Community Consultation Document for the

Draft Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System

September 2007

Australian Government

Environmental Protection Authority
Government of Western Australia

How to comment

This document has been released for public comment for 8 weeks along with the draft Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System. Your views are sought on these documents.

Written submissions should be made to the Environmental Protection Authority. Please submit your comments either by post, email or hand delivery.

Post	Environmental Protection Authority Peel Harvey Water Quality Improvement Plan Submission Locked Bag 104 Bentley Delivery Centre WA 6983
E-mail	policy@dec.wa.gov.au and enter subject line 'Peel Harvey Water Quality Improvement Plan Submission'
Hand delivered	The Atrium Level 4, 168 St Georges Terrace Perth, Western Australia 6000
How to find out more	To view the draft Water Quality Improvement Plan, please see the attached CD at the back cover of this document. Alternatively, hard copies are available from the Department of Environment and Conservation Mandurah office or library in Perth. It is also available to be viewed or downloaded on the Environmental Protection Authority's website www.epa.wa.gov.au
For enquiries	Please call the Project Officer, Peel Harvey Water Quality Improvement Plan Phone (08) 6467 5523
Preferred reference	Environmental Protection Authority (2007) Community Consultation Document for the draft Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System.
ISBN:	0 7309 7387 5
Front cover photos	Courtesy of Department of Water

The Environmental Protection Authority acknowledges and thanks the following partners in their contribution to the draft Water Quality Improvement Plan:

Department of **Agriculture** and **Food**
Department of **Environment** and **Conservation**
Department of **Water**

Peel Waterways Centre

PEEL-HARVEY CATCHMENT COUNCIL (Inc.)

Department of **Planning** and **Infrastructure**
Peel Development Commission
Western Australian Planning Commission

Foreword

I am pleased to release for public discussion the draft Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System (the Plan).

This document is a summary of the Plan. To view the Plan, please see the attached CD at the back cover of this document. The aim of the Plan is to improve water quality in the rivers and estuary by reducing phosphorus levels that are a known cause of algal blooms.

The Plan is being developed under a program jointly funded by the State Government and the Coastal Catchments Initiative, an Australian Government program of the Natural Heritage Trust, to reduce pollution in coastal water quality hotspots.

The Plan builds on the activities and research that have been underway for several decades and recommends a combination of actions that include changes to agricultural and urban practices and land use planning.

The views of residents, landholders, farmers, industry, community groups, developers, consultants, landcare groups, government bodies, and other stakeholders are an important part of developing the final Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System.

The Environmental Protection Authority has prepared this document to help you understand the key issues involved. It will also help you to provide input on the level of protection the community wants for the estuary, as well as helping select the appropriate mix of actions to improve water quality in the estuary.

I commend the Plan to you and encourage you to comment on it.

Barry Carbon
CHAIRMAN

'In lower reaches of the Serpentine and Murray rivers – water quality remains poor and algal blooms, fish kills, and surface scumming still occur.'

Improving the Peel-Harvey region through the Water Quality Improvement Plan...

The Peel-Harvey region is one of the fastest growing areas in Australia. It combines an enviable location close to the sea, extensive inland recreational waterways, and a lifestyle that can combine the very best elements of urban and rural living.

