COMMENTS ON THE

AGRICULTURAL COMPETITIVENESS GREEN PAPER

Introduction

This submission is to encourage and bring forward to a higher priority the further financial planning and scientific research to develop and implement the WELLINGTON DAM REVIVAL PROJECT. The status of the Wellington Dam Revival Project is identified in the Green Paper as warranting FUTURE CONSIDERATION OF POSSIBLE CAPITAL INVESTMENT.

This submission argues that the basic strategy to provide low cost fresh water for agriculture from Wellington Dam is to follow the option of using the revenue from drinking water to offset the capital costs of restoring Wellington Dam to drinking water quality. Not all of the resource would be required to be allocated (probably less than half). Restoring the water in Wellington Dam to fresh water quality would significantly reduce the scouring and flushing and tail water losses on irrigated pastures.

This basic strategy is set out and costed in the *Water Source Options in the Collie-Wellington Basin, Final report to the Minister for Water Resources,* (colloquially known as the Kelly Report) prepared by the *Collie-Wellington Basin Water Source Options Steering Committee May 2007*, and the subsequent *Collie River Salinity Recovery Project (CRSRP)* sponsored by the Western Australian Department of Water and undertaken by the Water Corporation. The CRSRP was jointly funded by the Federal and Western Australian Governments. The project was terminated in 2011. Investigation and developments under the auspices of the CRSRP strengthened the case for feasibility of the recommendations set out in the *Kelly Report*. (For convenience the colloquial name will be used throughout this submission.)

Restoring Wellington Dam water supply to fresh water is to be seen as a flagship project in the greater context of the recovery from salinization of Western Australia's water resources. Salinization of streams in the south west of Western Australia has arisen from effects of land clearing. It is the greatest environmental problem and risk to the water resources of Western Australia.[1]

The principal recommendations of the Kelly Report support the restoration of the Wellington reservoir to fresh water standards. This first stage would also generate 12 GL per year of high quality water drinking water and its associated revenue stream. The report suggests a further stage, allocating and developing a portion of the storage for drinking water purposes for the Integrated Water Supply Scheme (IWSS). The cost for the water produced would be less than or commensurate with seawater desalination. Because the cost of drinking water would be commensurate the cost of restoring the source to fresh water standards may be fairly met by the urban and rural drinking water community.

[1] Water and Rivers Fact Sheet June 2000.

At the time of writing the Kelly Report the large scale environmental damage to the Collie Basin groundwater source due to mine dewatering was not apparent. Those aspects of the report that suggest the use of groundwater will need to be amended. All other aspects of the report remain valid. Provision was made in the planning of the CRSRP to treat the saline ground water bores.

Stream Salinity in the South West Western Australia

It was recognised from the period of early European settlement that there were many brackish streams and salt lakes in the south west of Western Australia, particularly in the lower rainfall areas. However with ring barking of trees, forest clearing and establishment of agriculture there was a discernible trend of increasing salinity in the streams and problematic salinization of railway reservoirs used for supplying steam locomotives.

The conceptual model for this phenomenon is that high levels of salt are concentrated in the soil and the ground water from oceanic salt continuously brought inland on the prevailing south west winds. This salt is deposited via rain or as dry fallout. The problem of salinization became more acute with the rising demand for water from a rising population and, at the same time the increased clearing of land for agriculture.

The mobilisation of salt is a result of clearing native vegetation that changes the water balance. With clearing, native vegetation is no longer available to intercept much of the rain and take up much of soil water through transpiration. The result is a rise of groundwater levels until it intersects the ground surface or streambeds. With this intersection the salt load discharges into the stream, increasing its salinity. The salt balance is measured as a balance between the ratio of salt output to input. With clearing this ratio exceeded one. That is, more salt is being lost into the stream system than is being accumulated by rainfall or dry fallout. However, the time required for the balance to be re-established is estimated as centuries in the high rainfall areas and millenniums in those of lower rainfall.[2]

In 1996 five catchments were given priority for the management of salinity as they were considered to be potential future water sources for the south west region. The target was to achieve a fresh water standard (500 mg/L) by 2015. If they were not actively managed it was considered they would deteriorate beyond recovery. The five catchments were the Collie, Denmark, Kent, Warren and Helena illustrated in the Water and Rivers Commission June 2000 Fact Sheet shown in Figure 1.

