Management of the Peel- Harvey Estuary and urban Development Planning.

Urban sprawl from Perth is now being allowed by commercially driven Planning approvals to spread south with no obvious restriction. Unless Government Planning authorities reconsider the negative environmental consequences that will surely follow, urban development; predominantly low density housing, will shortly spread around the Peel-Harvey Estuary that is a massive body of deceptively shallow water that is already at serious risk of decline.

The Dawesville Cut intervention in 1994 was initially conceived as a response to blocking of large areas in the southern part of the estuary by algal growth. This was due to the trapping of water entering the estuary polluted principally by chemical fertilisers from a vast area of surrounding land developed for agriculture over the two centuries since 'Settlement. The downstream 'eutrophication' (the undesirable effect of algal growth and nutrients) in this polluted water en route to the ocean was exacerbated, especially at the Harvey end of the Peel-Harvey Estuary, which is overall an extremely large but shallow and slow-moving waterway formed by natural processes. The 'Dawesville Cut' linking the Harvey end of the Estuary to the ocean deliberately introduced seawater at a new point. That resulted in **some increase in circulation** and promoted the exit and dilution of **some of** the nutrients forming algal mass through creating a more saline regime.

It was recognised in 1994 that further and unpredictable changes would result from this intervention. However, no serious attempt was made to forecast the extent and timescale of saline alteration to the overall ecology of the Estuary resulting from this man-made intervention - and no means to monitor or manage this was established then (or since).

Most obviously, as can be witnessed today from the marked reduction in shoreline vegetation, the previous predominantly freshwater in the upper parts of the Estuary is now being progressively replaced by brackish water and salinity is continuing to increase, especially closer to the two outlets to the ocean.

The effects of the Dawesville Cut were initially beneficial in respect of reducing the noxious effects of eutrophication, but **serious public health issues** are now arising directly from this and a variety of **further human interventions.** -Notably –

1. The substantially increased frequency of inundation by higher saline tides and consequent saltmarsh flooding and growth, resulting **in enhanced breeding conditions for millions of saltmarsh mosquitos.**

2. A major **increase in human exposure** though immediately surrounding urban development.

3. Very limited constraints on substantially increased recreational use of the Estuary for both pleasure-boating and fishing, some of that in craft of inappropriate draft damaging the underlying water-bed.

In principle, every river and estuary issuing from a major land mass into oceans is directly affected by both the natural land-form, regional climate and by human interventions on the land itself. In the case of this Estuary that drains a vast land-plane west of the Darling Scarp, the cultivation of that land for agriculture and the associated continued application of chemical fertilisers was initially the principal cause of pollution of run-off and troublesome algal growth.

However, whilst continued efforts have been made in recent time to reduce the use of such fertilisers, other factors are now evolving that are further complicating the so far minimal efforts to professionally plan for and actually Manage the Estuary itself. These include-

a) A general reduction of rainfall in the South West of WA and damming of outflows from the Darling Escarpment to retain water for human uses, both leading to a **reduction in freshwater flowing into the** streams and rivers that naturally irrigated the vast land-plane to the West and then into the Estuary.

b) The pollution of those water courses and groundwater by increasingly **intensive urbanisation**, together with associated industrial units and introduction of new mass transportation routes.

c) A gradual, already **observed, but modest increase in ocean sea levels** that is proving extremely difficult to exactly quantify.

These factors together, call for far more positive Management of this important Estuarine Region than has been put in place by both State and Federal Governments so far. Such management is quite beyond the capability and resources of any of the numerous Local Authorities within the region - that inevitably must have more parochial responsibilities and preoccupations.

Furthermore that Management is evidently not within the competence of the Land-Use Planning machinery that currently exists at State level, since that is forecasting and already approving massively increased urbanisation spreading southward from metropolitan Perth, but **without any comprehensive Land use analysis or Management Plan in place to control the complex effects of it.**

This complex of issues will most certainly not be adequately managed by more Committees, there dozens of them existing in the Region already (most suffering from 'consultation fatigue,' but few actual resources). It requires, immediately, a professionally staffed, appropriately skilled multidisciplinary team accompanied by **resources for localised applied research and innovation** in this unique Peel Region, to resolve the present problems - that are **essentially man-made** - and now very evident.

