Submission No 49

INQUIRY INTO ADEQUACY OF WATER STORAGES IN NSW

Organisation: Caldera Environment Centre

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Caldera Environment Centre Inc.
FOUR QUEEN STREET MURWILLUMBAH N.S.W 2484 PH: 02 - 66 721 121
PO BOX 5090 SOUTH MURWILLUMBAH N.S.W 2484

The Director,
Standing Committee on State Development,
Parliament House
Macquarie St, Sydney
NSW 2000

Dear Sir,

Re: Inquiry into the adequacy of water storages in NSW by the Standing Committee on State Development

The Caldera Environment Centre would like to make a submission to the Standing Committee on State Development on the adequacy of water storages in NSW and particularly in relation to current and future water storage of the Tweed Shire.

a) the capacity of existing water storages to meet agricultural, urban, industrial and

environmental needs,

Urban

- Current water storages ARE Adequate – for example Clarrie Hall Dam (CHD) has enough water to supply the Tweed Shire until 2035.
- Any perceived shortfall in the Tweed Shire supply has been fabricated by the council to justify the dam. In 2011 Geolink found that TSC figures overestimate future water consumption by between 5-15%.
- There are ALTERNATIVES to building Dams to supply water to urban areas
- More effort need to be placed on DECREASEING DEMAND
- rainwater tanks are a good alterative

In recent times Australia has made great progress by reducing the per capita water consumption. Recent major continental droughts have made citizens duty bound to conserve water resources. Major capital cities and most regional areas have made major advancements in the past 20 years in the realm of water conservation. Technology developed during that time in response to the water shortages is now available and ready to be utilised in urban areas to provide alternative supply to urban areas. The Sydney Olympic Park Authority has provided an excellent example of how a master planned community can develop a water saving culture, and demonstrates that recycled water is safe and cost effective. With 90% of water for household use being supplied from non-dam use, i.e. recycled water, water demand (from dams) in urban areas across the state of NSW could be decreased with a comparable in investment in water recycling technologies retrofitted to established urban areas instead of the large capital cost of a new dam.

Dams are certainly part of the overall water supply matrix. Dams should not be seen in isolation from other water saving and recycling technologies, but as one input among many. Rainwater tanks provide a meaningful way for householders to take greater responsibility for water use and decrease demand on dam supplies. Water tanks of sufficient size to provide water over an extended period should be 20 000L. The NSW BASIX development code is an excellent way of promoting sustainable building practices and needs to be encouraged and expanded upon.

The reliance of urban areas on a single point source for the water supply has been shown to have considerable health risks .This was most obvious in Sydney after the 1998 water crisis when giardia and cryptosporidium infected Warragamba Dam. Dams are breeding places for algae and bacteria; the water is still, stratified and high in nutrients; perfect conditions for eutrophication. While contingencies plans can be made and policies and guidelines developed, the risk of bacterial contamination is ever present from dam reservoirs. Water recycling technologies manufacture water to a cleaner standard than dam water.

Tweed Shire Council – Example

The perceived shortfall in the water supply of the Tweed Shire as claimed by the local council authority in the *Tweed Shire Council Demand Management Strategy* (2009) and which has been used by the council to justify the need for a dam has been proven to be in error, by overestimating the future demand of water by up to 15%. The Council also claimed water savings made through the BASIX regulations as its own initiatives (Geolink 2011 *Tweed Shire Demand Management Strategy and water supply Augmentation A brief Technical review*) (see point (b) below for further details on the overestimated figures). However, the point to be made here is that the existing water supply is more than adequate. If supplementary water is needed then alternative sources of water should be utilised including rainwater tanks and grey water recycling. Employing such technologies will negate the future need for a dam.

Agricultural

- Current land management practices have resulted in salinization, erosion and loss of soil fertility; increasing dam water storage will not solve these fundamental problems
- Keyline farming (developed in the 1950) has demonstrated a way of increasing onsite water storage without the need for large dams
- Improving streamside and floodplain vegetation, and overall increasing landscape vegetation improves the ability of the land to retain moisture during high-flow periods and release water during low-flow periods.
- Permaculture is another agricultural innovation that needs to be widely promoted

There are a variety of established land management techniques that have been proven to work at increasing the water holding capacity of the land without the need of dams. P. A. Yeomans developed the keyline farming method in the 1950s which has been proven not only to increase on site soil moisture but actually increases soil fertility and builds the soil profile at an amazing rate, due to the inclusion of organic matter back into the soil profile by ploughing it under (Yeomans 1993).

