

## Draft NSW Water Strategy submission form

The NSW Water Strategy will be the first 20-year water strategy for all of NSW. It will provide a blueprint to help us tackle the key challenges and opportunities for water management across the state.

For more information about the strategy or to download a copy of the strategy, please visit [dpie.nsw.gov.au/nswwaterstrategy](https://dpie.nsw.gov.au/nswwaterstrategy).

### Your voice is important

We would like to hear your views on the draft strategy, including whether you think it identifies the right priorities, challenges, opportunities and actions.

Please provide your feedback in the submission form below and email your completed submission to [nsw.waterstrategy@dpie.nsw.gov.au](mailto:nsw.waterstrategy@dpie.nsw.gov.au) or post to NSW Water Strategy, Department of Planning, Industry and Environment, Locked Bag 5022, Parramatta NSW 2124 **by 28 March, 2021**.

The form will take approximately 15 minutes to complete and your response can remain anonymous if you wish (see question 1).

Questions marked with an asterisk (\*) require an answer.

If you have any questions about making a submission, please email:

[nsw.waterstrategy@dpie.nsw.gov.au](mailto:nsw.waterstrategy@dpie.nsw.gov.au)

### Making your submission public

We collect information about you, which may include personal information, to assess submissions in response to the department's dealings and activities, and to perform other functions required to complete the project. This information must be supplied. If you choose not to provide the requested information we may not be able to assess your submission.

To promote transparency and open government, we intend to make all submissions publicly available on our website, or in reports. Your name or your organisation's name may appear in these reports with your feedback attributed, unless you have chosen to remain anonymous.

**If you would like your submission and/or feedback to be kept confidential, please let us know when making your submission.** You will be asked for your confidentiality preference at question 1.

If you request that your submission be kept confidential, it will not be published on our website or included in any relevant reports. However, it will still be subject to the *Government Information Public Access Act 2009*.

Your submission will be stored securely consistent with the department's Records Management Policy and you have the right to request access to, and correction of, your personal information held by the department.

Further details can be found in our privacy statement available on our website.

[industry.nsw.gov.au/privacy](https://industry.nsw.gov.au/privacy)

## 1. Information on confidentiality and privacy\*

I give permission for my submission to be made publicly available on the NSW Department of Planning, Industry and Environment website.

- Yes  
 No

I would like my personal details to be kept confidential.

- Yes  
 No

## 2. Your details

Name\* Col Bruton

Contact phone number\* 02 4284 9929

Postcode\* 2519

Email address\* colbruton@hotmail.com

Do you identify as an Aboriginal person?

- Yes  
 No

Are you an individual or representing an organisation?\*

- Individual  
 Organisation

## 3. Organisation or business details

Who do you represent?

- Government Please specify  
 Peak representative organisation Please specify  
 Local Water Utility  
 Other (please specify) Private Study Scholar

## 4. Draft vision

The NSW Government has developed the draft NSW Water Strategy as part of a suite of long-term strategies to maintain the resilience of the state's water services and resources over the coming decades.

*The proposed vision for the draft NSW Water Strategy is sustainable water resources for thriving people, places and ecosystems, both now and for future generations.*

### Which aspects of water management are most important to you and your local community?

to care for the the man on the land who produces all our food products

To ensure water is distributed equally and fairly throughout all water comsumers with no favours for any minority groups

To ensure that Inland NSW receives an abundant water supply from Coastal areas

### Do you support the proposed vision for the draft NSW Water Strategy?

Yes

No

### Please tell us more about your response:

The draft Water Supply is too Political correct. Obviously compiled by people who have been instructed to do so. Water is too precious to be dominated by minority groups. Should have more input from people who make their living from the land , depending greatly upon Liquid fresh water.

## 5. Draft objectives

The draft NSW Water Strategy sets high level objectives and principles to guide water service delivery and resource management across NSW. We have identified six core objectives which underpin the draft strategy. These are based on the *Water Management Act 2000*. They are:

- protecting public health and safety
- liveable and vibrant towns and cities
- water sources, floodplains and ecosystems protected
- cultural values respected and protected
- orderly, fair and equitable sharing of water
- contribute to a strong economy.

### Which objectives are most important to you?

Please rank the objectives from most important to least important (where 1 is most important and 6 is least important).

- 4 Protecting public health and safety
- 2 Liveable and vibrant towns and cities
- 5 Water sources, floodplains and ecosystems protected
- 6 Cultural values respected and protected
- 1 Orderly, fair and equitable sharing of water
- 3 Contribute to a strong economy

### Do you have any comments on any of the proposed objectives?

As I have stated, Priority No.1, is the fair and equitable sharing of water. Probity should prevail above cultural issues.

## 6. Draft guiding principles

The draft strategy also proposes seven principles to guide the long-term strategic planning for water resource management in NSW. These principles work in tandem with the draft objectives to guide development and implementation of actions.

The guiding principles are:

- healthy environments sustain social and economic outcomes
- water is a limited (although recyclable) resource
- systems thinking to optimise outcomes
- data-enabled planning and decision-making
- transparency and accountability to engender community trust
- forward thinking to build preparedness and resilience
- giving effect to Aboriginal rights and access to water.

### Which principles are most important to you?

Please rank the objectives from most important to least important (where 1 is most important and 7 is least important).

- 2 Healthy environments sustain social and economic outcomes
- 5 Water is a limited (although recyclable) resource
- 4 Systems thinking to optimise outcomes
- 6 Data-enabled planning and decision-making
- 1 Transparency and accountability to engender community trust
- 3 Forward thinking to build preparedness and resilience
- 7 Giving effect to Aboriginal rights and access to water

### Do you have any comments on any of the guiding principles?

Shoul not include minorities just to please Political masters. Spoils the essence of what could become genuine objectives. Water is for everyone. An Abundant supply would ensure equity and pobity prevails,

## 7. Opportunities, challenges and actions for improved state-wide water management

The draft NSW Water Strategy outlines seven strategic priorities for action, focused on meeting the core objectives based on the *NSW Water Management Act 2000*. These strategic priorities are:

1. Build community confidence and capacity through engagement, transparency and accountability
2. Recognise Aboriginal rights and values, and increase access to and ownership of water for cultural and economic purposes
3. Improve river, floodplain and aquifer ecosystem health, and system connectivity
4. Increase resilience to changes in water availability (variability and climate change)
5. Support economic growth and resilient industries within a capped system
6. Support resilient, prosperous and liveable cities and towns
7. Enable a future focused, capable and innovative water sector.

Under each priority the draft strategy identifies several opportunities and challenges, and a total of 41 proposed actions to improve water management across the state.

### Do you have any comments on the seven strategic priorities identified?

Remove item 2. It is too political, drawing much criticism for something that should be attended to automatical. Would you prioritise a one armed or one legged Farmer?

### Do you have any comments on any of the proposed actions identified?

Should concentrate on developing livable towns without reference to minority groups. why not pay more attention to returned service people, immaterial of Race, Colour, or Creed.

### Are there any additional opportunities, risks and challenges that should be considered in the draft strategy?

See my essay on "Reversing the Flow". Originally composed in 1975, now updated and resubmitted (as previously advised) in 2021

**What actions should be prioritised for immediate implementation and how should they be implemented?**

why not resolve the issue of turning Treated Sewage Effluent into Potable Water. Then consider the implications of transferring Liquid Fresh Water into Inland Waterways

## 8. Other comments

**Do you have any other comments on the draft NSW Water Strategy?**

Generally not for my liking, far too Politically Correct. Quite different to the way most people living in Inland NSW think. Too Academic in most places. Need much more input from farmers in the MacQuarie River Basin. Shout "Talk the Talk" of Country NSW.

## 9. How did you hear about the opportunity to provide feedback on the draft NSW Water Strategy?

**Please select all that apply from the list below:**

- Newspaper
- Radio
- Department of Planning, Industry and Environment website
- Direct email
- Social media
- Have your say NSW website
- Word of mouth
- Other (please describe)

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DRAFT COPY ONLY—FOR FURTHER COMMENTS PLEASE

PROJECT NAME :- **“REVERSING THE FLOW”**

**Of what?... To where?... What is the Concept? ...**

*“Water, Water everywhere. And all the boards did shrink,  
Water, Water everywhere. Nor any drop to drink!” ... Lines 37,38,39 and 40, part 2,  
From the famous Poem, “Rime of the Ancient Mariner”. Samuel Taylor Coleridge, 1798. And also*

*“Intelligence is the ability to adapt to any change”. Stephen Hawkins, 1998.*

And I was watching *“One World, One Planet”*, with Sir David Attenborough quite recently. A Ten-year-old boy asked him, *“How can we save the Planet?”*. His reply was, *“Just don’t waste, ...Electricity....paper ...food.... Look after the natural world, and the animals in it, and the plants in it too. This is their planet, as well as ours. Don’t waste them”*

I shall use all three statements as my “Conceptual Framework” for presenting “Reversing the Flow”, in my illustrated essay. All three statements apply equally to the project.

And so, some 223 years after Samuel Coleridge’s, *“Nor any drop to drink”*, we have a similar situation with Sydney Water and Water NSW, along with their strange attitude to the most wasted resource in Australia, which cannot even be drunk. (*“Nor any drop to drink”*). That of the 1,250,000,000 litres of Treated Sewage Effluent, each day, to which Sydney Water cannot handle in a just and proper manner. The Treated Sewerage Effluent mismanagement reflects a deplorable laziness of scientific esprit (*“Intelligence is the ability to adapt to change”*), within Sydney Water. So, the otiosity, sees Treated Sewage Effluent being wasted into the Tasman Sea. The acetified Treated Sewage Effluent (per head of population) is the greatest resource waste, world-wide, ever, of a vital resource! And considering Australia is the Planet’s driest habituated landmass, even more so. (*Just don’t waste....*)

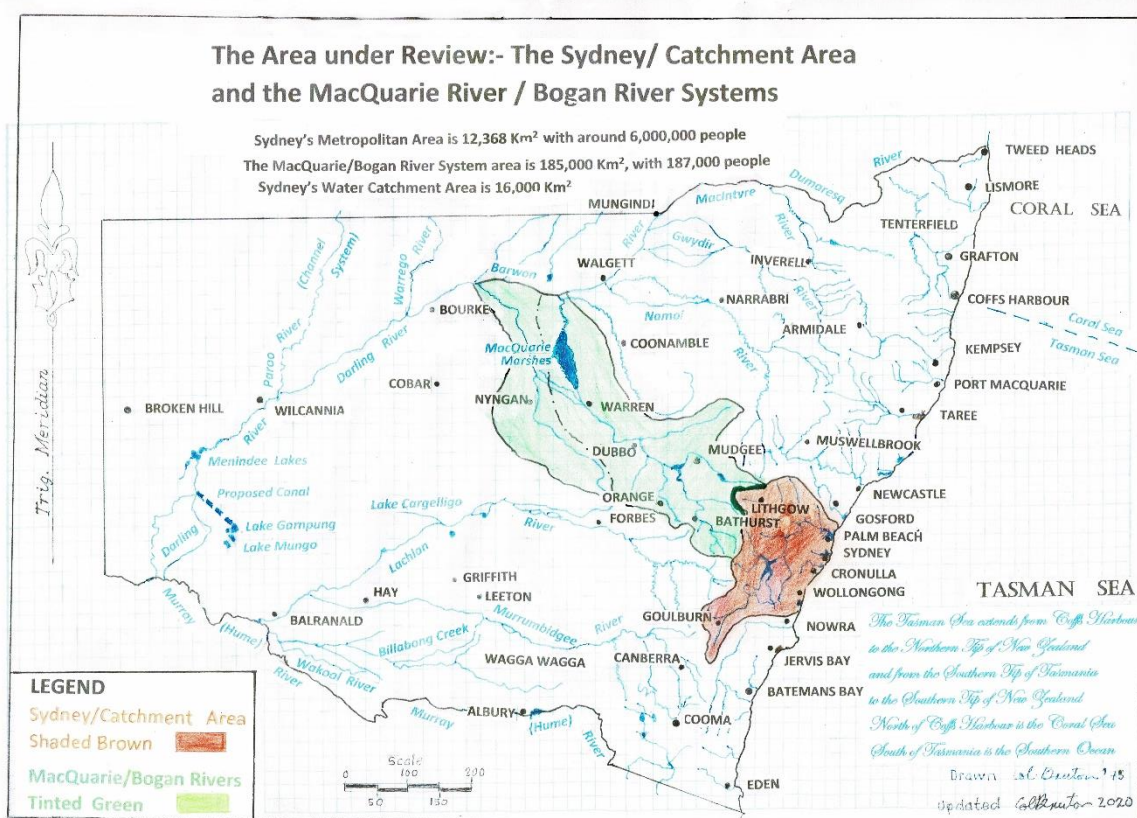
**OF WHAT IS THE CONCEPT? WHEN? PLEASE EXPLAIN! ! !**

Intercepting and reversing the flow, (firstly, part of; then eventually most of) the 1,250,000,000 litres per day of Treated Sewerage Effluent, from the various Sewerage Treatment Plants, lying within the Greater Sydney Basin. Then secondly, further Tertiary Treating and Polishing, the Treated Effluent to be of Potable Standards. (Home drinking quality), sometimes called “Ultra-Pure Water”. Meaning the water so produced is of better quality than Desalinated water and even better than Stored water from a Dam Reservoir. To be carried out in 5 stages. **Say from 2025 to 2050** (Don’t waste a drop)



## FROM WHERE? And TO WHERE ?

Then pumping the Treated Sewage and “polished” Effluent, over the Great Dividing Range. Preferably, into Cudgegong and Turon Rivers, via a series of Weirs, Pipelines and Canals, to Windemere Dam, then flowing into Burrendong Dam and eventually into the MacQuarie River system. Secondary use is to supply the MacQuarie Marshes with sufficient water. Tiercely use, is to have the “Left over water” from the MacQuarie River Basin , to be carried by the Barwon and Darling Rivers to the Menindee Lakes System for further use. The initial concept, however, is to supply an Abundance of Water, for the MacQuarie River Basin, from Sydney’s Treated Sewerage Effluent . Hence my opening statements of “*Water, water everywhere*”..... “*Intelligence is the ability to adapt*”..... And ....”*Just don’t Waste*”.... Which in itself, is NSW Water’s and Sydney Water’s greatest challenge to date. May I dare both organisations to accept the challenge? See Map 1 below



## HOW?

By climbing the Colo River via a Dam at the base of Grose River. Then pumped to a series of weirs, along the Colo River. Then ending in a Storage Pondage near Glen Alice, at the Water shed of the Great Divide, From the Glen Alice Pondage, the water, now west of the Great Divide, gravitates into the Cudgegong and Turon Rivers. Eventually becoming the 2 sources for the MacQuarie River Basin.