[2] Mayer,X, et.al. Stream salinity status and trends in south-west Western Australia. Department of Environment, Salinity and land use impact series. Report No SLUI 38, January 2005

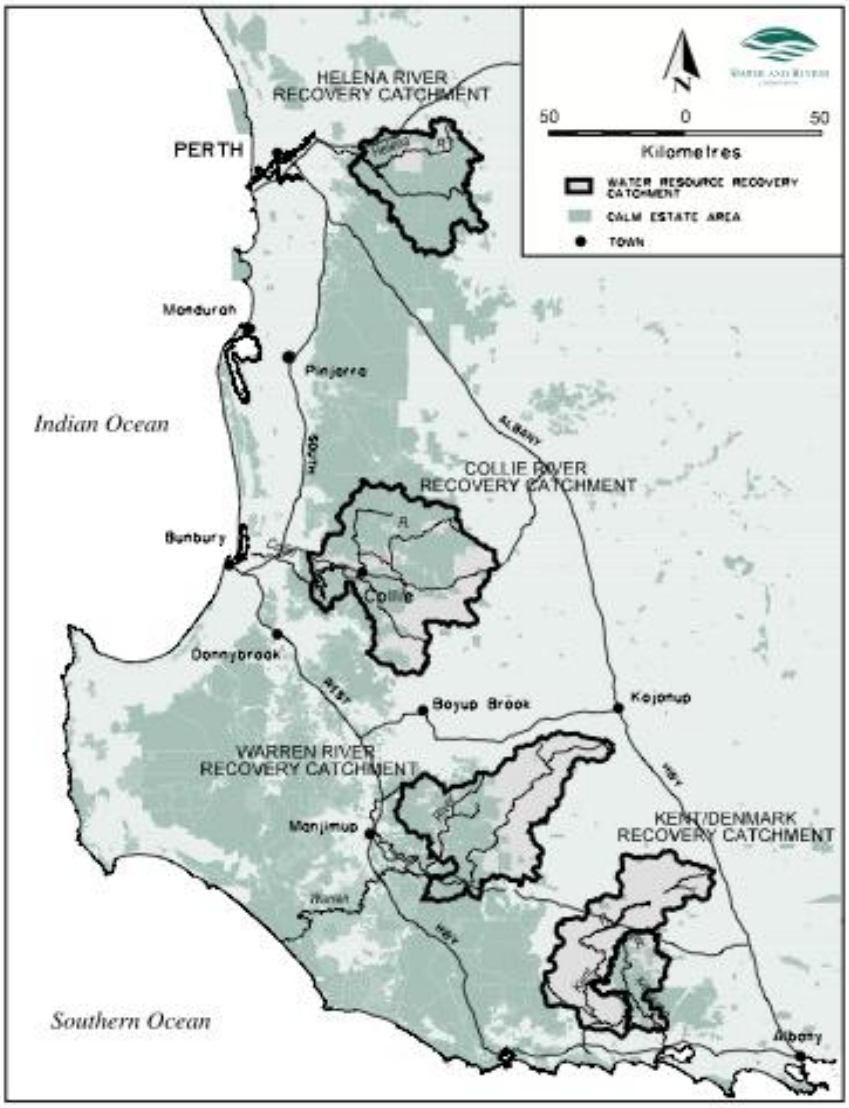

Figure X Salinity Recovery Catchments in the south west of Western Australia.

The Collie River Recovery Catchment was of the greatest economic significance of the catchments listed. It was dammed by Wellington Dam to form the largest surface storage in the south west of the state. Its water storage deteriorated from fresh to brackish and was abandoned for drinking water use in 1990. It was also the most prospective as by 2001 the surface water stream flow salinity situation was well understood. The east branch of the Collie River contributes just ten percent of the flow into Wellington but contributes 40% of the salt loading. There are opportunities for the technically simple capture and diversion of East Collie River flow and also mining voids in the Collie Basin that are suitable for temporary or permanent storage of captured stream flow.