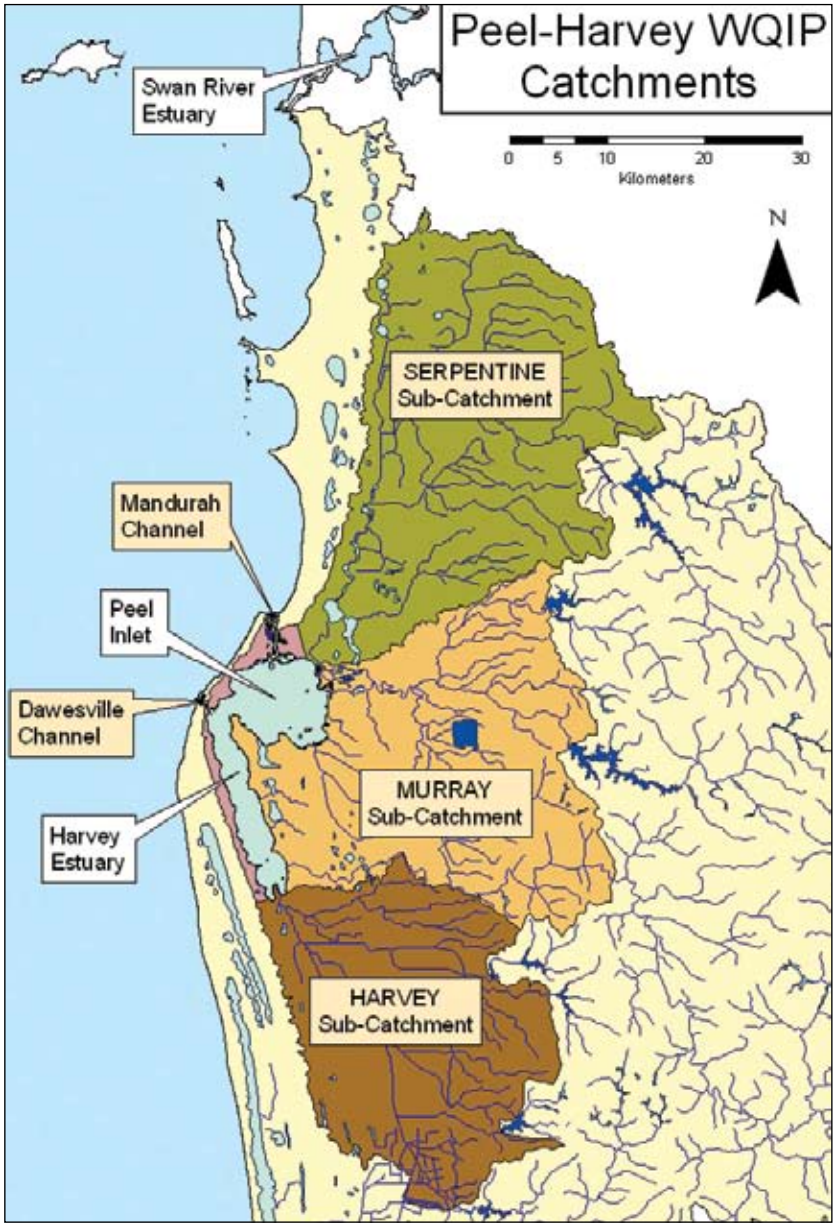
After decades of declining water quality and severe algal blooms in the Peel Inlet-Harvey Estuarine System, a four-pronged strategy was initiated in 1989. This strategy consisted of constructing the Dawesville Channel; continuing harvesting nuisance macro-algae; preparing and implementing a catchment management plan and finalising the *Environmental Protection (Peel Inlet-Harvey Estuary) Policy 1992.*

The Dawesville Channel has been effective in cleaning up the estuary and reducing algal blooms in the open waters of the Peel Inlet and Harvey Estuary. The channel was not expected to improve the water quality in the Serpentine, Murray and Harvey rivers which flow into the estuary. There has been no appreciable overall improvement in the quality of water in the rivers generated in the catchment.

In the rivers, particularly in lower reaches of the Serpentine and Murray rivers, water quality remains poor and algal blooms, fish kills and surface scumming still occur.

In 2003 the Peel-Harvey coastal catchment was identified as a priority hotspot under the Australian Government's Coastal Catchments Initiative.

Aerial view of the Peel Inlet-Harvey Estuarine System taken in December 2005 (Source: Department of Agriculture and Food)



Area covered by the Water Quality Improvement Plan

The Peel Inlet-Harvey Estuarine System is about 75 km south of Perth and consists of two connected shallow basins – the Peel Inlet and Harvey Estuary. The Plan focuses only on the coastal portion of the Serpentine, Murray and Harvey catchments as shown coloured on this map and marked as sub-catchments. Monitoring shows that 80-90% of the phosphorus that feeds the algae originates from these sub-catchments (Source: Department of Water).

The Initiative consisted of seven coordinated projects that contributed to and assisted in the preparation of this Plan developed by the Environmental Protection Authority with assistance and coordination provided by the Peel-Harvey Catchment Council.