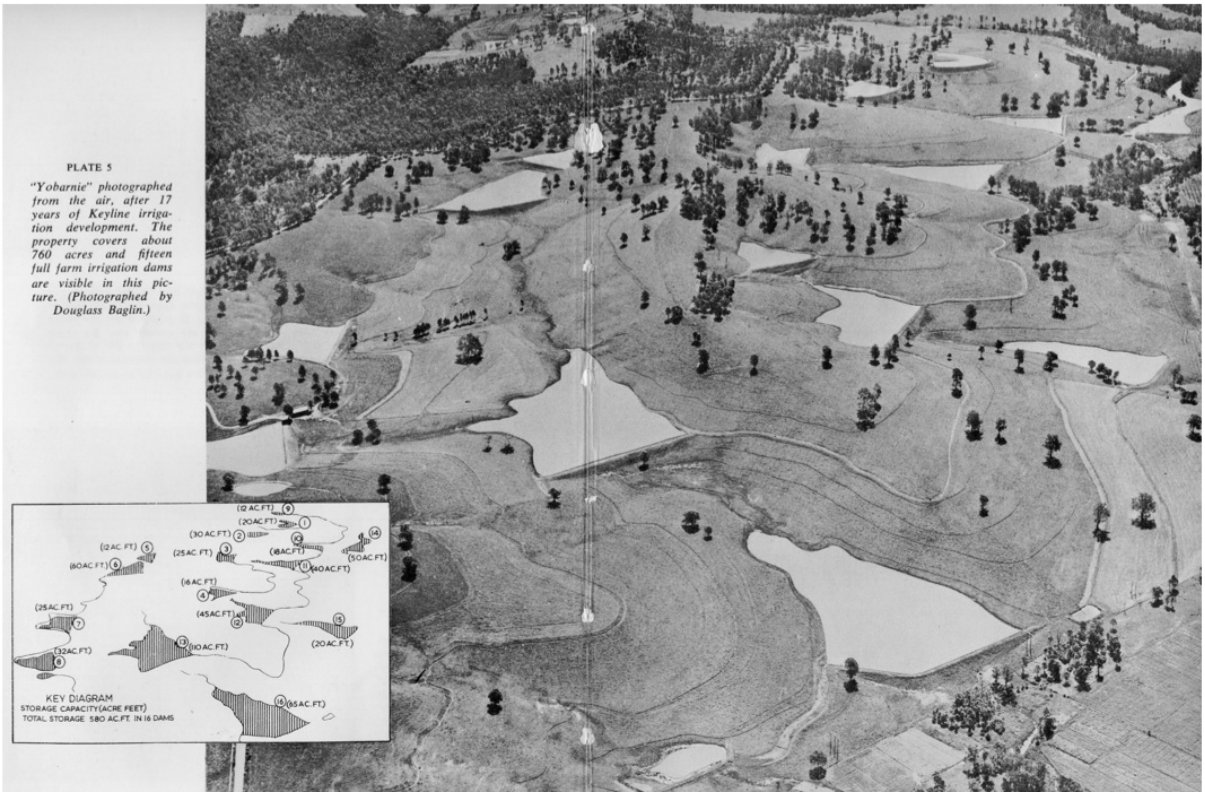

Image 1: *Keyline Farming Plan*

Such methods involve forming swales to slow water movement and planting appropriate plants to increase water filtration are a primary concept in the keyline method. Peter Andrews is a recent example of this methodology being applied successfully with some further personal innovations. There are other examples of this farming style that is now over sixty years old. The reliance upon dams is a centralised supply-side response that exacerbates problems of agricultural water shortage by creating a false sense of security about water availability and removing the relationship of the land owner from active engagement with the land to one that is in control of, or dominating the land.

Image 2: *Peter Andrews Tarwyn Park, Qld. Subsurface Irrigation (on left of image) from restored streams; compare to conventional farming (right)*

If more incentives were offered to promote a cultural change towards more of a Landcare style of farming, then there would be less demand for dams in agricultural areas as farmers become self-sufficient, and existing reservoirs cater for future water demand.