The Wellington Dam and its Catchment

Wellington Dam was constructed in 1933 to support and further agricultural development on the coastal plain west of the Darling Escarpment. The dam was subsequently enlarged in 1944 and again in 1960. In 1956 a pipeline was constructed from the Dam to Narrrogin to begin the supply of drinking water into the great southern towns. This became the genesis of the Great Southern Town Water Supply Scheme (GSTWSS) and the dam's use was extended to supply drinking water in

addition to water from agriculture.[3] Wellington Dam is the second largest dam in Western Australia and has a reservoir capacity is 186 GL. It has a current allocation limit of 85 gigalitres (GL) per year. The dam originally captured the fresh waters of the east and south branches of the Collie River, the Bingham River and the Harris River. With increasing salinization of the Wellington Reservoir the Harris Dam was constructed on the Harris River and in 1990 commissioned as the source of potable water (allocation limit of 15 GL per year) for the Great Southern Town Water Supply Scheme (GSTWSS). This left the Wellington Reservoir as a "fit for purpose" source for agriculture and industrial uses. The increasing salinity (currently 1,000 mg/litre) of the water in the reservoir severely limits its fitness of this source for these purposes. Industry generally needs water of less than 200 mg/L and agriculture would prefer water of less than 700 mg/L. Due to the risks of secondary salinization on the sandy coastal plain it would be strongly preferable that the salinity be below 500 mg/L.

When the Wellington Dam was constructed in 1933 the salinity in the Collie River was approximately 280 mg/L total dissolved solids (TDS). As a result of deforestation on the catchment the salinity progressively increased until in November 2001 the salinity of waters flowing into Wellington Reservoir averaged just under 900 mg/L. A program to minimise the further releases of crown land, controls on the clearing of native forests on the catchment, and encouragement for re-forestation programs were put in place. These strategies followed a series of studies that were undertaken by the then Waters and Rivers Commission to understand the management options available to control and reduce the salinity back to 500 mg/litre by 2015.[4]

The major source of salt loading into Wellington Reservoir comes from the East Collie River. As with other streams feeding Wellington Reservoir, clearing caused the saline water table to rise to feed salt into the east branch of the Collie River. Each year the river contributes 15 to 20 GL water together with approximately 60,000 to 110,000 tonnes of salt into Wellington Reservoir. (Water Corporation project computations from years 2002, 5 and 7) The Kelly Report summarised the situation by stating that although the East Collie River contributes a little over 10% of the total flow into Wellington Reservoir it delivers almost 40% of the total salt loading. It is also thought that the East Collie River may be contaminating areas of groundwater where the East Collie River transects the Premier Coal Basin for a length of over one kilometre. This is due to the East Collie River recharging the lowered water table resulting from mine dewatering. Other sources of salinization may be implicated. Prior to this mine dewatering program the fresh groundwater of the Premier Basin supplemented the East Collie River and hence the Wellington Reservoir.

The Kelly Report

In 2006 the Minister for Water Resources announced an investigation into the proposed future uses of water from the Collie Coal Basin and Wellington Dam. A five member steering committee formed under the chairmanship of Mr Ross Kelly was known as the Collie-Wellington Basin Water Source Options Steering Committee. The Director General of the Department of Water and an Executive Director of the Department of Treasury and Finance were the senior government officers on the committee. The committee consulted widely. It received submissions from a diverse range of major

[3] Register of Heritage Places – Assessment Documentation Wellington Dam Precinct, 3 February 2009, Heritage Council of Western Australia.

[4] Mauger, G.W., et.al., Salinity situation statement Collie River, Water and Rivers Commission, Report No WRT29, October 2001.

stakeholders and other centres of expertise. The committee reported its findings to the Minister for Water Resources as the *Water Source options in the Collie-Wellington Basin Final Report to the Minister for Water Resources, May 2007*, colloquially known as the *Kelly Report*.

The report considered the restoration of the water in Wellington reservoir to fresh water quality by diverting the east branch of the Collie River via a new pipeline to an ocean outfall. An alternative preferred option was to divert and concentrate the river water to sea water salinity and divert this concentrated brine via the existing Verve Energy Saline Water Disposal Pipeline and ocean outfall (SWDP). This pipeline is an existing underutilised state government asset. By capturing and concentrating 14 GL of the East Collie River flow 12 GL of fresh or drinking water would be available for either the GSTWSS or the Integrated Water Supply Scheme (IWSS). The IWSS supplies the greater Perth region and the Goldfields and Agricultural Water Supply (GAWS). This capturing and concentration option then became the first stage of the Collie River Salinity Recovery Project (CRSRP).

