, cumulative or exponential impacts which might arise from a complex interaction between any or all of the identified risks and sea level rise/climate change/salinity/atmospheric $CO^2$/acidity of the Bay.

Since 1990, SL has risen faster than expected, already tracking above IPCC predictions[60]
We therefore contend that the now unavoidable consequences of climate change and sea level rise, along with impacts of increasing population on the coast will have direct impacts on the Bay, and should be a major feature of future EMPs.

Unfortunately the prevailing mindset seems to be that our irreplaceable coastal zones and waterways can be exploited to provide the recreational open space which is elsewhere being turned over to housing estates and shopping centres. Consequently, Port Phillip Bay's coastline is becoming hardened, denuded, trampled and littered, with obvious implications for reduced ability to accommodate sea level rise, and greater runoff and litter into the Bay. Meanwhile its waters are suffering the impacts of ever growing exploitation from port development plans, dredging, spoil dumping etc.

PPCC Inc. Policy Statement No. 6 *'Dealing with coastal erosion or accretion in Port Phillip"*[61], adopted in 1998, points out that coastlines are dynamic natural systems that are subject to change due to powerful and relentless natural coastal processes, which are best respected by not interfering with them or restricting them. Attempting to control these forces is excessively expensive, and has many adverse effects – not least a reduction in the natural amenity of the coastline, a consequent reduction in tourism and beach related activities, and ultimately the health of the Bay.

Since our Policy Statement No. 6 was adopted, the community has become more aware and accepting that changes will occur to our coastline within our lifetimes and now expects all levels of government to be preparing for a very different future, particularly in our coastal regions. However, the law generally lags behind public opinion and/or accepted research, so whilst legislation and underpinning policy documents might still allow a development to occur, a decision to approve coastal development on public land, or allow dredging which may impact

[59] 'PORT PHILLIP BAY ENVIRONMENTAL MANAGEMENT PLAN: Background Document' 2002, Page 52
[60] Garnaut Climate Change Review Update 2011, http://www.garnautreview.org.au/update-2011/update-papers/up5-the-science-of-climate-change.html
[61] http://www.ppcc.org.au/policies.htm

the coastline etc., may not represent good planning, especially in light of what we now know about impending climate change impacts.

Location of non coast dependent facilities such as skate parks, playgrounds and swimming centres on public land in coastal areas will contribute to reduced amenity of remaining natural coastal experiences and expose ratepayers to unacceptable future costs.

Whilst $millions of taxpayer funds have been expended on supposed state of the art Plans for various coastal regions, and Port Phillip Bay, many have paid scant regard to the overwhelming scientific evidence that our coastline will change dramatically within decades, and that those changes will have consequences on land and for the Bay.

In reviewing the EMP, particular attention should be given to the compelling evidence already available on likely future impacts including:

1. **House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts October 2009 Report *'Managing our Coastal Zone in a Changing Climate – the time to Act is Now'*** The Report provides commentary and data particularly relevant to the issues raised in our submission regarding the plans for Rosebud and its coastline.

Quote: *"Climate Change is a global issue that requires government to move beyond traditional approaches and boundaries or governance and environmental responses. At present governance and institutional arrangements concerning climate change and the coastal zone are significantly disjointed, lack leadership and accountability"* [62]

We refer you especially to evidence in relation to insurance and coastal land:

- In Victoria alone, more than 80,000 coastal buildings and infrastructure are at risk from projected sea level rise, coastal flooding and erosion[63].
- The area of land subject to inundation by storm surge is likely to increase by 4- 15% by 2030 and 16 - 63% by 2070. It is predicted to affect more than 2000 individuals, 1000 dwellings and approx. $780 million in improved property value[64].
- A 1-in-100 year storm surge is likely to happen every 1 to 4 years by 2070[65], and, also in relation to predicted frequency of storm events: *"What this means is that if you have a flooding event which only happens every year at the moment, by the end of the century it will be happening every day"*[66].
- In relation to Insurance cover for coastal buildings and infrastructure, the Insurance Council of Australia (ICA) confirmed that there are some things that cannot be insured for: *"Risks identified.....and not generally covered….. include Storm Surge, Landslip and Sea Level Rise…….no you cannot get cover for that in any significant or competitive way ….You would not be able to find a policy to cover you for a landslip issue …..I would not envisage that changing into the future"*[67].
- *In relation to Sea level rise, ICA stated: "you simply cannot get an insurance product at the moment for gradual sea level rise that at a future time prevents you using a parcel of land because it has become untenable….",* and *" whereas the value of coastal buildings may be protected to some extent by insurance, the land value of properties is not insured at all"* [68]