Environmental

- Australian ecology is not compatible with dams, large still bodies of water such as those created by dam reservoirs are destructive to Australian aquatic ecosystems; they promote an artificial ecosystem that is dominated by exotic flora and fauna, such as *Salvinia*, and carp.
- Environmental flows are highly contentious and rarely actually implemented as intended.
- Water released from dams for environmental flows is unsuitable for aquatic ecosystems and often has negative downstream effects; it is high in toxins, including dissolved metal ions, particularly soluble iron and methyl-mercury. Methyl Mercury is caused by rotting vegetation in anoxic conditions (like those found at the bottom of a dam) and is bioaccumulative, increasing in concentration up the food chain, affecting human beings most of all. Water released from the bottom of a dam is also extremely cold and anoxic (it has no dissolved oxygen) and so can actually cause asphyxiation of fish immediately downstream. The Cold water affects reproduction as fish rely upon temperature queues to begin mating (Andrew Boulton and Margaret Brock, 1999, *Australian Freshwater Ecosystems*).
- Dams destroy physical connections in the environment and inundate lowland and floodplain ecosystems

- Current practices of the past 200 years that have regulated the Murray River, in particular through the Snowy Hydro-Scheme have resulted in salinization, choking of the Snowy-River through inadequate flow regimes, and the slow death of the River Red Gum along the Murray River through altered water-tables.

One of the dominant characteristic of the Australian landscape is eloquently described by Dorthea MacKellar as "a sunburnt country… a land of drought and flooding rains" and we have an ecology that has adapted to that harsh variability. A dam does not help the environment. The argument that a dam is necessary to supply water to critical habitats in times of drought via environmental flows ignores the meaning of 'natural system'. If the natural ecosystem is in decline, it is not because of natural variation in water availability but rather land clearance, species loss and the excessive extraction of water for human consumption and agriculture over the past two centuries. The use of artificial water storages to keep rivers flowing is akin to keeping a terminally ill patient on life support; the problem lies with the existing agricultural system and cannot be solved by intravenous injection by a dam.

Some ecosystems need a drought as part of their natural cycle. Droughts can remove problem species or in combination with floods allow regeneration of other species once favourable conditions return; but droughts are now exacerbated by historical land clearance and contemporary mass-market farming landscape changes. Dams interfere with these natural rhythms and the result is problems like salinization and loss of aquatic fauna. Water released from dams is cold, acidic and contains mobile toxic metal ions, particularly iron chelates, and methyl-mercury; methyl mercury is particularly insidious as it is biioaccumulative and is formed by the process of decomposing vegetation under anoxic conditions (http://en.wikipedia.org/wiki/Methyl_mercury , Boulton and Brock 1999). Sulphides and methane are often dissolved in the water as well, such water is toxic to downstream flora and fauna (Boulton and Brock 1999).

Dam reservoirs sever wildlife corridors and restrict the movement of terrestrial flora and fauna across the landscape. Echidnas can't swim! and the movement of other large terrestrial species is also debateable. Aquatic ecosystems are also drastically changed, lakes and large bodies of still water are not a natural feature of the Australian landscape and a proliferation of exotic aquatic flora and fauna take advantage of these conditions and can easily outcompete native aquatic species and contribute to declining water quality; particularly through eutrophication because of fecund exotic water weed growth.

It has been argued by prominent wildlife ecologists that Australian biota is under threat of extinction (Flannery 1995 *The Future Eaters*, Low 2003 *the new nature*, Lindemayer 2007 *On Borrowed Time*). The natural ecosystems are unable to take much more impact from human development, dams and water supply occupy a particular blind-spot with the needs of a booming human population being put before the needs of the natural ecology; and before sober consideration of the concept of carrying capacity, or an ultimate sustainable limit to population growth (Flannery, Lindemayer 2007).

Industrial

- Water should be prioritised for human consumption and agricultural uses in preference to industrial uses; industrial uses such as mining should have stronger regulations against water use
- Coal Seam Gas – will dam water be used for CSG?? No water storage should be used for CSG activities. The National Toxic Network (2011 *Hydraulic Fracturing in Coal Seam Gas Mining: The Risks to Our Health, Communities, Environment and Climate*) explained in detail the types, quantities and deleterious effects of chemicals used in the hydraulic fracturing process
- More emphasis needs to be placed on on-site water storage (rainwater tanks) and reuse and recycling of water in industrial processes

The use of dam water for industrial purposes is not to be condoned. Use rights should be exclusively for human and agricultural uses. Current industrial water demand could be managed with greater improvement and incentives towards onsite water capture, reuse and recycling.