The major problem in the rivers is an excess of phosphorus entering from the catchment and feeding the growth of algae.

The goal of the Plan is to keep total phosphorus loading into the waterways below 75 tonnes a year – nearly half the current level of 145 tonnes a year.

This can be achieved by implementing actions to reduce phosphorus discharges (to address current and present land use practices); as well as new preventative measures (such as domestic connection to reticulated sewerage and environmental planning) to minimise phosphorus load.

Actions to fix the problem

The Plan is based on the findings of the Coastal Catchments Initiative projects to identify ways to lower phosphorus levels in the Peel-Harvey Estuarine System.

The projects found that phosphorus discharges in the waterways are caused by rural and urban land use practices, and that it is a problem occurring throughout all the catchments.

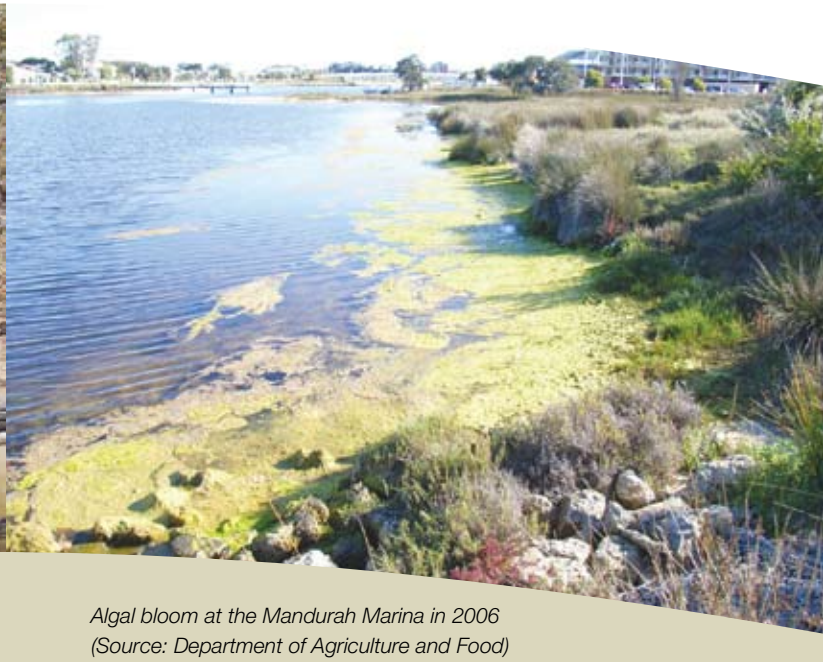
The reports from the projects also contain a series of actions for the Plan to reduce phosphorus levels in the waterways.

The projects showed that the most successful actions to reduce phosphorus discharges are fertiliser management and soil amendment. Fertiliser management involves using the right fertiliser at the right rate and time. Soil amendment involves using soil additives to make the soil retain more phosphorus instead of allowing it to leach into waterways.

These need to be combined with other actions across the catchment, depending on the land uses involved and soil capability.

We'd like your feedback on what you think of these actions.

Fish deaths in February 2004
(Source: Department of Agriculture and Food)



Algal bloom at the Mandurah Marina in 2006
(Source: Department of Agriculture and Food)

Here's what we have to do

1. **Use a slow-release, low water soluble fertiliser, applied after the break of season, preferably in spring and at reduced rates, on sandy soils in rural areas**

   When normal phosphate fertiliser is applied to the sandy soils in the catchment it may become quickly dissolved in rainfall and wash through the soil and into waterways.

   If instead, a slow release phosphate fertiliser is used, it will dissolve only slowly and is more likely to be taken up by plants or attached to the soil. The timing of fertiliser application is also important.

   Changing the type of fertiliser (highly soluble to low water soluble/slow release, eg superphosphate to red coat super phosphate) on agricultural areas would reduce the overall load delivered to the estuary by 13 percent. Through modelling, the Serpentine catchment can be predicted to have an estimated 18 percent drop in phosphorus discharges after switching to a slow release fertiliser.