The report then addressed the further treatment of a proportion of the fresh Wellington water to potable water standards. Table 1 summarises the financial implications of two options of capture/concentration and brine discharge via the SWDP from the Kelly Report and compares them with alternative IWSS potable water options. The first option assigns 45GL for treatment to drinking water quality, and the second option is for just 25GL for supply to the IWSS .

Option	Capacity	Capex	Capex efficiency	Opex	Estimated Water cost
	GL/year	$ million	$m/GL/yr	$m/year	$/kL
SW Yarragadee source	45	375	8.3	19.7	0.92
SWY-IWSS pipeline	45	734	16.3	18.4	1.35
Total SWY	45	1109	24.6	38.1	2.27
Kelly Report Wellington Option 2	57 12 (Stage 1) 45 (Stage 2)	849 total 224 625	14.9 18.7 13.8	Opex costs included in annual costs	1.60 total 2.40 1.40
Kelly Report Wellington Option 4	37 12 (Stage 1) 25 (Stage 2)	719 total 224 495	19.4 18.7 19.8	and included into water cost totals.	2.00 total 2.40 1.80
Kelly Report Options 5-9	Groundwater options as set out in the report need to address salinization of groundwater				
SSWDP Stage3	50	1215	24.3	83	3.07

Table 1: Comparative costing for the development of drinking water proposals for supply into the the IWSS

Further development work undertaken in the CRSRP confirmed the feasibility of the brine concentration option for restoring Wellington reservoir to fresh water standard.

The Kelly report, although in project management terms considered as a pre-feasibility report, may be considered as definitive with respect to managing the salinity in Wellington due to salt loadings arising from stream flows. The report is not considered as definitive with respect to its groundwater recommendations. Salinization of the Premier sub-basin and saline mine dewatering discharges were not identified.

The strategy for managing stream flow salinity suggested in the report follows the generally preferred method of tackling the contamination as close as possible to its source. In this case it means that only 14GL needs to be treated each year to achieve the result of achieving fresh water standards in Wellington reservoir. The CRSRP revealed that the temporary storage of water in the mining voids required to balance the treatment plant with the variable provided a naturally occurring primary treatment sulphur acidification. This acidification holds bivalent and trivalent contaminant ions in solution and reduces both the fouling index and bacteriological contamination.

The Kelly report suggested the potential to use the ground water in the Collie Basin. Groundwater in the basin had in the past had been fresh and been used for power station cooling water. In recent times desalination plants for power stations have been constructed as groundwater salinities have increased. At the time of writing the Kelly Report the hydrogeological data was limited. The series of options relating to using 22 GL/year of groundwater and the management of saline dewatering discharges were considered under the CRSRP. Provision was made for these quantities in securing a treatment plant site, but not specifically addressed during the CRSRP.

Regulatory Failure in the management of the Collie Basin groundwater area and saline discharges

Mine dewatering is now thought to be a second major source of salinity into Wellington Dam. The salinization of the groundwater in the Collie Basin was not addressed in the Kelly Report.

The borefield planning to dewater the Premier sub-basin did not predict the marked increase in salinity that corresponded to the drawdown in the water table with pumping. Varma[5] reported in 2007 that the groundwater in the basin was generally fresh (less the 500 mg/L TDS) but identified increases above fresh water quality in areas in the southern part of the Cardiff sub-basin where the south branch of the Collie river is above the groundwater level. This was considered as groundwater recharge from the river. The salinity implications of groundwater recharge from the east branch of the Collie River following drawdown of the water table in the Premier sub-basin were not anticipated as the hydraulic conductivity in the basin is low.

Accurate details of the salinization and dewatering practices are not definitely known. It is estimated that dewatering bores in the Premier sub-basin of the Collie Basin have a dewatering capacity of at least 60 MLD (22GL per annum). This requires multiple bores fully screened to a depth of 300 metres. It is believed that the bore salinities range from 400 to 3,000 mg/L with an average of a little in excess of 1000 mg/L. The salinity contours are not well defined.

The dewatering water is discharged after treatment to correct pH into the east branch of the Collie River and thus into Wellington reservoir.