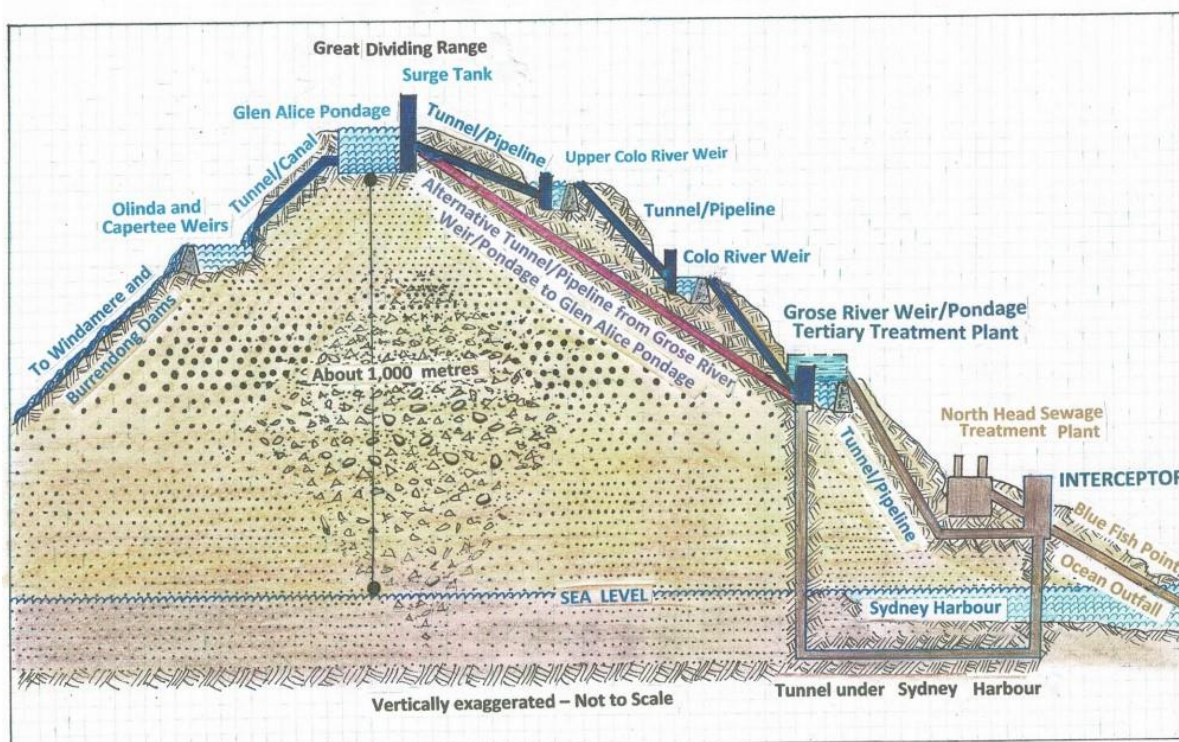


Diagram 1. showing the possible ways of Pumping refined Sewage Effluent “Ultra-Pure Water” over the Great Dividing Range to give inland New South Wales a reliable River water supply. Often called Water Security

Our project is based upon supplying more water to inland New South Wales, by further tertiary treating the Treated Sewage Effluent (De-sewage-ation), from the River and Ocean Outfalls in Greater Sydney. We then pump the Purified “Ultra-Pure Liquid Fresh Water” over the Great Dividing Range, via 575 Kms. of Tunnels-Pipelines, Canals, Weirs and Pondages in selective locations. To be built in 5 Stages from 2025 to 2050, costing around \$15,000,000,000. (2021 order of costs).

### De-sewage-ation Comprehension

Before we even consider the proposal, we must understand the concept of the De-sewage-ation of Treated Sewage Effluent. Generally, Potable (Human Drinking Water), from Treated Sewage Effluent has the “YUK” effect. *“I’m not going to drink some-else’s piddle and poo, I’m dead against it”*, is often the response, which is quite understandable. Recent improved scientific advances makes a lot of sense in the concept of turning Treated Sewage Effluent, into drinking “Ultra-Pure” fresh-water fluid.

A De-sewage-ation plant veritably, separates the remaining matter, after pre-treatment into a high-Quality Liquid Fresh Water. Does not come cheap. But neither does Desalination. Even after all the Capital Works are casted into the factors, Liquid Fresh “Ultra-Pure Water” from De-sewage-ation Plants is better in Quality than Desalination and Cheaper to produce.

See Table 1. next page

Table 1

## Comparison of costs- Treated Sewage Effluent and Desalination

Element	Units	A: from treated sewage effluent	B: from Ocean Sea Water	Ratio : Cost Benefits
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### Capital Costs

Infrastructure and Pre-treatment	\$M <sup>3</sup> /d	161	320	1.99
RO	\$M <sup>3</sup> /d	321	624	1.94
<b>Total</b>	\$M <sup>3</sup> /d	<b>482</b>	<b>944</b>	<b>1.96</b>

### Total Life Cycle Costs

Capital	\$M <sup>3</sup> /d	0.07	0.24	3.43
Operate/Maintain	\$M <sup>3</sup> /d	0.21	0.38	1.81
<b>Total</b>	\$M <sup>3</sup> /d	<b>0.28</b>	<b>0.62</b>	<b>2.21</b>

Source:- Cote, P. and Siverns, S. for Australian Water Association Speciality Conference "Membranes and Desalination" Adelaide 2005.

As can be seen from the Chart, further Treatment of Treated Sewage Effluent producing "Ultra-Pure Water" is about 2.2 times cheaper to manufacture, than that of Desalinated water. Moreover, the de-sewage-ation water is Ultra-Pure liquid, meaning that is of Distilled water quality. The water needs to be mixed with River water or a Dam Reservoir.

Although the chart is quite old, with numerous reductions in both de-sewage-ation and desalination, the figures remain roughly the same. The comparisons were made at the Santa Monica de-sewage-ation plant and a desalination plant about 80 kilometres northwards.

**Anammox Super Bugs:-** Have been developed by "Urban Utilities" in Brisbane. The superbug, that feeds on nutrients in sewage water (Black Water), to clean the solids, has been grown from scratch at a Sewage Treatment plant in Brisbane. The 10-year project by "Urban Utilities" is an Australian first, leading to reducing the need for chemicals and costs at Sewage Treatment Plants. The next major item with "Super Bugs", is to develop a strain that devours salt!

Perth is now looking to recycle all of its treated sewage. The Treated sewage is discharged into sand beds, then stored as Ground water, in the super saturated sand. No doubt, the Anammox bugs would thrive in such an environment. Perth has been progressively "drought -proofing" itself by diversifying the City water supply. Desalination and ground water extraction provide about 90% of the City's water supply.

The other alternative is to build a Pipeline from the massive Argyle Dam to Perth, which in itself, is a major undertaking, costing billions of dollars.

### Requirements for adding Potable (Drinking) Water to a River Basin

For a River Basin to receive “External” Water on a Long-Term Basis,

1. A continual and abundant supply of Drinking water.
2. Well drained soils and compatible wetlands
3. Good drainage throughout the Basin for the 2,030 Irrigators
4. A plentiful supply of suitable fertiliser
5. Removal of all salts from the “External” Water .
6. Adopt the Three Scientific Principles of sustainability .

Adapted from, “A Water Story”, Page 3, Geoff Beeson, 2020 CSIRO publishing

### Suggested “Reversing the Flow” Project- Manly to Glen Alice

1. Intercept Treated Sewage Effluent Outfalls at Selected Sewage Treatment Plants.
2. Retreat effluent, then pump the Treated Effluent to Grose River Weir or Pondage.
3. Mithridatise intercepted Treated Sewage Effluent at Grose River Treatment Plant by;
4. (a) Reverse Osmosis, (b) Urine-atronics, (c) Distillation, (d) Freezing and Refreezing.
5. Then pump the Effluent from the Grose River Treatment Plant, to Colo River Weir.
6. Next step, then pump the Treated Water from Colo Weir to the Upper Colo River Weir.
7. Option “X”, Pump water from Upper Colo Weir to Glen Alice Pondage.
8. Option “Z”, Pump water direct from Grose River Treatment Plant to Glen Alice Pondage.
9. Pump, or preferably, gravitate water from Glen Alice Pondage via:-
10. A series of Pipelines, Tunnels and Canals to the Olinda Weir and Capertee Weir.
11. From the Weirs, the Water then flows into Cudgegong River and Turon River.
12. Water then flows into Windamere Dam and Burrendong Dam, then to continue watering of the MacQuarie River Basin

*“Can’t be done!”*, Said Sydney Water Board back in 1975, which immediately reflected their blinkered view, their intolerance and laziness to new ideas. “Reversing the Flow” was far too acute, being unusually strange to them. When I first presented the Project to the Board, the reply was. *“You are years ahead of your time. The water is suitable only for Irrigation. Maybe by 2020, it could well be a goer. But right now, far too expensive, being well beyond the Board’s area of Operations. (In here we put “Water, water everywhere.....” and “Intelligence is the ability to adapt.....”) . “Not interested in anything west of the Great Divide. Far beyond our areas of interest”*. Came the quite expected reply from the Board, coming over the phone and not as what was promised. The Water Board said. *“All proposal will be acknowledged, with the plans and proposals returned to the person submitting the concept”*. Plans and written documents were never returned to me, despite my often calls of, *“Where are they? And what day next week, can they be returned to me”?*

There was never any of “Now with a few modifications let’s see if we can produce something?” It was a straight out “NO”, reflecting the lack of entrepreneurial and

innovative attitudes within the Board. But the trouble with a bureaucracy, is that they tend to promote mediocracy. Most people working in such places are trained bureaucrats.

**The Science of Water Purification has changed Drastically over the past Half Century. Virtually any water, Sewage (Black Water), Brackish Water, or Sea Water can be treated to be of a Domestic Drinkable Standard)**

Since 1975 and now being in the year 2021, the treatment of Sewage Effluent (on a World basis) has changed dramatically. Why not in Australia? Yet purifying Treated Sewage Effluent is around 2.2 times cheaper to produce than the Desalination of Sea Water. Moreover, the “polishing” or “tertiary cycle” of Treated Sewage Effluent yields a better quality of “Ultra-Pure Water”, than do the Sea Water Desalination Plants. (Hence Sir David’s comment, (*“Don’t waste a Drop”*))

So where to from here? Basically, I call the project “Reversing the Flow”. Meaning that we should intercept as much of the 1,250,000,000 litres per day of Treated Sewage Effluent, from being discharged into the Georges River, The Nepean River, the Hawkesbury River and the Pacific Ocean (Tasman Sea actually), then pumping the further “Polished” Treated Sewage Effluent, (to Domestic Drinking, “Ultra- Pure” liquid fresh water), beyond the Great Divide. Thereby giving inland NSW a much need permanent River Water Supply

“Over the Great Divide you say?” The Water Board in 1975 said, “It can’t be done. Too expensive. The Treated Sewage Effluent is only good for irrigation”. .... Rubbish! This is now 2021, when the Water Board, back in 1975, said it could be not done. Simple logic now says, “let’s do it”! And by letting us do “it”, become the great Challenge!

Some time ago, Sydney Water produced an 8-page brochure entitled “Why the Ocean is a Natural Purifying Plant” (see appendix “A”). I objected to the publication on the grounds that the basic philosophy of the brochure was wrong. The “Ocean” is not a “Natural Purifier”, in that sea water and fresh water do not readily mix. Being fortunate enough to having lived by the Seaside and being a competitive Surf Ski, Kayak Paddler and Surf Boat Sweep, I was able to observe first handed, the results of Stream and River flows not mixing with the Ocean. As any year 7 Scholar of Physics will tell you, Fresh Water, being lighter than the Ocean, will “Float” on the surface for quite some time, before being dissolved. I gave Sydney Water some practical demonstrations, to which was met with a POO-HOO. Not to their liking at all.