   The phosphorus loads to the estuary would be reduced by 11 percent when the rate of fertiliser applied is reduced by 20 percent combined with splitting the fertiliser application (ie. 30% at start of the season and 70% at the end of the season). The Harvey catchment showed the greatest reduction at 22 percent.

2. **Undertake soil amendment on sandy soils in rural areas**

   The sandy soils of the catchment are low in the natural clays and loams that bind onto phosphorus and reduce the rate of leaching. It is possible to add amendments to the soil that help to hang on to the phosphorus.

   Using soil additives or conditioners such as 'yellow sand' or 'bauxite residue' help to absorb phosphorus and is very effective in reducing leaching into the Peel Inlet-Harvey Estuarine System. 'Yellow sand' (Spearwood sand), for instance, can retain phosphorus better than the grey or white sands, and is available in the catchment.

   The application of bauxite residue dramatically reduces leaching, resulting in greater total phosphorus in the soil surface and a greater amount of phosphorus available to plants. Bauxite residue has been given some bad press, but there is no science to support it.

Soil amendment being undertaken using 'bauxite residue' in the Harvey catchment (Source: Department of Agriculture and Food)

'The main cause of algal blooms is nutrient discharges from catchments that feed into the rivers.'

The Meredith Drain catchment area is about 4300 hectares of which 2500 hectares is farmland. It is an agricultural drain discharging into the Harvey Estuary. Widespread use of bauxite residue started in 1994 with most fields being amended with 20 tonnes per hectare and showed reduced phosphorus concentrations by up to 70 percent in the drain's waters and increased pasture productivity by up to 25 percent. A total of 30 000 tons of bauxite residue was applied. Prior to the development of the Department of Agriculture and Food's Code of Practice 80t/ha and up to 200t/ha were applied in small areas. Farmers have been getting good results by simply applying between five to 10 tonnes of bauxite residue per hectare re-applied between 5 to 10 years. Extensive laboratory, field and catchment-scale trials undertaken since 1993 have shown an immediate and marked ability of bauxite residues to reduce leaching of nutrients. A deed of indemnity was signed by the State Government in 1999 to indemnify the manufacturer against any liability for its use as an agricultural soil amendment. As with low water soluble broad acre fertiliser, the product is not currently commercially available and discussions will continue through the public consultation process to enquire if remaining barriers to uptake can be removed.

3. Use low water soluble fertiliser in urban areas

The use of a low water soluble domestic fertiliser at reduced rates for domestic gardens will also reduce the load to the estuary. Designing gardens so that they contain plants that require less water or fertiliser will also assist.

4. Connect all existing homes to infill sewerage

Ensuring all current homes are connected to a reticulated sewerage system where available or septic tanks replaced with alternative onsite systems will have a significant impact on the health of the rivers and estuary.

Modelling demonstrates that full connection to the infill sewerage should bring a reduction of 22 percent of the total loading to the estuary. The Murray catchment showed the greatest predicted reduction of 27 percent. For the Serpentine catchment connection to the infill sewerage would be sufficient to go halfway towards meeting the load reduction targets for two of the reporting subcatchments.

5. Zero discharge from licensed agricultural premises

Eliminating phosphorus discharges from licensed agricultural premises such as turf farms or intensive feedlots, can have a significant impact on the water quality in their local catchment. This can be done by processing effluent for compost or re-using the animal effluent as fertiliser over the dry summer months.

Two subcatchments in the Harvey catchment would meet the load reduction target when the previous best management practice (full connection to infill sewerage) and this best management practice (zero discharge from licenced agricultural premises) are combined.

Reducing the licenced export from the licenced agricultural premises of phosphorus to zero in a subcatchment in the Serpentine catchment (Gull Road) would account for half of it's required load reduction.

6. Improve other agricultural practices to reduce phosphorus discharges

Perennial pastures

Replacing annual pastures with perennial pastures can help in the uptake of phosphorus and other nutrients. Perennial pastures have deep-rooted systems, to intercept water and nutrients that have leached below the shallow root system of annual pastures, and provide opportunities for immediate water and nutrient uptake when there is un-seasonal weather.