[62] Manly Council NSW submission to House of Representatives Standing Committee on Climate Change, Water, Environment and the Arts Report October 2009 *'Managing our Coastal Zone in a Changing Climate – The time to Act is Now'* Page 5
[63] Ibid Page 37
[64] Ibid Page 37
[65] Ibid Page 37
[66] Dr. Hunter, Antarctic Climate and Ecosystems Cooperative Research Centre, in evidence to Committee. Page 47
[67] Mr. Sullivan. ICA submission Ibid Page 116 -117
[68] Ibid Page 118 - 120

- In relation to uncertainties about legal matters relating to climate change and the coastal zone, the National Sea Change Taskforce (NSCT) commented: *"…Councils are at a loss as to how to respond at the moment. What we are seeing is developments being approved right now that, if some of the projections coming out of the IPCC are proved correct, will be placed at risk in the future….there are still properties being approved today, which perhaps it would be prudent not to"* [69]
- The legal practitioners Australian Network of Environmental Defenders Offices (ANEDO) state: *"First do no more harm. It is important to not compound the significant problems already faced by coastal communities by making further ill- considered planning and infrastructure which ignores looming biophysical realties. If decisions are made ignoring this principle, they will inevitably create even larger costs for future generations to bear, and undermine the concept of intergenerational equity…"*[70]

The Report signals the need for immediate and serious changes to our coastal land management practices. In relation to the cumulative impacts of coastal developments, the Committee recorded that the cumulative impacts of many small decisions taken along the coast are clearly not being dealt with effectively under current Federal and state environmental protection regimes, stating: *"This also requires urgent attention"*[71].

In relation to population impacts on the coast, the Committee recorded that the clear message was that coastal development and population pressures were having a dramatic impact on the coastal environment and that our present poor coastal land use planning practices were a significant factor in this regard[72].

**2. *Climate Change Risks to Australia's Coast*** Report, Australian Government Department of Climate Change Released 14th November 2009

Some key findings for Victoria:

- Between 27,600 and 44,600 residential buildings in Victoria may be at risk of inundation from a sea-level rise of 1.1 metres and storm tide associated with a 1-in-100 year storm.

- The current value of the residential buildings at risk is between $6.5 billion and $10.3 billion.

- There are approximately 4,700 residential buildings (and numerous public assets) located within 100 metres of 'soft' erodible shorelines.

Clearly much of those assets within 100 metres of the shoreline will be on public land, and will have been paid for with public funds. Damage to these assets, especially drainage systems, will have substantial impacts on water quality and flow rates to the Bay.

Nationally, the Report makes a number of recommendations relevant to future coastal planning in our local area.

- While risks will unfold over time, there is a case to begin now with early national action to reduce current risks and avoid the building of new exposures

- Avoidance of future risk is the most cost-effective adaptation response in most cases. Decisions on future development, particularly in areas highly exposed to the impacts of climate change, should not increase risk.

[69] Ibid Page 144 NSCT submission
[70] Ibid Page 149
[71] Ibid Page 192
[72] Ibid Page 218

- There is a large risk legacy in the coastal zone from buildings and other infrastructure constructed in the past.

- Natural ecosystems provide valuable environmental services and can buffer many of the risks associated with a changing climate in the coastal zone. Planning is needed to maximise system resilience, allow for ecosystem movement and make explicit decisions about tradeoffs.

- Leadership by governments will be necessary if adaptation action in the coastal zone is to be effective[73].

These recommendations have obvious relevance for the future management of publicly owned coastal land and the resultant impacts on Port Phillip Bay.

The following images show how the shoreline is behaving under **present** climate conditions. Local and state governments must add local and anecdotal evidence to any studies modelling future scenarios for the coastline.