A year or so later, after I had retired from the Board, (or should it read “Bored”, with the Board), I received a “Confidential” document outlining and tracking Sydney’s Sewer Effluent by applying small doses of radio-active matter. (quite harmless to humans). Would you believe, the floating effluent made it to Jervis Bay?! Admittedly the conditions were ideal. North East winds blew the effluent down the Coast at about 3 knots. After one day, the effluent travelled at least 40 Kilometres. Overnight gentle Nor’ Westers pushed the Effluent out to sea and further south. The Nor’ Easters then sprung up the next day , pushing



the floating mass another 40 or so kilometres southwards. After 4 to 5 days, part of the floating mass entered Jervis Bay. That is another 40-page story. See Appendii B and C

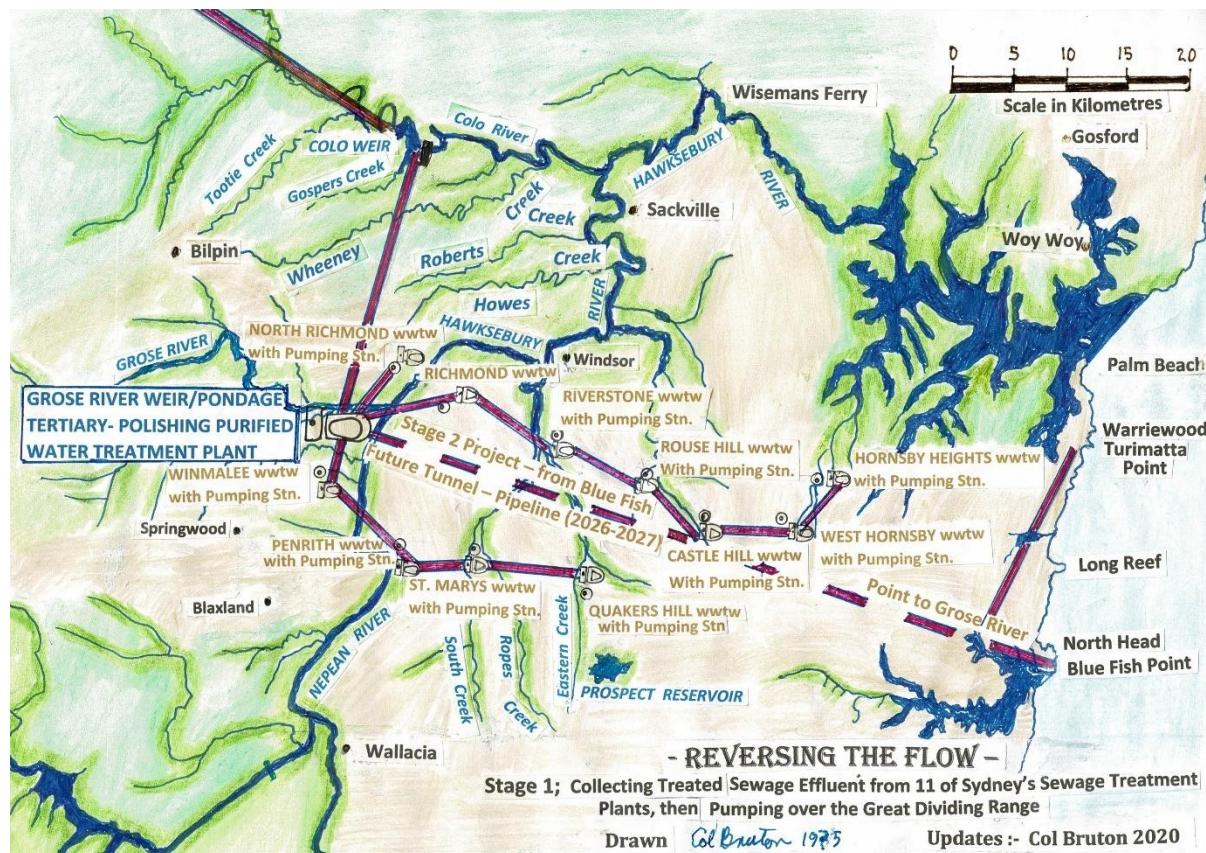


Diagram 2. Showing stages 1 and 2, gathering effluent from Stage 1, the 11 North Western Sewage Treatment Plants and Stage 2 from Warriewood and North Head Sewage Treatment Plants

**Stages 1. of the Project:-** Includes the interception of treated sewage effluent from 11 of Sydney's North-West Inland Sewage Treatment Plants. That of (from the East), 1. Hornsby Heights, 2. West Hornsby, 3. Castle Hill, 4. Rouse Hill, 5. Riverstone and 6. Richmond. All 6 Plants being linked via a common Sewage Effluent line. The Richmond plant then Pumps across to the Grose River Wier/Pondage. At the Grose River Plant, further Treatment takes place to where the Treated Sewage Effluent receives further Tertiary-Polishing, then becoming Potable (Human Drinking Standard) Water.

7. Quakers Hill, 8. St. Marys, 9. Penrith, 10. Winmalee. Similar to Plants 1 to 6, These 4 plants are also linked by a common Sewage Effluent line, then pumped to the Grose River Weir/Pondage for further Tertiary-Polishing Treatment, to Ultra-Pure liquid Freshwater

11. North Richmond Plant's Effluent may be pumped directly to the Grose River Weir/Pondage, again for further Tertiary- Polishing Treatment.

It may be possible to amplify-augment some of the Treatment Plants to where Drinking Water can be produced. The St. Marys comes close, with some other Plants already providing dual reticulation, with others supplying Treated Sewage Effluent to Golf Courses, Racetracks, Agricultural and Horticulture needs.

However, there is a great need for final Treatment at the Grose River Plant, which would become a “Super Plant”, the biggest and most expensive in Metropolitan Sydney.

**Stage 2. Of the Project;** Includes the interception of the Treated Sewage Effluent from the Warriewood (Turimatta Point Outfall) Plant and the major Plant at North Head (Blue Fish Point Outfall). Then connecting the Effluent to the Grose River Weir/Pondage for further Tertiary- Polishing Treatment.

### Building the Tertiary/Polishing Treatment Plant

The Grose River/ Pondage Treatment Plant will bring Sydney up to International Standards of Treated Sewage Effluent. The Plant will be the biggest in Sydney. Not only should it treat Stage 1 of the project, but continuing Enlargement should see the Plant, capable of treating Stage 2 of the scheme. Stage 2 includes the Treated Sewage Effluent from both the Warriewood Plant and the North Head Plant. Building and Operating the Plant, will be Sydney Water’s greatest cost and challenge to date, of any Treatment Plant. Such a Plant will see the Engineering side of Sydney Water, leading Australia in purifying effluent to a new “Dinking Fresh Liquid Water Standard”, suitable for Urban domestic consumption.

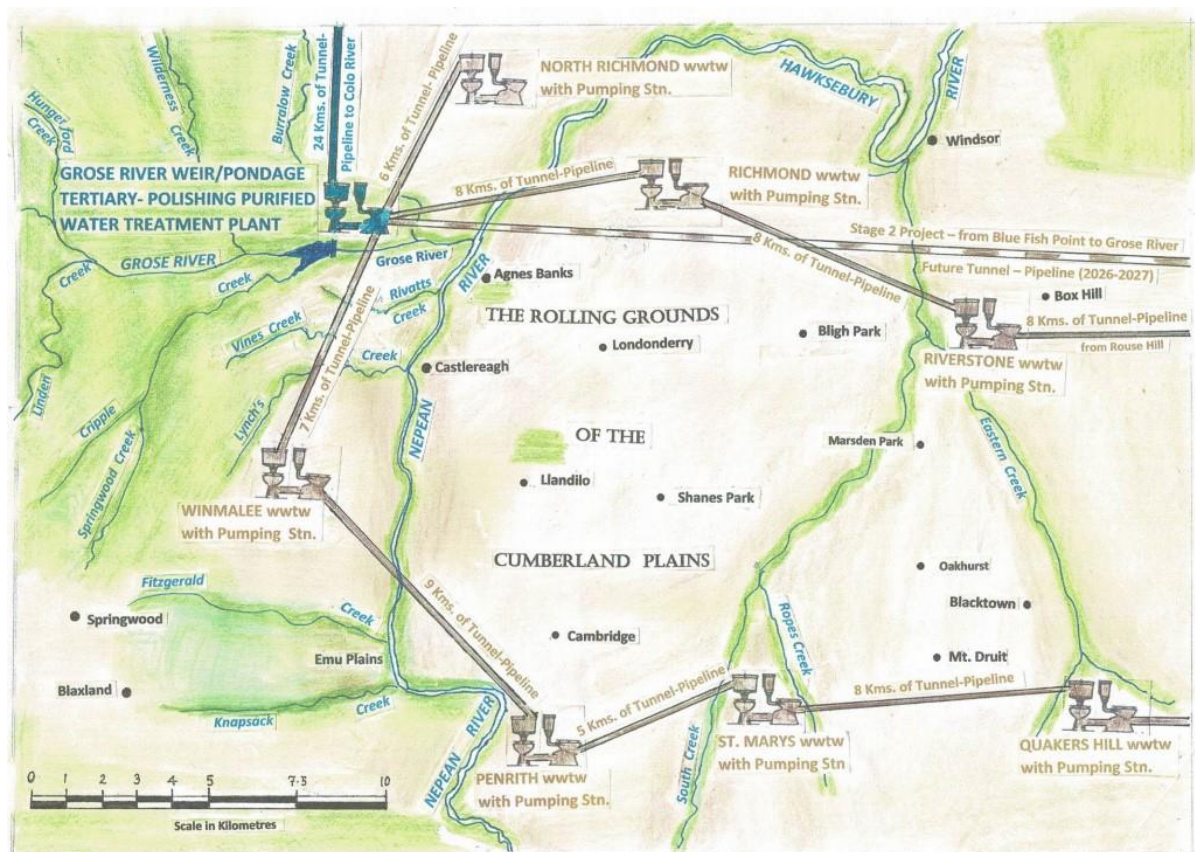


Diagram 3. Showing 7, in a more detailed plan view, of Sydney’s North Western Sewage Treatment Plants and the difficulties that need to be overcome by Tunneling or by laying Pipelines across the Cumberland Plains

“Climbing the Colo is the way to go” was in my original proposal. Firstly, we pump the Treated Sewage Effluent from all the Sewage Treatment Plants North-West of Sydney. We put this through a “Polishing” or Tertiary Process, (to a Potable reintegrative class), then



pump the Tertiary Treated Effluent to the lower Grose River Weir. Hold for a few days, superinduce aeration, with the Sun adding some sanitisation to the water. We then pump to the Colo River Weir where further aeration and sanitisation takes place.

From the Colo River Weir, we pump to the Upper Colo River Weir. Then, from the Upper Colo River Weir to the Glen Davis - Glen Alice Pondage. From Glen Davis Pondage the Potable or Drinking water (as it now is), can be gravitated to the Turron and Cudgegong Rivers. The Cudgegong River having firstly, a confluence with Windamere Dam. Both Rivers finally discharging into the Burrendong Dam, which is not far from Wellington.

The 3 most important Dams or Weirs in “Reversing the Flow” Project are the proposed Upper Glen Davis – Glen Alice Pondage, the existing Windamere Dam and the Burrendong Dam. Even after the recent “Flooding Rains” and “Bountiful Rainfalls”, Windamere is fairing rather poorly, steady at 28.7% of capacity, while Burrendong is faring a little better, but dropping to 39.8% of capacity, as at 15-03-2021. This is disastrous! These Dams should be full. And partially full Dams, should never be tolerated by any Government interested in the welfare of inland New South Wales (NSW). Particularly when a practical solution is readily (or could be), available. The MacQuarie-Bogan River Catchments could well become the “Breadbasket” for exporting food to overseas Countries. All we need to do, just “ADD WATER”!

May I suggest, further treatment of the 1,250,000,000 litres of Treated Sewage Effluent being wasted every day, in and around Sydney. The correct “Political” and gender polite term is “Wastewater”. Damn Politics and the associated Bureaucratic leeches! Let us be Scientifically and Technically correct by calling it “Treated Sewage Effluent”, which physically, is precisely what it is! Sydney Water needs to delete the term “Wastewater” and Substitute the term “Water Recycling”. Wastewater implies the Treated Sewage will be wasted, giving the impression that “Wasting” is normal and acceptable. Where-as the term now-a-days is quite objectionable, being strongly opposed to Sir David’s “Just don’t waste”.

### The Importance of “WATER SECURITY”

By adding water to the MacQuarie River and its 185,000 people, simply means we are providing “Water Security”. And if you ask 99% of the people in the Basin, What is the most important issue in the basin, I will guarantee once you mention “Water Security”, you will have a resounding response. One wonders why some organisation, supposedly interested in the farmers and residents living up to the Basin’s welfare, have not posed the question. How much does “Water Security” mean to you?

This same item is one that NSW Water Department could take up. The findings could be quite startling! Then again, would not NSW Water do what they are doing now about “Water Security”? The whole concept behind “REVERSING the FLOW” is to “ADD WATER” to the Basin, which in turn, endows the image of “WATER SECURITY”.