[5] Varma, S. Hydrogeology of the Collie basin, Western Australia. Doctorate Dissertation, Curtin university of Technology. Department of Applied Geology. 2007

The regulatory framework for managing the salinization of the ground water and the quantity of salt discharged into the east branch of the Collie River is not clear. There appears to be no meaningful research into the cause of the salinization of the groundwater in the Collie Basin. Without an understanding regulation to control its occurrence cannot occur.

The control of the discharge quality (but not the quantity) of Premier Coal's dewatering discharges is set out under the licence conditions set out under the Environmental Protection Act 1986 – Licence L5094/1987/15 and administered the Department of Environment and Conservation (DEC). Clause W6(b) of the licence provides a water quality exemption to permit contaminant levels in the discharge waters to be equal to or below the (upstream) receiving water quality. As the upstream water salinity may vary between 1,000mg/L and 16,000mg/L and averages in the range of 3,000mg/L to 4,000mg/L there appears to be no control of the salt loading going into Wellington reservoir from mine dewatering. The quantity of ground water discharged is administered under the Department of Water (DoW) under the Rights in Water and Irrigation Act. It is understood that the DoW exert some influence to restrict the level of salt in the mine dewatering discharges to 1,000 mg/L. The total tonnage of salt being discharged into Wellington reservoir from mine dewatering is not known although clause 3(a) and 3(b) require quantities to be measured and records kept and reported upon to the DEC.

Question on Notice No 181 asked in the Legislative Assembly on 7 May 2013 by Mr M.P. Murray MLA, the Member for Collie-Preston, requested to know the tonnage of salt discharged by Premier Coal into east branch of the Collie River. The departmental response was that the tonnage was not required to be monitored or calculated. Thus although the contaminant levels and quantities are required to be continuously measured no simple computation to multiply the contaminant concentration by the flow rates to give tonnage appears to be in place. Without this knowledge of the total contaminant load it appears impossible to assess the effect of mine dewatering on the water quality of Wellington reservoir.

The Collie River Salinity Recovery Project

The CRSRP was funded by a joint contribution of $15 million from Commonwealth and a matching amount from the Western Australian Government. The State funding was to be sourced through the Water Corporation as a consideration for being relieved of the obligation to annually release five gigalitres of water from Harris dam into Wellington reservoir. The total of $30 million was considered a seed amount to develop the concept and prove out the recommendations of the Kelly report. The total for the first stage realisation of the Kelly report (i.e. to restore Wellington to fresh water standard by capture, concentration and diversion of 14 GL of the east branch of the Collie River) was estimated to cost $240 million. The initial project aim was to divert just six gigalitres of Collie River east branch water into a mining void and thence concentrate the salt content and dispose of the brine via the SWDP.

The CRSRP project may be considered as a series of developmental stages. Each of which was designed to provide information for technical confidence to move to the next stage. The asset creation activity for the construction of the first stage of the water treatment plant (6.5GL/annum) progressed in parallel with this program of work. The project activities were:

- Conduct a series of limited trial diversions over a three year period. The winter flow of the east Collie River was diverted into mining void Chicken Creek four (CC4). The total amount of water diverted into CC4 at the end of the three year period was 4.5GL.
- Determine the water treatment process and the relative sizing of the weir, pump stations, balancing storages, water treatment plant capacity and performance objectives, and pipeline sizes.
- Select and secure a water treatment plant site suitable for the treating the 14.5 GL of river diversion and 22 GL per annum groundwater as the ultimate objectives set out in the Kelly report.
- Construct the first stage (6.5GL/annum) of the brine concentration plant and treat the water stored in CC4. CC4 void needed to be empty to meet Premier Coal's mine plans.