A 'whole of Government' commitment is clearly required and this matter is progressively becoming more urgent with the extent of **urbanisation of this Estuarine Peel Region** being deliberately sponsored by the Planning arms of Government.

As a **Postscript** to the above, the author recommends immediate serious investigation by way of a **professional Feasibility Study**, of introducing tidal surge control gateways (Barrages) under automatic control, continuously linked to meteorologic data, at the two links of estuarine water flow to and from the ocean, namely at the Dawesville Cut and the Mandurah town-site 'Inlet.'

The primary purposes of these (would not be to convert the Estuary into a freshwater lake, but) to **prevent the penetration of higher tides that are increasing in frequency**. – Those higher tides in turn inundate and increase the area of saltmarsh **mosquito breeding sites** within the Peel Harvey Estuary, as well as serving to increase the **general level of salinity that is markedly reducing the biodiversity of the**

Estuary, now clearly visible at the shoreline. That shoreline with its distinctive ecology has been for many centuries a unique feature of this Region and a major tourism attraction, with future growth potential.

For obvious financial reasons, ***the results of this Feasibility Study*** *should be considered before any Civil Engineering work is commissioned to alter or* ***replace the Old Mandurah Bridge*** *over the Mandurah town-site Inlet,* ***or*** *Channel-deepening* ***excavation in the Dawesville Cut.***

Peter H Forrest. January 2013.

Ref: A Press report relating to the above – (Healthy Estuaries 2112 Forum. November 2012).

Barrage gates proposed for Estuary at Mandurah. Barrage construction at the ocean entries to the Peel-Harvey Estuary, plus several other related initiatives were proposed by retired resident Peter Forrest last week to Commonwealth and State Ministers for Environment, that will drastically reduce mosquito breeding in the Peel waterways as well as protect against rising salinity and sea levels.

Mr. Forrest has been, from his own voluntary initiative, working full-time for 2 years on researching complex future problems confronting the Peel Harvey Estuary. He has recently highlighted to Government Departments and Ministers many current threats, the greatest of which he says is currently increased salinity resulting from both the opening of the Dawesville Channel in 1994 and deep dredging at the mouth of the Inlet at Mandurah.

Greater exposure of the largely land-locked Estuary to ocean tidal activity arising from these man-made initiatives, implemented over a lengthy period, for what were earlier thought to be sound reasons, has resulted in major unpredicted changes that are increasing both human health risks and making negative changes to the local ecology.

The increased breeding of troublesome saltmarsh mosquitoes, at peak times of summer outdoor activity by residents and visitors, can be traced back to greater salinity, reduced rainfall into the catchment and increased tidal fluctuations arising from further opening up of the Estuary to saline sea-water entry. The general ecology is also being drastically changed by these factors and is also threatening wild-life, notably the internationally renowned concentration of numerous rare wild-bird species.

He proposed to both Federal and State Ministers for Environment several new major initiatives to respond to these threats, as well as from the gradually rising external sea levels.

These involve the construction of electronically controlled automatic-water control ‘Barrages’ across the ocean entries at Dawesville and Mandurah, continuously linked to ocean hydrological and meteorological data about ocean fluctuations and seaward flows into the Estuary from inland. The type of barrage proposed would open fully to allow passage of boats; is adjustable to open and close flexibly according to tidal and flood cycles; and operations can be continuously linked to information messaging accessible to water users by mobile phone many hours in advance.

The concept includes a range other initiatives including much wider setbacks for building around the Estuary and the input rivers, to provide more space for natural filtration purposes for land-sourced water pollution; a substantial on-going research programme to record detailed ecological information not currently available; and a new professional management team responsible specifically for controlling development in and around the Estuary.

Part of the funding for these initiatives is suggested to be from a Levy on development on all surrounding land draining into the Estuary.

Mr Forrest posted a summary of identified threats at a technical 'Healthy Estuaries 2112 Forum' organised by Murdoch University in Mandurah. He also discussed his proposed initiatives personally with the keynote speaker at the Forum, Prof. Mike Elliott, a prominent European expert on scientific Estuarine and Coastal matters, Prof. Elliott pointed to projects e.g. in Holland where such barrages have coped successfully with comparable problems.

Peter Forrest has written several detailed Papers on this and closely related issues and will readily share his work. Anyone interested can write to him at email: (community23@bigpond.com)

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