Water Security gives a “Sense of Place” to people. MacQuarie River Basin is their home. Who would want to live any-where-else, when one has a secure water supply system? The



whole scope of the freshwater fluid idea would echo throughout the Basin. It is Water for the Home, water for Industry, water for Irrigation, water for Commercial use and even Water for Recreation. Recreation could mean Water Sports, such as Water Ski-ing, Canoeing, Sailing, Rowing, Fishing, Open Water Swimming and Stand-up Paddle Boarding. Such activities could be confined to certain locations. Water Security has no bounds.

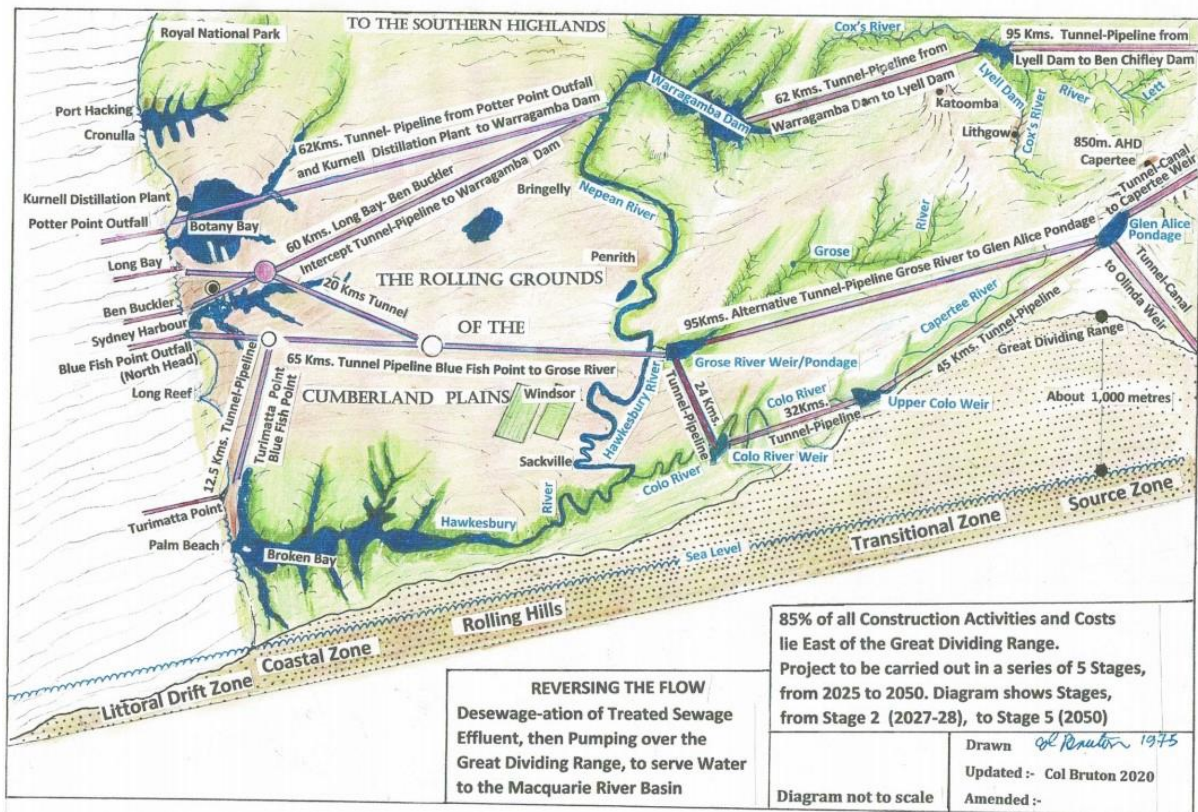


Diagram 4. Showing the Projects Stages 2 to 5. A rather congested plan of Tunnels and Pipelines

Stage 2, being the Tunnels-Pipelines from Warriewood (Turimatta Point) to the junction of the North Head (Blue Fish Point), then from North Head to the Grose River Weir/Pondage Tertiary-Polishing Treatment Plant, then onto the Colo River Weirs and onwards.

Stage 3. Being the Tunnel-Pipelines from South Head (Ben Buckler) and Malabar (Long Bay) Treatment Plants to the Warragamba Dam, bypassing the pipeline to City Tunnel. Stage 3 also includes a Tertiary/Polishing Treatment Plant, with more capacity than the Grose River Treatment Plant. Again, another Engineering challenge to Sydney Water

Stage 4. Being the Combined Pipeline-Tunnel from Kurnell Distillation Plant and the Potter Point (Cronulla) Outfall to Warragamba Dam.

Stage 5. Tunnel-Pipeline from Warragamba Dam to Lyell Dam then to Ben Chifley Dam. The Warragamba to Ben Chifley Dam Tunnel-Pipeline would probably be the most difficult and expensive to build. Yet the Tunnel-Pipeline would bring great benefits to the Bathurst-Orange areas. These 2 cities miss out completely on Stages 1 and 2 of the "Reversing the Flow" project. However the 2 very important centres areas must be included in the project.

By not constructing the Tunnel-Pipeline to include both Bathurst and Orange in the delivery of “New Water”, would appear to be a deliberate exclusion of both Major Cities from the scheme. Such an action would bring considerable criticisms from both Centres as being neglected and not considered to be worthy of “Imported Water”. In the long term, the MacQuarie Rive the Campbell River and all places downstream, along the Darling River, would also benefit.

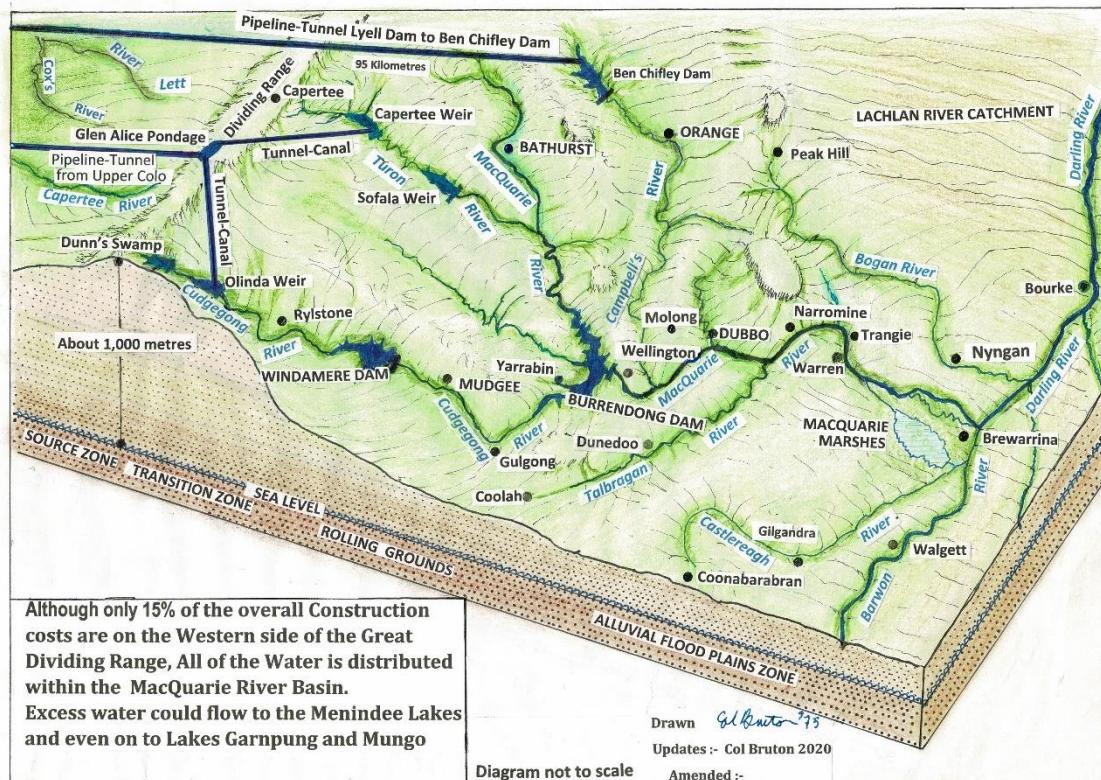


Diagram 5. Showing the Projects Aim of distributing Treated Water, west of the Great Dividing Range.

**Step1.** From Glen Alice Pondage, gravitate Treated Water (via Tunnels and Canals), to Olinda Weir, (below Dunn’s Swamp), then into the Cudgong River, which in turn, flows into Lake Windermere then to the Burrendong Dam.

**Step 2.** From Glen Alice Pondage, gravitate Treated Water (via Tunnels and Canals), to Capertee Weir, which in turn flows into the Turon River. Then the Turon River flows into Sofala Weir, then flowing into Burrendong Dam. From Burrendong Dam, the water flows into the MacQuarie River system, near Wellington. Excess Water then continues into the MacQuarie Marshes and eventually into the Darling River system.

**Step 3.** One suggestion has been to build a series of overtopping Weirs, at selected locations along the 3 Rivers of Cudgong, Turon and MacQuarie. Basically for drought proofing, for Irrigation, for recreational purposes and even Aqua-Culture. An idea worth considering.

Although not part of the Project, the superfluity of water when available, could flow onto the Menindee Lakes Scheme. Possibly with a flow carrying on to the Garpung and Mungo



Lakes via a Canal system. If not already done, the Garnpung and Mungo Lakes area could be handed over to the Paakantji and Ngiyampaa people upon the Lake's filling, if desirable.

Filling of either Lake, should be in consultation with the Traditional owners, as it could become an extremely sensitive issue. Do they want filling of the lakes, or not?

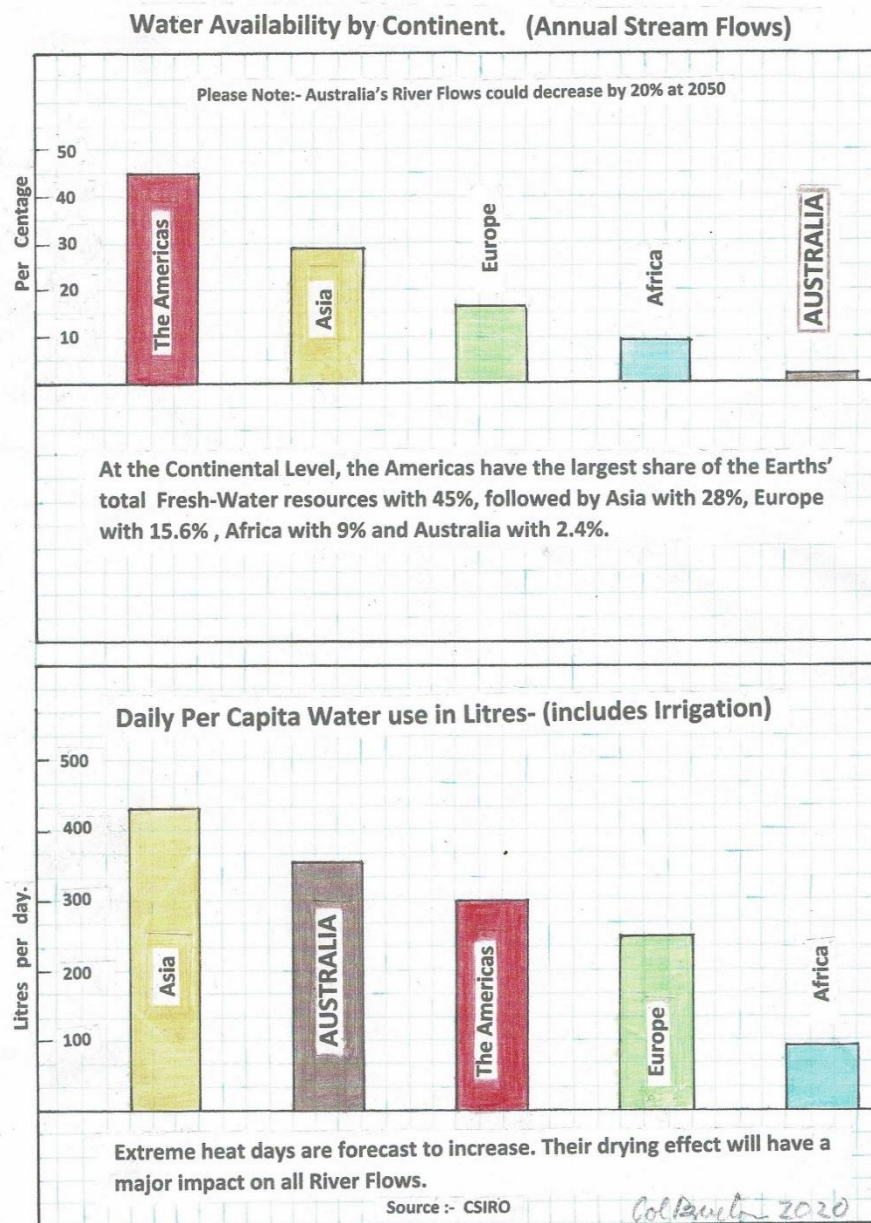
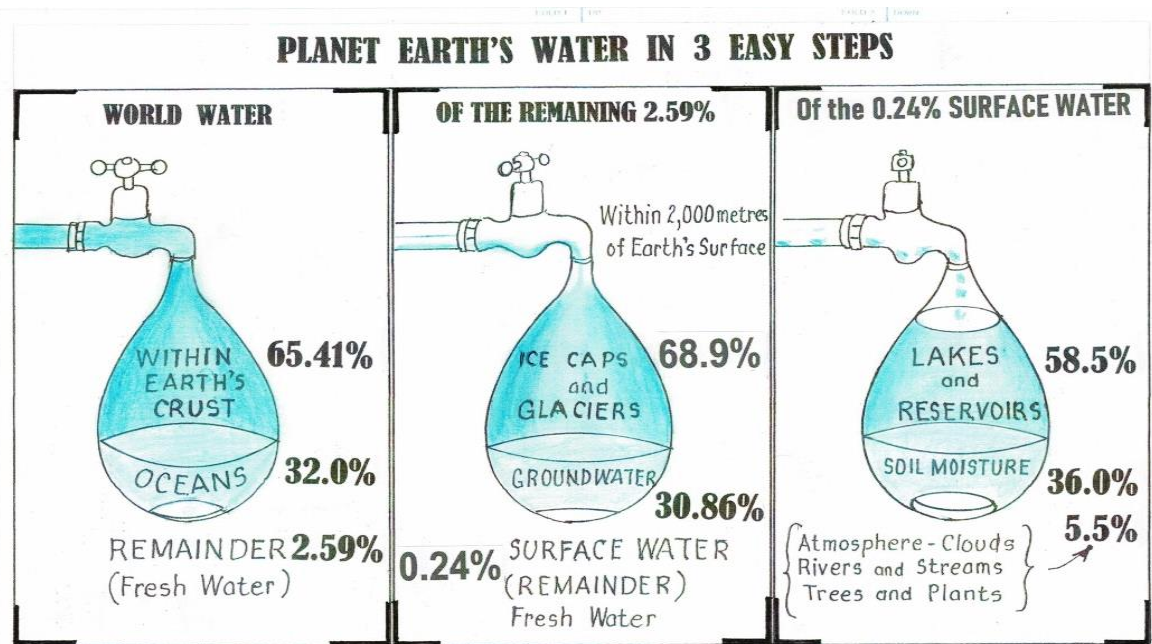