Perennial pastures include kikuyu, paspalum, couch, rhodes and veldt grass.

Effluent management

Effective management of effluent on dairy farms can significantly reduce the total load of phosphorus delivered to the estuary. When handled correctly, animal effluents are an excellent nutrient source, and should be regarded as a resource and recycled on farm or stored appropriately for use off site. As with licensed agricultural premises in action five, zero offsite phosphorus is required.

Better managing irrigation systems

Shifting to a more efficient irrigation regime can reduce nutrient loss and there is the potential to stop summer phosphorus losses.

7. Undertake strategic reafforestation of agricultural land

Modelling results show that a well-targeted reafforestation program could improve the health of the estuary with big phosphorus reductions to be made in the upper Serpentine and small areas of the Harvey.

Reafforestation can involve the utilisation of agricultural land solely for timber production, broadly referred to as farm forestry, or combining with agriculture to produce agroforestry.

8. Connect to sewerage all homes and properties for new urban developments

Gardens and septics are the primary source of phosphorus in urban areas.

All homes and properties should be connected to reticulated sewerage in all new developments.

9. Undertake soil remediation in all new urban developments with sandy soils

Soil remediation is a technique used to create fertile topsoil by increasing the soils' ability to retain moisture and nutrients before they infiltrate through to the groundwater. Soil remediation involves adding an agent to the soil to improve its structure, water holding capacity and nutrient recycling capacity. Potential amendment/remediation agents include compost, organic rich soils, loam soils, natural clay and crushed limestone.

10. Implement Local Planning Policies, Strategies and Planning Conditions that incorporate Best Management Practices where applicable

Decision-making authorities need to take a lead role in implementing best management practices. Incorporating these into local planning policies, strategies and planning conditions will ensure best management practice implementation. Government and community need to work cooperatively towards reaching the targets of the Plan in reducing phosphorus to the estuary.

11. Incorporate water sensitive urban design in all new developments

All new developments to incorporate water sensitive urban design according to local planning policies and the Peel-Harvey Coastal Catchment Water Sensitive Urban Design Technical Guidelines. Water sensitive design focuses on a 'whole of water cycle' approach.

Key aims are to reduce nutrient runoff and peak flows from suburbs to protect downstream waterways and wetlands, and groundwater. It can involve the use of features that incorporate stormwater into parks and public open space to retain first flush events onsite. In many cases, such features can be designed as part of streetscapes, bush or park landscaping and add to the amenity of a neighbourhood. The technical guidelines and the Local Planning Policy prepared by the Peel Development Commission – were recently completed in consultation with local government officers for planning and future development proposals.

12. Improve the agricultural and urban drainage system

Improving the agricultural and urban drainage system will enhance their ability to remove nutrients during flow, using guidelines contained within the Technical Manual for Water Sensitive Urban Design and the Stormwater Management Manual.

The main task of the Plan is to find the best mix of practical and reasonable actions to meet the Environmental Protection Authority's target of less than 75 tonnes of total phosphorus load per year.

The proposed actions are a mix of voluntary and regulatory measures. The mix selected may possibly change over time if, for instance, either land uses change following further development approvals or if longer term monitoring reveals that water quality is not improving.

Water sensitive urban design (Source: City of Mandurah)

The extent of the problem

The Coastal Catchment Initiative projects pinpointed the sources of phosphorus in the catchment waterways. They found:

- The majority of phosphorus entering the waterways comes from agricultural activities, with farmland used for grazing being the dominant contributor.
- Urban areas currently account for only 6% of the catchment, but contribute more than 20% of phosphorus – and this figure is rising. For instance, full implementation of the Peel Region Scheme (with traditional practices) may lead to a 40% increase in phosphorus in some catchments, and an 800% increase in catchments with high urban use.
- Changes in land use and vegetation clearing have also resulted in increased flow, erosion and delivery of nutrients and sediments from the catchments and waterways.
- Unsewered urban areas have a big impact, contributing 17% of phosphorus in winter.
- Gardens, lawns and septics are primary sources of urban phosphorus discharges. Established lawns need very little phosphorus.