The results of this program were as follows:

- The water treatment process for brine concentration was settled upon. This was a two stage membrane process using the natural acidification of the water in the mining void as a preliminary process. Acidification kept the iron and manganese ions in solution and virtually eliminated all bacteria. Acidification reduced the fouling index of the raw river water. A low fouling index is essential if membrane processes are to be economical, reliable and have a high yield. The first stage was microfiltration followed by reverse osmosis. It was anticipated that the yield from this process would be approximately 85%. This generally corresponded to the environmental limits for brine concentration set for the SWDP ocean outfall discharge licence. Higher yields that would meet the outfall criteria may be possible should the brine discharge be further treated as the river salinity is high in magnesium and calcium ions. This double membrane process also had the advantage of possibly meeting the Water Corporation's drinking water standards for treatment from an alienated catchment. If this proved acceptable it would reduce the need for pipeline and pumping to South Dandalup Dam.
- An agreement in principal for the purchase of the optimal treatment plant site in Coalfields Road and Cabbage Tree Hill Road was secured from the owners, Premier Coal.
- Preliminaries to Works in accordance with the powers under the *Water Agencies (Powers) Act* were completed.
- The Principal's Preliminary Design in accordance with *AS 4902-2000 General conditions of contract for design and construct* was completed together with the Principal's specification requirements.
- Consultants were briefed and tenders called to short list a panel of design and construct tenderers. (The project was halted at his point).

The reasons for halting the project were:

- The urgency to treat the water in CC4 was no longer present as the diverted water in the void had dissipated into the surrounding groundwater,
- Agreement in principal for the conditions for access to the SWDP was not achieved.
- It was clear the capital budget would not be adequate to meet the limited objective of constructing a treatment plant of 6.5GL capacity for the project,
- No operating budget nor powers to operate were included in the project structure,

- The project was in competition with other governmental and stakeholder priorities for access to the SWDP,
- Changes in ownership of the coal mines and departmental changes in staffing and priorities occurred.

Compliance with the Principles for Commonwealth Involvement in water infrastructure projects

Projects need to be nationally significant

At a regional and state level there is a diverse range of economic activities dependent upon fresh water resources in the Collie-Wellington Basin. The Collie Irrigation District comes immediately to mind. Without a source of fresh water the district remains under-developed and there is little merit in capital expenditures to minimise current large losses in the existing irrigation system. While there has been a focus on the Collie Irrigation District the need to support the agriculture to the east of escarpment is also of significance. There are no water resources east of the Collie Basin. The GSTWSS, supplied from the Collie Basin, supports the Great Southern agricultural region and towns as far east as Lake Grace. These are major wool and grain areas of the state. With the growing markets in South East and East Asia there is a need for secure supplies of fresh water for current and proposed economic activities in these regions. Bauxite mining and alumina production are of national significance and are constrained by fresh water availability and need, from time to time, to draw upon the limited resources of Harris Dam. The power generators in the Collie area are the major suppliers of electricity to the state. They have significant demands for cooling water of low salinity. There has been interest in developing value added industries to the coal of the Collie Basin. The proposed urea plant was to be a major exporter. A large allocation was provisionally set aside for this proposal. The high salinities in Wellington suggested the need to additional treatment and its associated expense to this project.

The CRSRP also had national significance from a technical point of view. The project could be seen as a flagship project for the development of other brackish and saline water resources. Some of the techniques that were being developed to recover the water resource of brackish and saline catchments are of more universal application, some are specific to the Collie area. Specific geographic features include the availability of existing Wellington Dam and use of the coal mine voids for buffer storage and natural acidification. The CRSRP also highlights and extends the potential use of mine voids as potential raw water storages. The volume of mine voids in the Collie coalfield is already in excess of 60GL. Future mine development indicates that these voids will in time be greater in capacity than Wellington Dam. Australia, and Western Australia in particular, is limited in suitable dam sites (assuming environmental approval would be given) but has a great number of deep these often located in arid areas.

There must be strong State or Territory support with capital contribution and involvement of the private sector and where appropriate local government

In this respect the State appears to have been unable to find a focus to support the development of the Wellington Reservoir as a fresh water source. This still appears to be the case. Of greater concern is the apparent failure of the State to regulate neither the salinization of the Collie groundwater basin nor the discharge of brackish to potentially moderately saline mine dewatering water into the east branch of the Collie River. During the implementation of the CRSRP it was

apparent that the water resource and its development were in competition with the policies and priorities of a diverse number of stakeholder groups, State utilities, and Government departments.

Projects should address a market failure which cannot be addressed by proponents, State or Territory governments or other stakeholders and limits a project of national significance from being delivered

The treatment of lower quality brackish and moderately saline water resources will incur additional costs that many agricultural industries cannot carry alone. The cost structure for restoring the salinity in Wellington to fresh water quality precludes its use for agriculture alone. The Kelly report recognised that, where possible, high value added uses of water such as for industry and drinking water supply may provide support for the lower value added of water used for agriculture. (Kelly Report Recommendations 1 and 4.)