Figure 1

Planet Earth's Water showing where Australia is the poorest receiver of Liquid Fresh Water, but yet is the 2<sup>nd</sup> largest consumer of water per head of population.

Solution? We need to produce more Drinkable Liquid Fresh Water! But how?

- (1) More Dams? No good if there is not enough water from Rivers. Limited amount of water.
- (2) Distillation? Need more Plants and Pumping Stations. Unlimited source of supply.
- (3) De-sewage-ation? Probably the best solution, Unlimited supply. Then there are the Pumping, Pipelines, Canals, Tunnels and Weir Costs



**Figure 2.** Drawn originally in 1975 by Col Bruton, updated 2020 by Col Bruton.

Diagram of Planet Earth's water reflecting the current views, expressed in Per Centages of the Water-Mass within and on the surface of Earth. Note how the bulk of the Water-Mass is within Earth, related to the volume 32% within our Oceans. There is only 2.59% in the form of Fresh Water on our Planet, with 99.76% being locked up in Ice Caps, Glaciers and Underground Water. The Underground Water, which is mostly "Plutonic Water" (named after 'Pluto', God of the underworld-underground), is generally available by accessing Artesian Basins. The Great Artesian Basin is Plutonic Water, (There is another 42 pages of proof), while the Burrundulla Aquifer and Peats Ridge Aquifer are good examples of "Ground or Sub-Artesian Water", having a good surface "Intake" area.

Surprisingly enough only 0.24% of Earth's Surface Fresh Water is readily available to the World's Population. I will bet you that not many Politicians and their parasitic bureaucrats know how much FRESH Water is available to our Cities and inland Country Towns. Should ask them "In Australia, what is the amount of Fresh Water, (as a Percentage), is available for distribution to Cities and Outback Towns"?

And for Australia, of the remaining 0.24% of available Fresh Water, preclusively (only) 5.5% is readily recoverable from the 0.24%. When a dry spell occurs and turning into a drought, as recently experienced, Fresh Water Lakes and Reservoirs in Western NSW, tend to deplete rather rapidly. Resulting heavy reliance on a miserly 5.5% of 0.24% equalling 0.000132% of AUSTRALIA'S Water being available to Drought Affected Areas if it rains. Drought simply intensifies if it remains dry, then that very thin thread becomes thinner. By comparison, generally there is about 0.24% of Earth's enormous amount water, being readily available to humans as liquid fresh water. We as the planet's driest Country, fare very badly for the access to Liquid Fresh Water. Of

all Liquid Fresh Water, to which we have access, at the best of times, to a paltry 0.24%. Where-as In drought, as previously stated, it drops to 0.000132% in Australia.

I was greatly appalled at the treatment of our Farmers and Irrigators, during the last drought. Men and Women on the land were already exhausted from the heightened, self-serving, mutton-headed Politicians. They seemed to think Farmers and Irrigators were the cause of it all. There was a failure to remedy injustice from poverty. Primary caused by reducing water intake by the Kevin Rudd- Penny Wong's, "Environmental Robbing" of an agreed water allocation. In most cases, there was a failure to protect the most vulnerable and marginalised man and his family on the land. Irrigators were the devil! I put it to you; you make life hard for the Man on the Land, you make life hard and more expensive for every-one. Extra water collectively enriches our lives. Why can't Politicians understand what a 6<sup>th</sup> year school child understands so well?

Can't we build a much fairer future with more water? Even our National Anthem says, "*Advance Australia Fair*". Such a philosophy should apply to all people whose income and welfare comes from the land. It is these people whose tonicity requires an adequate supply of liquid fresh water.

Little wonder, because of our unique reliance on an extremely thin thread of Water availability, as to why droughts bite so hard in areas west of the Great Divide. Although a perennial abundance of Water flowing through a Major River System (such as the MacQuarie River), would not cure all aches and pains. The abundance of permanent Water would make the Drought much more bearable to those with access, to and around the Water. (Which incidentally embraces some potentially 56,000 Hectares of what could become Irrigated or partially irrigated lands).

### Some comparisons of where we sit in World Water usage

To put the scarcity of Water and River Flow in Australia, into an international perspective; Years ago, I was listening to former NSW Premier, Bob Carr, being interviewed on ABC T.V. He made a statement along the lines of, "*You can put all the Waters of Murray River into the Mississippi River and you would not notice the difference*". Being a great disbeliever of what any Politician would say; I chased the Statement up. By crikey, he was right! The "*Murray River*", ( which incidently should be changed to "*Hume River*"), has an average flow of around 45,200 litres per second, being only 0.0074% of the Mississippi River flow.

And all the rivers in Australia, amounting to 245,650 litres per second, are only 0.043% of the Mississippi River Flow. Mississippi River Flow equals 610,00,000 litres per second, or as a swimmer says, about 195 and a half good sized Olympic Pools a second. While the MacQuarie River, (in good times), has a flow of around 37,615 litres per second (0.02 of an Olympic Pool per second), at Dubbo. Or could we say, MacQuarie River has a lowly 0.0062% flow of the Mississippi River flow.

## Why does America have so much Water?

Basically, because America has 4 Great Mountain Ranges. On the West Coast, there are the Siskiyou Coastal ranges, then travelling East are the Sierra Nevadas, west of the middle, are the Rocky Mountains and on the East Coast the Appalachian Ranges. The Worlds best Snowfields, both in numbers and quality, lie within The Sierra Nevadas and the Rocky Mountains. America has twice as many Snow Skiers than all of Europe. Although don't tell that to a Swiss, from St. Moritz or Zermatt. Nor to an Austrian from Grossglockner or from Sankyt-Anton-am-Alberg. It is the Mountain Ranges that bring the Snow and Rain. Low and fast moving Meteorological weather fronts, love high Mountain Ranges.

Our trouble in Australia is we lack anything over 2,000 metres high, except for the Kosciuszko Region. When a Low approaches the Western Coast of Australia, there are no Coastal Ranges to "Draw" the clouds inwards. This greatly depends upon the Indian Ocean Diapole. What usually happens, is that the Low Meteorological weather mass will skirt around Western Australia. Only until the Low approaches the Snowy Mountains, will it make any contact with land.

Where-as In America, on the Pacific or Western Coast, the Sishiyou Ranges can reach over 2,500 metres in some places. Even the Appalacian Ranges (On the Atlantic or East Coast), on an average, are 500 metres higher than the Great Dividing Range and have a rainfall of around 1,750mm per year. A good comparison may be made between Dubbo (pop.40,000) and Atlanta, Georgia State (pop. 500,000) . Dubbo's annual rainfall is around 385 mm per year. Atlanta' rainfall is 1300 mm per year, (approx. 3.5 times more). Both Cities are roughly the same distance inland from the coast and around the same height above Sea Level. If you travel cross-country to Atlanta, from the eastern foot of the Appalachian's, you would travel around 300 Kms, at around 900 metres above Sea Level. You would pass through mountain terrain where peaks are around 1500 to 1800 metres above Sea Level. Some 2,500 Kms diagonally across the great plains from Atlanta, we have Denver (pop.770,000), America's "Mile high City", sitting at aroun 1,500m. above the sea. Denver has an average rainfall of 1350mm per year. Denver is a little further west of the Atlantic than is Broken Hill, west of the Tasman Sea.

So in a nutshell, our worn out Country, does not have the High Mountain Ranges of America. Mind you, 200,000,000 years ago, there was a Coastal Mountain Range nearly 9,000 metres high in Western Australia. Kosciuszko and parts of the Great Divide were over 10,000 metres high. But now, gone with the wind.



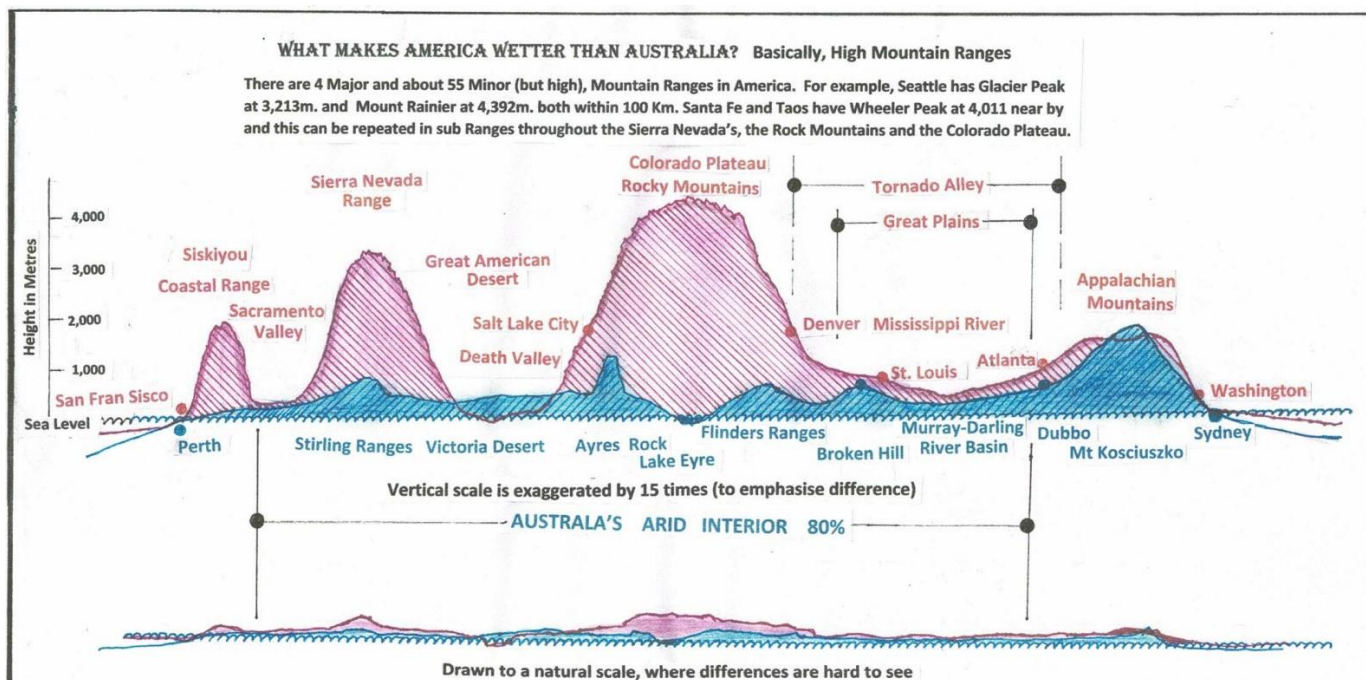


Figure 3. Showing profiles of Australia compared to America

The problem with our River flow into inland Australia, is that around 50% of all our flowing Rivers, flow into the Gulf of Carpentaria. Incidentally, the Gulf of Carpentaria is a huge body of water, about 36,000 square Kilometres, You could fit 2 Englands inside. Our major "Gulf Rivers" of Mitchell, Gilbert, Norman, Flinders and Roper are all untapped. While the Daly and Victoria Rivers flow unchecked, into the Timor Sea. Of all these 7 rivers, 122,825 litres per second are lost permanently.