Above and below: Surging drains on McCrae foreshore adjacent to Pt. Nepean Rd McCrae during storm 26th April 2009

[73] *Climate Change Risks to Australia's Coasts* Australian Government Department of Climate Change Page 135 http://www.climatechange.gov.au/en/publications/coastline/climate-change-risks-to-australias-coasts.aspx

Above: No Beach remaining on the flat McCrae beach…..what will an additional metre of SL rise look like? Approximately, it will mean the shoreline will be tens of metres further inland, across Pt. Nepean Rd. Images © J. Warfe 2009

Above: Portsea beach post "restoration" October – December 2010 Images: ©J. Warfe

Portsea beach has been in various states of taxpayer funded reconstruction since 2009-2010. The former beach is unrecognisable, and continues to erode. Since 2010, $millions more have been spent by government in failed attempts to hold back the sea from Portsea beach. It provides much less open space and local businesses have been adversely affected. A very poor outcome for the publicly owned space at Portsea.

Erosion ongoing - Portsea beach May 2015. Image ©Josh Clark Dive Victoria

Above & Below: Rosebud Foreshore public open space at Pier experienced dramatic erosion impacts, requiring costly rehabilitation and maintenance. With increasing sea levels, this area will likely be inundated. Image 22nd July 2009

Incredibly, the MPSC has recently endorsed a $4 million 'Rosebud Foreshore Recreation Node Master plan'[74] including installation of playgrounds, boardwalks, viewing platform, fitness station, BMX track, event servicing stations etc. within metres of the shoreline.

At a time when we should be actively preparing to move back from the coast, a development which entrenches non coast dependent hard infrastructure and high impact uses of the coast can only have negative impacts on the Bay and its coastline.

The Rosebud pier beach was "reconstructed" in 2010 at a reported cost of $250,000. Image: June 2010 © J. Warfe

Since 2010, the sandbag "solution" at Rosebud beach has been an abject failure- and no beach has returned. Further desperate attempts to hold back the sea were undertaken in 2015 with the installation of several timber groynes – thus whilst some sand may return to this section of beach it will be lost to some other section of the coastline.

We also draw your attention to the growing body of literature on litigation surrounding climate change, negligence, duty of care, and public nuisance in failing to act appropriately to mitigate impacts. As far back as 2002, Australian Conservation Foundation (ACF) lawyers pointed out the possible scenario of common law actions around an entity posing a public nuisance by diminishing the public's right to enjoyment of and access to the adjacent beach and foreshore[75]. A public nuisance action is not tied to the possession of land or proprietary rights.

In future, when government approves non coast dependent developments on publicly owned coastal land, large scale infrastructure which produces irreversible damage to our bays and waterways etc., it should consider the likelihood of exposing taxpayers to possible litigation for failing to act appropriately to protect commonly owned assets – our beach, foreshore, seabed and waterways.

*Recommendation: In future, coastal development on public land must only entail essential coast dependent services. Non coast dependent structures should be removed so that coastal reserves can be optimally prepared for climate change.*

[74] http://www.mornpen.vic.gov.au/Whats_On/News/Master_plan_adopted_for_Jetty_Road_Rosebud_foreshore_area and http://www.mornpen.vic.gov.au/files/2a29cb56-a8a6-4e77-b9b7-a533010e4c33/Jetty_Road_Foreshore_Master_Plan.pdf

[75] Tort Based Climate Change Litigation in Australia, pages 12-17

**Finally**

For decision makers, it is no longer appropriate to cling to the well worn paradigms of the past and present. We are in a time of great change, and the decision making tools relied on in the past, including some current legislation have passed their use by date.

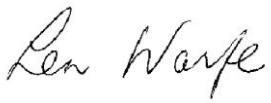
We reiterate two important concepts.

1. The Precautionary Principle[76], binding on all levels of government since 1992, which attributes to the advocates of the project the burden of proof that there will be no harm. Briefly put: If in doubt, don't.
2. Newton's Third Law (1689). Newton's Third Law, put simply says: For every action (force) in nature there is an equal and opposite reaction. It is an immutable, observable law of nature, so it is indeed puzzling why after 350 years we are surprised when nature responds according to a fundamental law of the universe. Newton's Third Law is particularly obvious in modern man's incessant tinkering with marine and coastal processes, and the environmental consequences that subsequently arise.

It behoves the DELWP, as custodians of Port Phillip Bay, to ensure that these concepts underpin your decisions around the future of Port Phillip Bay.

We trust you will give due consideration to our recommendations

Yours sincerely



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[76] Rio Conference 1992