Existing industries have a poor record of water use, with massive amounts being wasted in industrial processes. The disappearance of rivers in the hunter valley through fracturing of the streambed geology epitomise the destruction of the existing coal industry on water supplies

As well as this threat the community now has to contend with Coal Seam Gas (CSG) mining which threatens to invade artesian and ground water. There is much uncertainty about the future of CSG and the impacts it will have on water quality. Will the CSG industry have access to dam water via local government authorities and who will have to pay for it? Where will the water go? The commercial in confidence classification of chemicals in the CSG process is also concerning and contradictory, given the regulations placed on landholders pesticide uses and water quality.

b) models for determining water requirements for the agricultural, urban, industrial and

environmental sectors,

The Tweed Shire Council Demand Management Strategy

- Is the main justification for augmenting local water supplies
- Overestimates future water demand by 5-15%
- Assumptions of exponential population growth have been undermined by reality, the latest population figures (Tweedlink 26/6/2012 No766) show population growth is actually slowing.
- Tweed Council claims credit for NSW state planning initiatives; BASIX is listed as a council water saving measure and is used to justify the claim that council is saving water. In actual fact it is meeting its statutory responsibilities and has not actually taken [proactive steps to reduce water consumption
- More emphasis needs to be placed on LARGE rainwater tanks

The regional North Coast Council of Tweed Shire recently embarked upon a process of community consultation to decide on a new water supply option. The experience of the community is described below as a "model" of contemporary government process. Ignore the community and expert advice and do what you wanted to do in the first place.

Case study – Tweed Shire

The Tweed Shire is developing from a largely rural population and economy to a more urban population with the associated demands in water. In the Tweed Shire the existing water storages will be able to satisfy demand up until 2035 and population growth is slowing (TweedLink 26/6/2012) which means that expected demand forecasts will be delayed. The Tweed Shire council has implemented minimal water saving or recycling technologies, and is now considering the need to augment its water supply through increasing existing dam capacity or construction of a new dam.

Existing storages are fine, and adequate to meet current needs however, they need to be complimented by 21st century water saving technologies and public education that aims to increase social acceptance of water recycling technologies. This will prevent the need to augment water supplies by increasing existing dams or building new ones

In 2009 the Tweed Shire Council initiated the Community Working Group (CWG), to provide community input into a multi-criteria analysis that was to inform the council staff recommendation of preferred options to the councillors. Councillors summarily dismissed the staff's recommendations and scoffed at the community input and wet ahead with their own individual preference to build a new dam rather than to increase the size of the existing dam.

The DMS and the CWG process were inputs into the model (multi criteria analysis), and this has been since shown to be faulty. There needs to be better scrutiny of local government assertions about water demands

Some assumptions made during the TSC MCA process have since been invalidated (Geolink 2011).

These include:

- The rate of population growth, The DMS assumes a faster population growth rate than is actually occurring (Tweed link Issue 766 p.1 - 26/6/2012).
- Projected consumption figures in the TSC DMS (2009: Table 4.3) have been reviewed by external experts and found to be overestimated by at least 5% and up to 14% (Geolink 2011)
- Claiming NSW government BASIX regulations as council initiatives or options (TSC DMS 2009)
- Claiming that 30 000 ML from a new dam is needed to provide for an estimated 3000ML deficit in exiting supplies
- Failure to properly quantify prices of recycled water, assuming that they are "too expensive"

The result has been the assertions made by the council about the need for a dam is disputed by a large section of the community given the obfuscation of figures and disregard of rate payer funded community consultation input by elected representatives.

c) storage management practices to optimise water supply to the agricultural, urban,

industrial and environmental sectors,

- Rainwater tanks, Water Recycling and reuse are the best ways to optimise water storages
- Better pricing mechanisms need to be in place to make recycled water more desirable
- Increase on-site water storage practices in agricultural sectors, not by building large irrigation dams, but by following a methodology developed by PA Yeomans and Peter Andrews that uses the keyline method, riparian revegetation and landscape restoration to improve subsurface water flows and so increase surface water quality on farms
- Higher water prices are needed for industrial sectors, mining in particular. This industry is currently subsidised through cheap water prices. The returns on investment made by mining companies means they can afford higher levels of water charges.