Your views

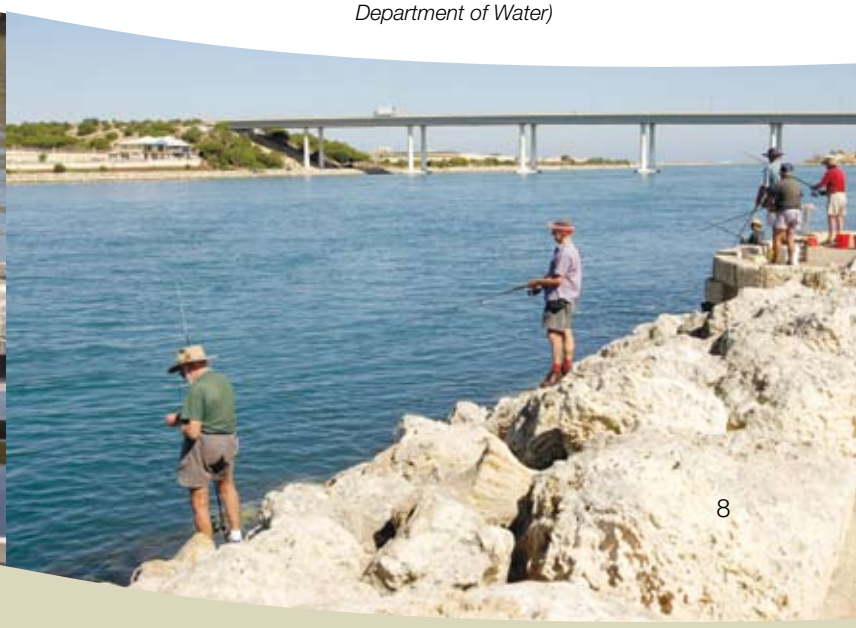
Based on feedback you've already given us, we have an understanding of what the estuary means to you, your family, your lifestyle, and your livelihood, as well as what you would like it to be like in 20 or 30 years time.

With the Plan, we now have a way forward – but we still would like your views on the proposed actions and their implementation. As you can see, everyone will have a part to play.

Implementing the actions may affect you, and might involve an initial cost and a future benefit, or changes in how you manage your property.

The Plan requires a long-term, 'big picture' approach to working out what the Peel-Harvey rivers and estuary should be like for future generations. It is challenging, but necessary if we are to achieve healthy waterways for the region you live and work in. We need to protect our waterways from nutrient pollution.

This will mean that these waters will be safe for swimming and boating, fishing and be open to the needs of other uses.



Left: Pelican basking in the sun (Source: Department of Water)
Right: People fishing in the Dawesville Channel (Source: Department of Water)

'We need to act swiftly. The amount of phosphorus currently discharged into the waterways far exceeds safe levels...

Reaching the target for the Peel-Harvey Waterways	
Where are we now in 2007?	145 tonnes per year of phosphorus entering into Peel-Harvey waterways
Where do we need to be in the future?	75 tonnes or less of phosphorus per year
What's required?	Reduce phosphorus by 70 tonnes or 48% of current levels
How do we achieve cleaner, healthier waterways?	By taking actions identified in the Water Quality Improvement Plan to reduce phosphorus discharges
What it means?	It may affect you … every household and business can contribute
How you can be involved?	Tell us what you think of the 12 proposed Water Quality Improvement Plan actions

... and this amount is expected to grow because of major rural, residential and industrial developments earmarked for the surrounding areas.'