Projects should align with the Government's broader infrastructure agenda to promote economic growth and productivity, or provide a demonstrable public benefit and address a community need.

The proposals of the Kelly report do not appear to currently align with the Government's broader infrastructure agenda, nor does it fit within the Water Corporations planning agenda as the Department of Water has made no allocation to the Water Corporation from Wellington Dam.

The restoration of the water in Wellington to fresh water quality does not appear to be included in the policy position of the Minister for Water Resources. There also appears to be no support for the recommendation of the Kelly Report (Stage 2 of Options 2 and 4) for allocating a portion of the resource for drinking water to pay for the restoration of the source to fresh water standards. A recent article in *The West Australian* (1 October 2014) quotes the Minister as wanting to revert to examining water treatment options downstream of the dam. Similarly, the Water Corporation has not included Wellington Dam as a future water source option.[6]

The current growth in the drinking water demand for the Perth IWSS is currently met by the sea water desalination plants and the proposed aquifer recharge initiative. However, the implementation of the Kelly Report Options 2 or 4, Stage 2 would not be available for implementation until Stage 1 of these options had been in place for a number of years and the water in Wellington reservoir had reverted to fresh water.

Implementation of Stage 1 would restore Wellington to fresh water standards and generate a revenue stream at a comparable cost to other IWSS sources or supplement the Harris Dam source that is currently under stress. On completion of Stage 2 an additional revenue stream could be generated from the allocation from Wellington.

Projects should align with the National Water Initiative principles including appropriate cost recovery and, where full cost recovery is not deemed feasible, any subsidies are fully transparent to the community

The above proposal fully complies with the National Water Initiative (NWI).It is assumed that full cost recovery is not possible but with an allocation for drinking water a significant contribution could be made. It is not clear whether the coal miners have sufficient capital to treat their brackish

[6] Water Forever Southwest Draft Report. Water Corporation 2014.

discharges. Additional capital support may be needed for them to meet fresh water standards for their mine dewatering discharges.

If providing capital, consistent, robust analysis of costs and benefits is used and assessment is undertaken by Infrastructure Australia or similar experts.

The Kelly Report recommends the robust capital and operating analysis. This implies the need for a transparent balance between the optimum economic use of the resource and the needs of those industries and agriculture that are less able carry the cost of water associated with restoring the resource to fresh water quality. The costs or environmental degradation of the both the groundwater and the east branch of the Collie River need to be also included in the analysis. Many of the risks associated with the implementation of the Kelly Report have been addressed in the CRSRP and may now be included in any analysis.

Conclusion

The economic value of the water in Wellington Dam, the largest dam in the south west of Western Australia, is of little value as the water quality has deteriorated from fresh to marginal and is now brackish. The cause of this deterioration is due to land clearing on the catchment and latterly, believed to be, due to mine dewatering discharges into the east branch of the Collie River. The cost of restoring the dam to fresh water quality cannot be met by the agricultural community users alone as the productive value of water used in agriculture is far too low. The Kelly Report developed a series of options and recommendations to restore the dam to fresh water by reverting to the multiple use of the resource. By allocating a proportion of the resource for drinking water the majority of the restored fresh water resource can again be productively used for agriculture.

The Kelly Report recommends the diversion and treatment of the major source of salinity, the east branch of the Collie River. This strategy requires the treatment of only 14 GL/year of moderately saline water to restore Wellington Dam's full allocation (86GL/year) to fresh water quality. High recovery rates are anticipated from the water treatment process so that 12 GL/year of high quality drinking water is available for the IWSS or to supplement the single resource used for the GSTWSS. This first stage of the proposal would provide drinking water into the IWSS at a cost would be less than or comparable with sea water desalination and restore Wellington Dam to fresh water quality.

On re-establishing fresh water quality it is recommended that a proportion of the resource be allocated for further treatment to drinking water standards. This would provide drinking water into the IWSS at a lower cost than other options and would maintain equity for urban and rural drinking water users.

This submission was prepared by Mr Fred Shier. Formerly project engineer on the Collie River Salinity Recovery Project and onetime Principal Engineer Water Treatment, Water Corporation.