The primary water supply for the Tweed Shire is the Clarrie Hall Dam (CHD). The Tweed Shire Council is currently implementing an excellent program designed to improve water by working with landholders on riparian land that are tributaries to the Tweeds primary water extraction site at the Bray Park weir in Murwillumbah. Water is pumped from this site throughout the shire's 6000 + km of pipes and into the 70+ reservoirs. The irony is that despite the councils bets intentions cattle grazing and associated farming practices including broad acre herbicide and fertiliser application are occurring within the catchment of the CHD. Similarly within the immediate catchment of the weir cattle have unrestricted access to the reservoir. Council needs more power to manage agricultural practices that are non-point pollution sources contaminating the urban water supply.

d) proposals for the construction and/or augmentation of water storages in NSW with

regard to storage efficiency, engineering feasibility, safety, community support and cost

benefit,

CHD has a secure yield of 13 750 ML, adjusted for 2002 drought. The future expected demand is not expected to exceed the level of secure yield until 2023-2030. Estimated future water demand is 16 750ML, leaving a 3000ML shortfall. Raising the existing dam will provide 7 170 ML secure yield and building a new dam at Byrrill Creek will create 8 700ML secure yield, both of which are in excess of the 3000ML shortfall anticipated by 2030. However the councillors have decided to vote in opposition to the recommendations of their own staff and community advice, deciding to build the largest option possible that of a new dam.

The Tweed Shire is one of the wettest places in NSW there are other alternatives that the council an pursue with greater vigour; such as big rainwater tanks on urban residences and improving water recycling and reuse within existing developed areas, stormwater harvesting is another option also. However the two preferred options of the councillors are: i) Raising Clarrie Hall Dam and (ii) Constructing a new dam at Byrrill Creek.

Storage Efficiency

- BCD is unlikely to be very efficient due to the underlying geology which is highly porous and fissured by faults because of the local igneous geology
- CHD is the more efficient option because it is already established

Engineering Feasibility

- BCD as mentioned above is likely to have unanticipated problems because of the geologic layers where it is proposed to be built. No doubt engineering solutions can overcome this but the financial cost will be massive
- The Tweed council currently needs to make improvements to the existing spillway on Clarrie Hall Dam in accordance with the latest safety regulations designed to accommodate a one in a hundred year flood; this would be an ideal opportunity to raise the existing dam wall and create the extra water supply needed for future population growth.

Safety

- The Construction of a new dam in the Tweed River catchment (i.e. Byrrill Creek Dam) is an unacceptable risk to the safety of residents downstream on the Tweed River, particularly in the village of Uki ad the town of Murwillumbah. There will be two dams in the same catchment and the effective risk of dam failure is doubled.
- The health risks posed through large bodies of still water include increase in mosquito populations. The north coast area is already afflicted with mosquito borne diseases such as Ross river fever and Barmah Forest virus. Climate change is likely to result in higher temperatures and the southern migration of mosquito species from Queensland that carry diseases such as Dengue fever (Tim Flannery-*the Weather Makers*)
- There is also the issue of Reservoir Seismcity to consider. Geologists have linked dam construction and reservoirs inundation with the localised earthquakes in a phenomenon known as Reservoir Induced Seismicity (http://en.wikipedia.org/wiki/Induced_seismicity Patrick McCully 2001 – Silenced rivers, p.113).

Community Support

- Neither option is entirely supported by the community, in fact the community is polarised on the issue
- The Community Working Group – A consultative committee set up by the council was unsatisfied that Tweed Shire Council had made genuine attempts to investigate and implement contemporary water saving technologies
- Council manipulated figures to justify a pre-determined outcome, creating scepticism of council processes and loss of credibility in government assertions

Cost benefit

- Cost Benefit Analyses rarely include environmental costs such as species loss and habitat destruction.
- A CBA also overlooks social costs such as dislocation and the destruction of local communities “social capital”; costs which by definition are intangible.
- Carbon Prices should be included into any CBA and account for construction materials, construction process, vegetation clearance and methane release from decomposition of vegetative material in the dam reservoir
- Bent Flyvbjerg (2003 *Megaprojects and Risk)*, analysed the construction of major projects between 1930 and 2005 and found that not a single project had been completed on budget, generally, construction costs are under estimated by at least 10% and up to 100%. Local

experience of the Tugun Bypass and other road projects with ballooning costs validate this assertion. It is fair to say that official estimations for dam augmentation and construction are under estimated