Meaning that our overall River flow of 245,650 litres per second is only half of our usable total River flow. With 122,825 litres per second being lost permanently, to any form of consumption or Irrigation by the farmers of Australia. So when we say Australia has a certain average River flow, we should halve that amount to read 122,825 litres per second, being all the water available to serve all of Coastal and Inland Australia. So I ask you, can we as a "Dry Nation" afford to throw away 122,825 litres of water per second? That is 122,825x 365x 24 x60 x60 litres of water for a year?

Yet, in Australia, per capita, we are the World's second greatest consumers of Water. I'll give you an example. Denver, Colorado, USA, has the world's highest per capita use of Water, consuming something like 580 litres of Water per person per day. You will never guess which City is next? DUBBO ! NSW, with a consumption, (when restrictions aren't on), of 490 litres of Water per day, for each person. Dubbo just edges out New York, Los Angeles, Mexico City and Sydney. DUBBO, a Silver Medal winner for World Champion Water users

Obviously, our reliance on Water is taken in rather Cavalier attitude. Coupled with our saying, "Shee'l be all right mate"!, our future for inland Water dependence is quite bleak. To maintain a good healthy system, the MacQuarie River needs a minimum of 2,500,000 litres per day, of good clean, salt free, Drinking Water. Water that can be used for Irrigation and Human consumption needs. The 2,500,000 litres per day, represents only 2.00% of

Sydney's discharge of Treated Sewage Effluent per day. Only a "Drop in the Pacific Ocean", for Sydney, but a huge amount of Water for the MacQuarie River Basin.

We should be looking at least 25% of Sydney's Effluent discharge flowing into the MacQuarie River. Then building that amount gradually up to at least 50% of the Treated and Purified Sewage Effluent. And by the year 2050, to 100%. By 2050, the daily discharge of Treated Sewage Effluent will be in the order of 2,000,000,000 litres per day. Even so, at 25%, or should we say 312,500,000 litres per day or, 3,620 litres per second, equals almost a 10% increase in the average water flow to the MacQuarie River Basin. During low River flows this amount of water is vital to the River's health. Who, in their right mind would say, *"The people of the MacQuarie River Basin, do not deserve such an amount of extra fresh water! And who would spend such a vast amount of money spent on them?"* And who says this? The two Paracitic bodies of Sydney Water and Water NSW

Yet, I say to you, this is the very crux of the proposal. **Inland NSW needs more Water.**

The MacQuarie River Basin, (per square Kilometre), is the most heavenly Populated River Basin In Australia. Having Cities such as Dubbo, Orange, Bathurst and major Rural centres, such as Warren, Giigandra, Nyngan, Trangie, Narromine, Wellington, Molong, Dunedoo, Mudgee, Gulgong, Kandos, Rylstone and Oberon, makes the Basin first preference to the area recieving Drinking liquid fresh water from an "External" source.

And if we continue looking at 50% of Sydney's Effluent discharge being "Exported" to the MacQuarie River, we would deliver an extra 20% of the River's flow into the Basin. At 20% extra flow, we start to talk "Turkey" in real terms, of "Imported Water" into the MacQuarie River. The combination of Sydney's exported Effluent and the Basin's "Imported Purified Drinking Water", is indeed, the dis-entanglement to "Inland NSW needing more Water". Ah, for a drink of that cool liquid freshwater, even imported from Sydney, over the Great Dividing Range, nothing quite like it.

I'll guarantee one thing will happen. As soon as such a Project is announced, the neighbouring River Basins, such as Gwyder, Namoi and Lachlan will scream out *"What about us"*. And indeed they do have such a right! Although this project is only intended for the MacQuarie and Lower Bogan Rivers, the implifications are such, that all of inland New South Wales will virtually "Demand" a share of the "Reversing the Flow".

I have a great affinity for "The Man on the Land" including his wife and family. The "People on the land" are our Entrepenuers, Innovators and Investors, who produce our food. They are the bold Australians who produce our quality foods. I have not yet been to any other Country where such a wide variety of local quality Rural Commedeties are grown. The "Man on the Land" must take care of his property, to ensure he grows quality crops (or Stock) at all times. Despite of what some elements of our society may say, He (and She) are the perenial "Environmental Protector" of our lands. Do something wrong, then he goes broke. Therefore care of the land for food, is essential for his survival and income.



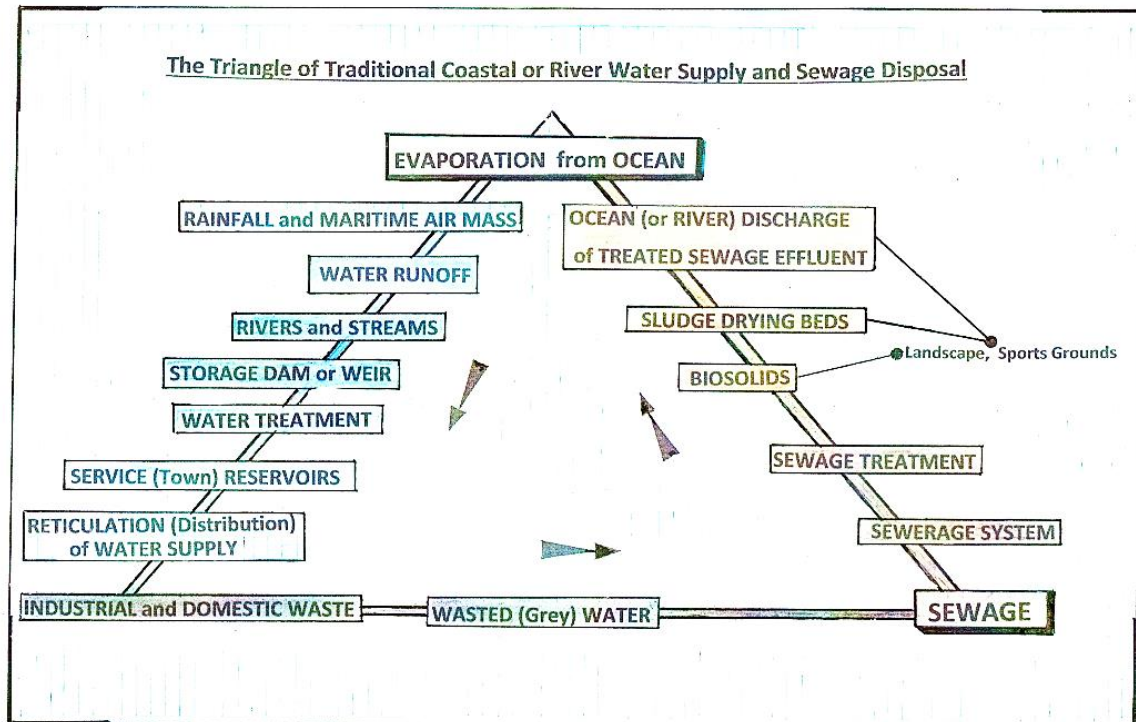
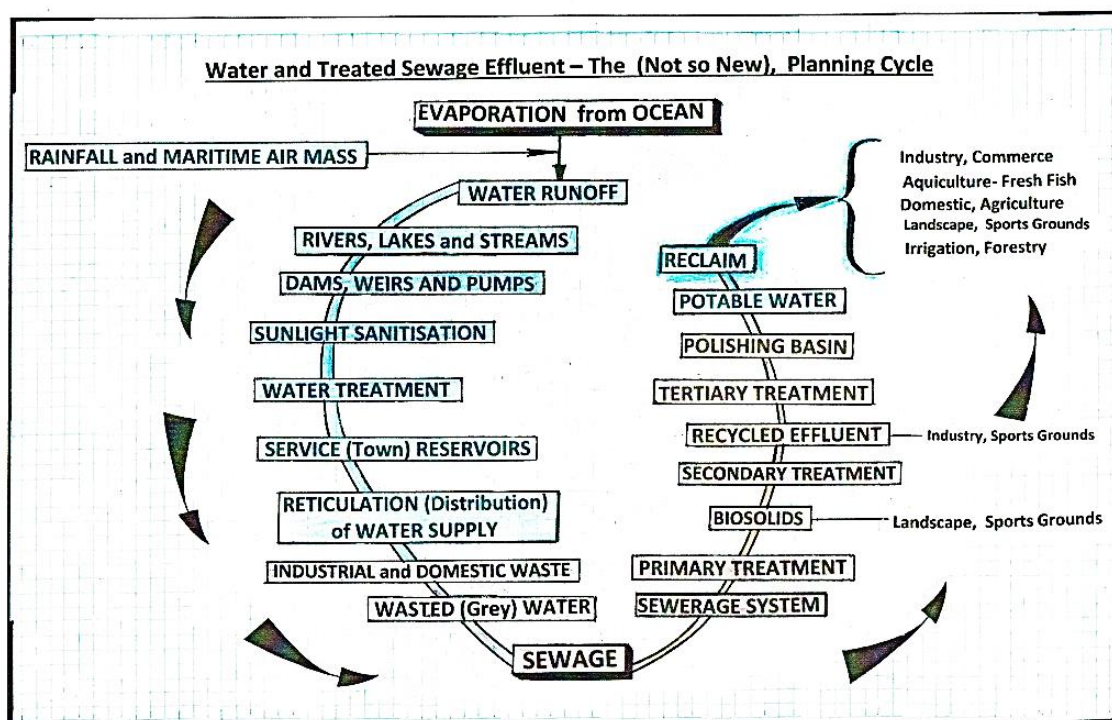


Figure 4. Drawn originally in 1975 by Col Bruton, updated by Col Bruton 2020.

A general Flow Chart of Typical Coastal or Inland Water Supply and Sewerage Systems for Regional Centres, Towns and Villages within Australia. The chart may alter from place to place. The one over-riding factor, is that there is little attempt to treat Sewage to a degree where the Treated Sewage Effluent can be Tertiary treated to become Potable (drinking) fresh water. Rather, does not the abhorrent practice, anywhere in Australia, of discharging Treated Sewage Effluent into a nearby Ocean, Lake, or River Outfall prevails?

Our variable rainfall throughout Australia, offers a challenging response to our Water Supply Authorities. Unfortunately, those in Charge of such Organisations have a blinkered view of long term planning, in that anything of a peripheral nature is completely ignored. Most of our Water Supplies are developed around Political opinions, rather than on long-term technical science and judgement. We have major differences, in the understanding of Water Supply and its availability. All Politicians and their paracitic buearcrats included!

Most City people are unaware of a drought, until Water restrictions are in place. Where-as, those farmers in the MacQuarie River Basin, would be acutely aware of Water scarcity, from the day the Water deficiency begins. Sydney people, in general, have no idea of Water's value. They assume, restrictions or not, Water will always come out of the tap, whenever the tap is turned on. They are utterly unaware of the 1,250,000,000 litres of Treated Sewage Effluent, being wasted into our Rivers and Ocean Outfalls each and every day. Non-stop! Further more, City dwellers have no concept of how the Treated Sewage Effluent can become an important and most valuable resource. Sydney Water's plutocrats, simply keep Water consumers and Toilet Flushers in the "Mushroom" conjecture.



**Figure 5.** Drawn originally in 1975 by Col Bruton, updated by Col Bruton 2020. The newer concept of Water Supply and Treatment of Sewage, showing the changes made to the application of Treated Sewage Effluent. The point being made that no Effluent should be discharged into a waterway. Rather, the entire Treated Sewage Effluent is Re-treated then recycled, to where the Effluent becomes a much sought after and valuable resource.

Water is essential anywhere. It is even more postulative (no other options), to the wellbeing of Australians living on and off the land. Water is life! Copious quantities of water makes life enjoyable. Particularly to the Irrigators, whose crops depend upon Rain and Stored Water, even from an exterior source. *(Just don't waste.... Sir David Attenborough)*

Moreover, a permanent Water supply gives a certain sense of place and security to our farmers. And yet Sydney Water boasts of the fact 1,250,000,000 litres of Treated Sewage Effluent per day is wasted and discharged into Rivers and the Pacific Ocean (Tasman Sea actually), every day. Or put into another perspective, 14,500 litres a second or, seeing as we are talking of sewage, 2,520 flushes of your toilet every second are wasted.

I liken "Reversing the Flow" very much to the "Golden Pipeline", the pipeline hand-built in the 1898 to 1903, that runs from Helena Reservoir now called Mundaring Weir about 40Kms East of Perth, (the only place in Australia where we have White Swans), to Kalgoorlie- a distance of 560 Kilometres. Amazingly, the Golden Pipeline is still in operation to this very day. The Pipeline traversed some of Australia's most inhospitable country which varies greatly from some steep and heavily timbered country encountered by this project. The "Golden Pipeline" was laid, solely for the purpose of mining Kalgoorlie "GOLD".

“Reversing the Flow” achieves exactly the same. But in terms of basic products of Cotton, Wool, Fruit, Vegetables, Cereal Crops, Wines, Beef, Lamb, Pork, Nuts and a variety of edible foods. In turn, the produce results in a “GOLD REWARD”, for the MacQuarie River Basin.