A tale of three catchments

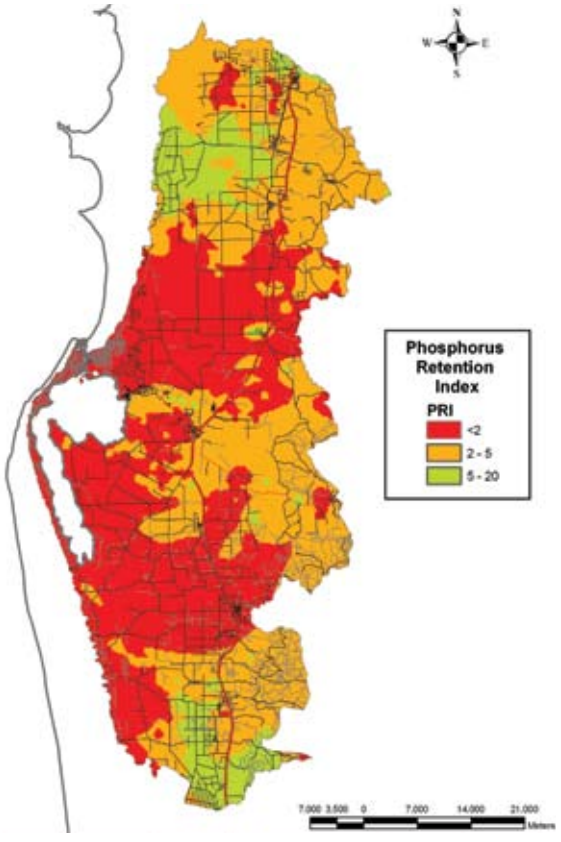
Water quality in the Peel Inlet-Harvey Estuarine System is determined by run-off from three rivers and their catchments: the Serpentine, the Murray and the Harvey – as well as 15 agricultural drains.

Nearly all of the run-off from these catchments – 95%– occurs between the winter months of May through to October, with winter rains leaching phosphorus from the sandy soils.

The Serpentine River currently contributes 69 tonnes of phosphorus annually; the Murray River 15 tonnes; and the Harvey River 61 tonnes.

The total phosphorus load of these three rivers is approximately 145 tonnes – nearly double the Environmental Protection Authority's target of 75 tonnes a year. To achieve the desired result, we have to reduce phosphorus load by 48%.

We have to work hard to achieve this reduction on the sandy soils of the western portion of the Serpentine and Harvey catchments.



Phosphorus Retention Index in the Peel-Harvey coastal catchment

This is a map of the Phosphorus Retention Index (PRI) which is one of the risk factors that influences the pathway of phosphorus loss from the landscape. Soils with a low PRI (shown in red) can leach phosphorus by movement with water through and across the soil; the soils with a high PRI (shown in green) lose phosphorus from across the surface. The lower the PRI the easier it is for phosphorus to move through these sandy soils. Below 5 is extreme risk. (Source: Department of Agriculture and Food).

Note: The information in this map was generated from numerous soil samples collected from 1982 to 2006. The colour shading is only a guide to soil Phosphorus Retention Index (PRI) since computer software was used to gererate and smooth the data. Individual samples will therefore vary from this generalised map. The Director General of the Department of Agriculture and Food and the State of Western Australia accept no liability whatsoever by reason of negligence of otherwise arising from the use or release of this information or any part of it.

'The most successful ways to reduce phosphorus load is fertiliser management and soil amendment.'

What happens next?

The final Water Quality Improvement Plan due for release in late 2007 will provide the framework for action based on what the community believes is desirable and the best mix of actions. The Plan will be considered by Government and implementation funding sought.

Progress will be monitored and reviewed, and adapted if necessary to help meet our targets.

It is possible, if funded, that monitoring will involve two aspects:

- An annual 'community scorecard' approach, which will look at the extent to which the actions have been implemented (looking at, say, how much low water soluble fertiliser or soil additives are being used on rural and urban properties; how many septic tanks have been converted; and how many existing homes have connected to sewerage); and
- The health of waterways in the catchment and estuary, which would involve regularly measuring total phosphorus, the phytoplankton abundance or levels of chlorophyll-a, oxygen, algal growths, fish deaths and the clarity of water.

In addition to annual monitoring and review, there is proposed to be a formal review of the Water Quality Improvement Plan after 10 years.

The Peel Inlet-Harvey Estuarine System will also be the focus of a future catchment management plan, as this is a requirement in the 1989 environmental conditions for the Peel Inlet-Harvey Estuary Management Strategy. The Plan will recommend conditions set pursuant to improved working partnerships between government and community to coordinate and implement these plans.

Lower section of the Serpentine River (Source: Peel Harvey Catchment Council)

Peel-Harvey Sunset
(Source: Peel Harvey Catchment Council)