- The same study found that benefits of large projects are typically overestimated. Dams are no exception. The benefit of dams is retarded through issues of water contamination and pollution through eutrophication and associated management costs
- Construction of either dam option will result in massive vegetation clearance. While, not an engineering obstacle, this will result in massive carbon pollution, and destroy landscape values and diminish habitat of threatened species
- The Byrrill Creek area adjoins the Mt Warning National Park and acts as a corridor between Mt Warning and the landscape to the south and the nearby Wollumbin National Park to the West.
- provides many examples of threatened species in a small area. What price does a koala have? Is its status as a threatened species mean that it is worth more than an Echidna? How are plant species valued? Such external costs need to be factored into CBA to better reflect the true cost of dam construction and augmentation
- A CBA process needs to acknowledge these institutional oversights and include environmental externalities to be credible.

Interesting to note with this particular term of reference is that it has omitted the word "environment". Admittedly the word is somewhat arbitrary in its definition and can be thought of to include the built and cultural environment as well as the more obvious and connotatively familiar "natural environment". The exclusion of the environment from the consideration of new proposals is unjust given the unceasing popularity of environmental causes. The impact of building a new, or even augmenting an old, water storage has a massive impact on the immediate local ecology of the environment and needs careful scrutiny prior to any decision being made. Not providing so much as the courtesy of considering the impact of new proposals on the environment invalidates any approval process to the ecologically minded citizens we represent. However, the current proposal to build new dams or augment existing ones, within the Tweed Shire, are unfeasible in terms of the other more quantifiable "storage efficiency, engineering feasibility, safety, community support and cost benefit" that their massive impact upon the local environment need only be discussed if the inaccuracies and erroneous assumptions (refer to dot-points in section (b) above) are not persuasive enough to discourage any local dam approval process.

e) water storages and management practices in other Australian and international jurisdictions,

- Current water storage practice at Clarrie Hall Dam. Probably only water supply reservoir in Australia where livestock have unrestricted access to waterways. There are no controls on pesticide use by farmers on the catchment above Clarrie Hall Dam. Compare this to the catchment of other dams in the capital cities where public access is restricted and farming enterprises are banned, there are strict controls on water supply practices in those areas, but the Tweed Shire is another planet.
- 1998 Cryptosporidium and Giardia outbreak in Warragamba Dam, Sydney. (http://en.wikipedia.org/wiki/1998_Sydney_water_crisis). While institutional changes

were developed in response to this outbreak of pathogens In the water supply, the crisis serves as a poignant reminder on the risks of relying on a single water supply source

- The Brisbane floods inquiry found that operators had not followed procedures for the management of Wivenhoe dam during one of the worst flooding crises ever. Consequently, poor dam management resulted in the flood problem being more serious than it should have been (if it had been managed better) and catastrophic dam failure was only just avoided. This highlights the major problem of dams and flood control; human error. Operators panicking in a crisis can result in more damage than would occur under natural conditions.
- In the United States agricultural dams constructed in the twentieth century are being decommissioned to improve river flows, release sediment and restore indigenous fish stocks
- The Aswan Dam in Egypt holds back so much sediment that the Nile Delta is being eroded by the Mediterranean sea.
- The conclusion is that dams have unanticipated and dangerous side effects

f) any other matter relating to the adequacy of water storages in NSW.

General Comments

The Terms of Reference seem to explicitly exclude consideration of ecological or other issues surrounding the "natural environment". Point a) considers the environment insofar as its needs can be satiated by dams through environmental flows; rather than considering the huge impact that dams have had upon the ecosystem. The lack of an explicit ToR that considers the impact that dams, (I) already have on the environment, and, (II) the impact that future proposals will have on the environment is out of step with contemporary thinking. Humanity and the environment are inseparable and our impact on the natural environment needs better scrutiny so that current land practices don't replicate the mistakes of the past.

Framing the terms of reference in such a skewed manner ensures a restricted view that does not encompass newer technologies and other solutions. No one water supply or storage option is itself adequate and a variety of options need to be considered in tandem in order to ensure the sustainability of the water supply.