Wine is becoming the “Golden Fleece” of the Basin. Big bold reds, coupled with endearing whites, are steadily making their way into the wine connoisseur’s cellars. The Mudgee Region already challenges the Barossa, Clare and Hunter Valleys for quality Wines. May I suggest one could try Peter Logan’s “*Ridge of Tears*” Shiraz for the best of Australia’s “*Big Bold Reds*”, serve at around 15° to 17° Celsius. Try Mudgee’s “*Ridge of Tears*”, a shade improvement on the Orange vintage. A little further west, off the Castlereagh Highway, at 141 Black Springs Road, is Pieter Van Gent’s “*Classical Mudgee Whites*” and his most quaffable “*Sundance White*”, a superb summer poolside sip, Riverside imbibe or Court-side tittle, served chilled. And if you have time, make your way to “Gooree Winery” about 15Km. north of Mudgee, along the Castlereagh Highway, to sample their Pinot Noir and Merlot. Well worth it. But I digress, after several pleasant fulfilling days at Mudgee

**Table 2. REVERSING THE FLOW - STAGE 1.**

<b>Sewage Treatment Plant and Outfall</b>	<b>Discharge of Treated Sewage Effluent per day</b>	<b>Discharge per second</b>
Castle Hill (Cattai Creek)	7,100,000 litres	82.7 litres
Hornsby Heights (Calina Creek)	6,500,000 litres	75.25 litres
Hornsby West (Waitara Creek )	12,700,000 litres	147.0 litres
North Richmond (Redbank Creek)	1,500,000 litres	17.5 litres
Penrith (Boundary Creek then into Nepean River)	14,700,000 litres	170.0 litres
Quakers Hill (Breakfast Creek to Eastern Creek)	35,100,000 litres	406.3 litres
Richmond (Rickerby’s Creek)	2,100,000 litres	24.3 litres
Riverstone (Eastern Creek)	2,600,000 litres	30.2 litres
Rouse Hill (Second Ponds Creek then to Cattai Creek)	30,200,000 litres	407.4 litres
St. Marys (Boundary Creek)	25,100,000 litres	290.5 litres
Winmalee Via Creek then into Nepean River	18,500,000 litres	202.5 litres
<b>Totals</b>	<b>156,100,000 litres</b>	<b>1,853.65 litres</b>

For calculation purposes, we should round up 2,500 litres per second, which then allows us to include the increase of flow over the next 10 years or so. To give one an idea of how

much water 2,500 litres per second of water can do:- This amount of water can fill Lake Windamere in a little over 60 days, say 2 Months. The same flow of water can fill Burrendong Dam in around 227 days or say 9 months and 2 weeks. Depending upon the amount of water taken from both Dams for Domestic Supply and Irrigation, the flow of 2,500 litres per second will keep each Dam almost to the “Top-up” level at most times.

Our next step now, is to include the STAGE 2 flows from both North Head Sewage Treatment Plant– Blue Fish Point Treated Sewage Effluent Outfall and that of Warriewood Sewage Treatment Plant – Turimatta Head Treated Sewage Effluent Outfall. Stage 2 water flows, from both the Sewage Treatment Plant outfalls, of Blue Fish Point and Turimatta Headland, will bring about the “ideal” water flow situation.

Table 3. REVERSING THE FLOW – STAGE 2.

Sewage Treatment Plant and Outfall	Discharge of Treated Sewage Effluent per day	Discharge per Second
North Head (Blue Fish Point)	365,000,000 litres	4,200.0 litres
Warriewood (Turimatta Head)	20,100,000 litres	232.6 litres
<b>Totals</b>	<b>385,000,000 litres</b>	<b>4, 432.6 litres</b>

Again, for future growth factors, we should round up the figure to 5,500 litres per second, making the overall flow for STAGES 1 and 2 to be 2,500 plus 5,500 = 8,000 litres per second. Now we have the flow of 8,000 litres per second to pump from the Grose River Dam or Pondage to Colo River Weir, then upwards to Glen Alice Pondage. No matter whether we adopt the “Climbing the Colo” concept. Or we choose the Pump direct to Glen Alice Pondage from the Grose River, we have that beautiful figure of 8,000 litres per second.

And what can we do with the 8,000 litres per second? Now isn't that being far too much Water? Such a flow can fill Lake Windamere in 20 days and filling Lake Burrendong with 85 days or say within 3 months. Not only would both Dams be full, but such a flow will not only fill the Dams but would have them overflowing. Even in a long drought! The ideal situation! No doubt many Irrigators would be delighted with an event. Incidentally, there is no such thing as “Too Much Water” unless flooding occurs.

Table 4. REVERSING THE FLOW – STAGES 3 TO 5

Treatment Plant and Outfall	Discharge of Treated Sewage Effluent or Desal. Sea Water per day	Discharge of Treated Effluent or Desal. Sea Water per second
South Head (Ben Buckler)	130,000,000 litres	1,505.0 litres
Malabar (Long Bay)	488,000,000 litres	5,650.0 litres
Cronulla (Potter Point)	60,000,000 litres	695.0 litres
Kurnell Desalination	250,000,000 litres	2,895.0 litres
<b>Totals</b>	<b>928,000,000 litres</b>	<b>11,000.0 litres (rounded up)</b>

With the 11,000 litres of Treated Water, per second, from the 4 plants South of Sydney Harbour, we now have the possibility of increasing the MacQuarie River Flow by some 28.6%, given that the flow is pumped to Ben Chifley Dam. How-be-it, there could be numerous "Offtakes" from the 4 Plants. After the Warragamba Treatment Plant, Sydney Water could demand a certain amount of the Treated and Purified Liquid Fresh Water be allocated to Sydney. This would depend upon the levels at Lake Warragamba. The Electricity body could also ask for more water for the Power Stations, fed by Lake Lyell. Bathurst could ask for a new Dam. While Orange, may enlarge Ben Chifley Dam. By and large, with increasing population at both Bathurst and Orange, demands on more water will be quite expansive.

So where we start with 11,000.0 litres per second at Warragamba Dam, this amount of water could be reduced by almost half. Leaving us with around 6,000 litres per second for the Campbell and MacQuarie Rivers. Even so, the 6,000 litres per second, would still increase the MacQuarie River's flow by around 16%. So by combining Stages 1 to 5, or 8,000 litres of water, plus 6,000 litres of water per second, we have a practical amount of 14,000 litres of water per second. Such an amount then increases the MacQuarie River flow at Dubbo, by around 37%! And year round at that, whether good rains or droughts.

### Getting back to "Reversing the Flow" after we cross the Great Divide

With Stages 1 and 2. From the Upper Glen Davis Pondage, I envisage Tunnels and Canals carrying the water to Cudgegong and Turrone Rivers. There could be a possibility of a canal connection to the Castlereagh River as an extra bonus to the project. I have great preference for canals. An open canal allows for the tumbling of water, which is a form of Oxygenation, adding to the treatment process, the sun also helping the sanitisation of flowing water.

After the water enters the Burrendong Dam, via Windemere Dam, it then flows into the MacQuarie River. The MacQuarie River takes a circuitous path, by meandering through Wellington, Dubbo, Narromine and Warren, going through the MacQuarie Marshes, before entering the Barwon River (Upper Darling), between Brewarrina and Walgett, very near Carinda.

From the Barwon River, the water then serves the project's second service. The water then flows into the Darling River, also substantiating a "back-up" supply for the down-stream regions of the Darling River. Eventually being a second source of good quality water for the Menindee Lakes.

The Darling is around 1472 Kms long, falling some 84 metres, with a very flat gradient of around 15 millimetres per metre. It would take roughly 2 months for a flow of water from the MacQuarie River to reach Menindee Lakes. Naturally, the stronger the flow, the shorter the time.

From Burrendong Dam along the MacQuarie River, there is a fall of 54 mm per metre over 173 Kms. However, the River slows greatly by recharging the MacQuarie Marshes, taking a good 4 to 5 weeks before meeting the Barwon (Upper Darling) River.

**However, our primary goal is to target the Macquarie River Basin**, by supplying an abundant and continuous supply of water at all times, especially during hot and dry weather. The 2032 Irrigators would welcome the perennial water supply, probably by increasing the area of cultivation, thereby, increasing employment and allowing for an extra source of income. The advantages, coupled with wealth generation, based solely on crop farming, Fruit, Grapes, coupled with Pastoral activities are quite predictable, reflecting a rather megalithic change in land use.

**Table 5 :- Land use, in the MacQuarie-Bogan Catchment Area.**

Land use category	Area in Km <sup>2</sup>	Proportion of Catchment expressed as a (%).
Grazing	61,037	81.6
Dry cropping and horticulture	6,964	9.3
Native Landscapes	1,986	2.7
Forestry	1,841	2.5
Irrigation	1,182	1.6
Conservation	872	1.2
Residential	540	0.7
Wetlands	275	0.4
Lakes, Rivers and Dams	117	0.2
Mining	5	<0.1
<b>Totals</b>	<b>74,819</b>	<b>100.00</b>

By Australian standards, the MacQuarie River Basin, is quite small. The Basin holds 0.95% of Australia's land mass. Yet you can fit Switzerland, Montenegro, and Slovenia in the same area. Mid you, you would have to tolerate 8,500,000 people packed into the same area. All speaking French, German or a Slavic language. Or if you so want, you could fit all of Ireland, with an extra 5,500,000 people speaking a lyrical, understandable English. The Basin, could comfortably, hold up to 250,000 people. However, to maintain that population, **WATER** and in an abundant drinkable quantity, would become extremely critical.

The day after Remembrance Day, I received my Sydney Water bill. Among all the paraphernalia attached to the bill, was an A4 coloured brochure, in which the words *"Our water is too precious to waste, so love water, don't waste it"*, appear. Obviously, someone from Sydney Water, was also watching Sir David Attenborough's programme.

**Table 6 :- Employment Analysis, in the MacQuarie-Bogan Catchment Area.**

There is a total population of 181,619, with 83,489 people being employed (Pre Covid-19)

Employment Category	Number of employees	Per centage
Agriculture, Forestry, Fishing	5,305	6.43%
Mining	3,517	3.87%
Manufacturing	4,891	6.14%
Electricity, Gas, Water, Waste	962	1.20%
Construction	5,186	6.51%
Wholesale	1,789	2.24%
Retail	8,302	10.52%
Accommodation, Food and Services	5,573	7.08%
Transport, Postal and Warehousing	2,954	3.71%
Information, Media, Telecommunications	793	1.03%
Financial and Insurance	1,206	1.54%
Rental, Hiring, Real Estate	927	1.17%
Professional, Scientific and Technical	3,137	3.94%
Administration and Support Services	2,256	2.84%
Public Administration and Safety	5,935	7.53%
Education and Training	7,635	9.71%
Health care and Social Assistance	11,408	14.44%
Arts and Recreation	2,355	3.06%
Other Services	3,220	4.04%
Not Stated (Prisoners- unemployed?)	1,797	2.1%
<b>Totals</b>	<b>83,489</b>	<b>100.00</b>

Australian Bureau of Statistics (ABS.Stat), G53 Industry of employment by occupation (LGA) 39 pages

By the year 2050, the Basin could have up to 200,000 people, with around 100,000 in permanent full-time jobs. With the Basin's total production output of around \$12,000,000,000 and increasing, the outlay of around \$15,000,000,000 to bring the treated and purified water over the Great Diving Range is a quite justifiable outlay. With increased value of produce, couple with extra tax gathered, it may well be envisaged, the \$15,000,000,000 cost of providing "Reversing the Flow", could bring great benefits. Coupled with a profit produced within several years.

After some 10 years the Cost-Benefits Analysis could be in the order of \$3:50 Benefits for every dollar outlay. Making "Reversing the Flow" project a most beneficial Project. Beyond 10 years, the benefits from the \$15,000,000,000 construction costs of "Reversing the Flow" will further increase as the years roll by. So we have the old Country saying, "WATER SECURITY equals WEALTH GENERATION!" Without wealth generation, there is no welfare.

Currently the project in its various stages, very much falls into line with the concept of decentralisation and applying infrastructure to regional areas. Although the majority of the Construction Activities lies east of the Great Divide, the benefits are very much Regional and Rural within the MacQuarie River Basin. Most of the benefits will apply food production, which within itself, is a highly desirable outcome. Particularly with the upcoming food shortfall within the next 5-10 years in North Africa (with overpopulation, more than India and China combined and scarcity of land), the Indian Sub-Continent and also with China. WATER SECURITY within the Basin will produce many unexpected benefits

### Some thoughts on World Food Supply

Quick comments on the World food supply. Currently our Planet Earth, needs another 70% of extra land to provide enough food to keep every person above starvation level. By 2030. We will require 2 complete Planet Earths to feed the population. And by 2050, we will have to have 3 Planet Earths, to provide sufficient food for everyone. Between the years 2025 and 2030, China will start feeling the pinch on feeding her massive population. Coupled with their enormous population, China has a salination problem with their marginal cropping areas. China's current policy of placing ridiculous tariffs on Australian food produce could well "Boomerang" on them. Australian food producers, could well find other reliable markets, When China starts to need more food, (in 2025), and quickly, who will feed China?

Currently, China wants to boost its ability to modify the weather by extending an artificial rain and snow making programme to cover at least 5,500,000 square Kilometres of land by 2025. China claims it would ensure its weather modifications capabilities would reach an advanced level by 2035. They have frequently made use of cloud seeding technologies to relieve droughts, or to clear the air ahead for major international events. Included in the programme is the building of a weather modification system in the Tibetan Plateau, Asia biggest freshwater reserve, with the aim of pumping huge quantities of silver dioxide into the clouds, in a bid to increase rainfall. The plan said China will continue its artificial weather operations in key areas like the Tibetan Plateau, as well the upper catchments of the Yellow and Yangtze Rivers

Food supply World-Wide is becoming utterly critically. If 6 Countries refused to send food to Japan, that Country would experience major famine conditions within months, if not weeks. Much civic unrest would eventuate, probably turning into Civil War. Military Forces and the Political Elite would receive most, if not all of the imported food. Armed Services will be needed for population control. Such a scenario already exists in some North African Countries.

### Food Production

World-Wide we can only produce 65% of food for Planet Earth's excessive population, if everyone had a sustainable diet . In United Arab Emirates (UAR), they only produce 15% of their own food. With their Oil rich population importing the rest. IN UAR their aim is to produce 30% of their food by applying nutrients and fertilisers to their sandy soils.



In China they produce 100% of their own food, but import “Quality” foods for their wealthy middle class. While in Australia, given adequate water supply, coupled with arable lands we can produce 192.75% of our food requirements. (See page 22, “Living in the Environment” G. Tyler Miller, National Geographic Press, Cengage, USA, 2019). Given good conditions, Australia can become a major food supplier (a breadbasket), for many over-populated Countries.

In conclusion:- May I say the concept of Reversing the Flow, may not be the Perfect answer, I do believe it is much better than any other solution to date.

“Not Quite PERFECT , Just BETTER”

**“APPENDIX A”**

## WHY THE OCEAN IS A NATURAL PURIFYING PLANT

The ocean is a natural recycling machine, continuously breaking down enormous quantities of naturally occurring “wastes” generated among ocean-dwelling organisms.

In these natural recycling processes, one organism’s wastes are another organism’s food.

For example, anchovy shoals off the coast of southern California produce as much faecal matter each year as 90 million people – and anchovies are only one of hundreds of species of marine life in the Pacific.

The “ingredients” in this bio-degrading and recycling process include oxygen, which occurs naturally in the water, salt and light, or sunshine. Everybody knows how salt and sunlight bleach clothes, hair, even skin if you stay in the water a long time or expose clothes to the beach environment very frequently.

These natural ocean purification processes are very similar to “secondary” and “tertiary” land-based sewage treatment processes, but on a much larger scale.

Sydney, like the surf cities of Hawaii and coastal California, has to use these vast natural purification properties of the ocean for effluent disposal, because they offer the cheapest, most effective, environmentally safe treatment systems available.

However, in the drive to have Sydney sewered, which is now very largely achieved, there was insufficient money available to properly handle the disposal of the effluent into the ocean. Consequently Sydney’s three ocean outfalls at Bondi, Malabar and North Head have discharged effluent right at the water’s edge and very near the surface. Too close and not deep enough.

This has sometimes overloaded the ocean’s natural treatment systems, so the ocean is not able to always fully treat the effluent before it is blown or taken by currents or tides close to a beach.

Since 1972 the Water Board has conducted the most intensive oceanographic, environmental and engineering analysis ever conducted in Australia to investigate the possibility of using long-range, deep-water ocean outfalls by extending and lowering of the outfalls at Bondi, Malabar and North Head. This research also examined a wide range of alternative methods of overcoming Sydney’s beach pollution problems.

The investigations included analyses of the marine environment, tides, currents, winds, water temperatures, fish life, bacterial die-off, etc.

The conclusion was that the proposed ocean outfalls would work. They cause minimum environmental damage and no marine life problems. Most importantly, they would protect our beaches from sewage-related pollution for decades even under the most extreme weather conditions. And they would be much more cost-effective than all the alternatives. Overseas consultants, given all the data to examine and conduct their own independent investigations, came to the same conclusions.

The new deep-water outfalls were designed to:

- Release effluent that has been more highly treated than at present (over \$150 million is being spent, as part of the Government’s \$450 million Beach Protection Programme, on expanding and improving Sydney’s coastal treatment plants).
- Always provide extremely high dilutions of the effluent right from the moment it enters the saltwater ocean environment.

This will greatly speed up the natural dispersion and bio-degrading processes provided by the ocean. The natural purification processes will never be overwhelmed by high localised effluent concentrations, as sometimes happens at present.

- Increase the “time of travel” between the discharge points and areas like bathing waters and beaches.

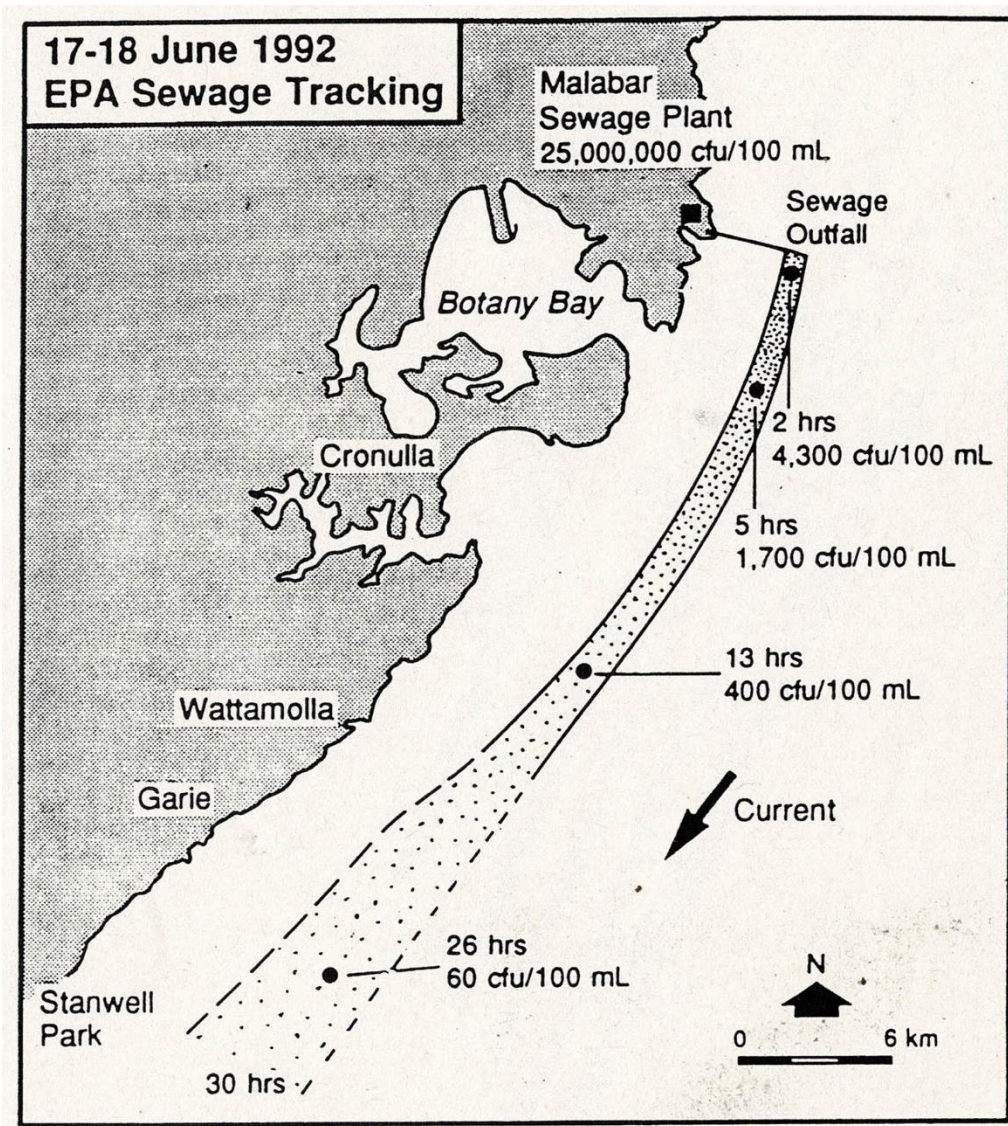
This will be achieved by a combination of three techniques:

- Increasing the dilution of the effluent when it hits the ocean waters (a very dilute effluent plume moves more slowly).
- Releasing the effluent at a very great depth (so that most of the time the effluent will be completely dispersed and broken down before it can even reach the surface, thus avoiding the influence of winds and surface currents).
- Releasing the effluent much further from the shoreline than at present.

Increasing the “time of travel” will allow the ocean’s natural purification processes – which will already be working *faster than at present* – much more *time* to complete their task.

Construction on the three long-range, deep-water tunnels started in 1984. The tunnels will be completed by 1991.

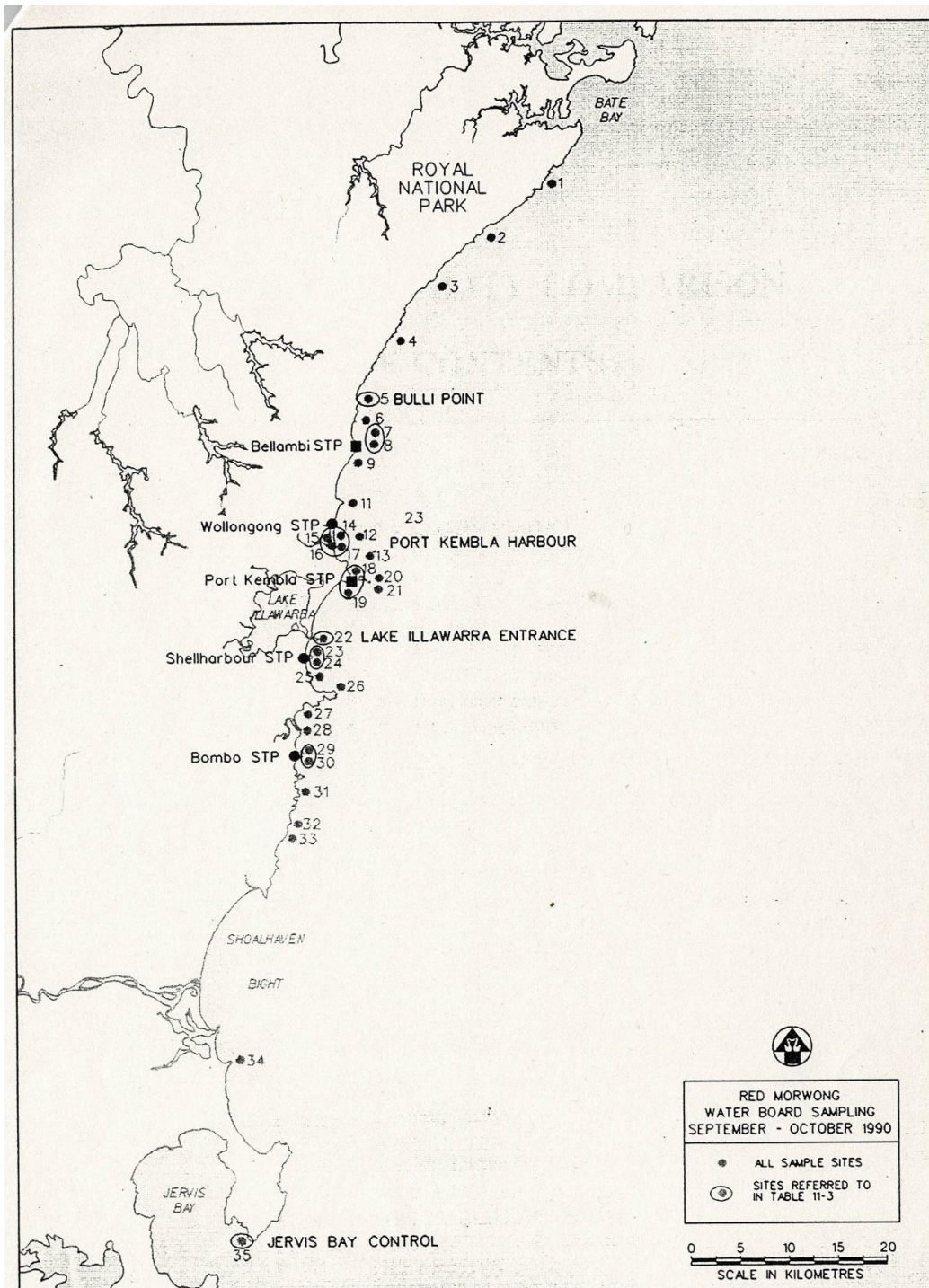
## Appendix "B"



Unfortunately, this diagram does not show the extra Treated Sewage Effluent from the Major outfalls of Blue Fish Point-North Sydney nor from Ben Buckley- Bondi. The "CFU's" are the counts for "Colony Forming Units" which is invariably a mirror of Coliform counts. Coliform counts reflect the amount of solid poo that still exist in the water. In this case, it shows a dispersion of solid wastes over a given period of time. CFU's exceeding 400 units per milli litre, should see the closing of Beaches and Poo-Pools until the count drops well below that level. My criticism is that there is no indication of the dilution factor between Fresh and Salt (open Sea) water. The exercise show dispersion from only one Plant, when all 3 and even Potter Point (Cronulla) should have been included



## Appendix "C"



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9,488 words, 28 pages, 361 paragraphs and 949 lines. Does not include words on maps, diagrams and charts