Water and Population

The supply of water needs to be seen as an ultimate limit to population growth in the state. The amount of water is a de-facto measure of the land's carrying capacity. Simply creating more and larger water storages does not automatically result in a linear increase in population capacity. There are negative feedback effects to consider such as salinization, destruction of landscape values and species loss that need to be factored into the ability of the land to support a human population. If, as historical trends indicate, an increase in irrigation water results in an increase in salinization and the concomitant loss of agricultural land and natural areas, then the capacity of the land to support an ever increasing population is decreased on the one hand, while increased on the other. Increasing

population without policy means that future generations will receive ever decreasing proportions of the wealth we now enjoy

Adequacy, Augmentation and Efficiency

The current supply of water in NSW should be considered as adequate. Water saving education programs and public acceptance has seen a decline in per capita water consumption. There are water saving and recycling technologies available to decrease demand on existing water supplies.

A Cost benefit analysis should be made between cost of retrofitting established urban and industrial areas with the cost of developing a new dam. It is more than likely they would be on parity; if true environmental values are placed on the externalities of environmental destruction caused by a new dam from vegetation removal and decomposition. Such costs include species loss, erosion and sedimentation, loss of indigenous and European cultural heritage, dislocation of communities and commensurate loss of local social capital. A total carbon emissions cost will need to be considered because of the massive CO^2 equivalents that will be released from any dam construction through vegetation removal and decomposition.

The cost of building a new dam is too high when compared to other small high-technology options. The environmental and social impacts are never property considered and there are unquantifiable risks concerning health and safety which are conveniently overlooked in the approval process for new dams. Investment in water saving and water recycling technologies provides a better long-term financial solution and will ultimately be ecologically sustainable.

The myth that water flowing out to sea is wasted

The most dramatic example of a dam failing because lack of water is the Nile River, the once fertile Nile Delta is eroding because sediment is blocked behind the massive Aswan Dam (McCully). In Australia, the Murray Darling fails to reach the Ocean because of a thousand small dams and irrigation projects scattered across the landscape. The claims of sophisticated interbasin water transfer schemes such as the Rocky Cutting Dam proposed by the Federal Government in 2007 are not a solution to the problem (SMEC 2007). Similar claims by farming communities that rivers can be 'turned inward' are unrealistic and will not provide a solution to the problem. The mouth of the Murray River at Coorong in SA is an indictment on current land management practices which, like the mythological frog Tiddalik has swallowed up all the lands' water.

River water from floods serves an ecological purpose by depositing nutrients and sediments into the marine environment and ultimately improving fish stocks for the fishing industry. Floods are necessary to clear rivers of algal blooms and other 'low flow' environmental conditions. The pulses of flood cycles are important in maintaining the health of mangroves and seagrass beds in the estuary and surrounding coastline. If too much water is removed from the landscape in the upper sections of the catchment then the volume of water further down is insufficient to perform the vital ecological functions required for good river health (Boulton and Brock 1999).

Social and cultural forces demand a mastery over nature that is unachievable in reality. Already the manifested problems of our state's previous attempts to capture water and irrigate pastures and crops have resulted in a pernicious salinity problem rendering marginal arable land unproductive. This is a result of too much water in the landscape. Additional water means additional problems.

Expedient political solutions to build a dam to solve a local water shortage will have wider regional effects.

The myth that dams will stop floods

A dam can stop a portion of a single flood. The usual purpose of dams as a water storage is invalidated if they are to be used a s flood protection. A dam can catch a single flood but then it will spill over; and it is unlikely that a rural NSW community will empty their dam in the expectation that there is another flood coming. It should therefore be seen as improper and misleading for government authorities and representatives including MPs to claim dual use for proposed future dams.

Agricultural productivity has increased, but as economies of scale have set in as a result of globalisation of commodity markets there has been a net loss in our social capital and environmental resources. The result is a loss of our distinctive icons of Australia, our animals and plants as well as the communities that the coastal cities think of as 'the bush', or 'regional areas'.

"Dams are Bad …"

Dams have many undesirable chemical and ecological attributes. They are breeding places for pest organisms and can also concentrate disease organisms. Dam water is generally unsafe because of the toxicity of Blue Green algae, and other bacterial life-forms that can parasitise the human gut.

Chemical problems, as discussed above include mobilisation of metal ions under particular pH conditions. Stratification caused by the immensity of the water volume is particularly inhospitable to Australian aquatic invertebrates and provides habitat for exotic fish species.

Other ecological impacts worth mentioning include severing of wildlife corridors, inundation of floodplain or lowland plant communities.

Sincerely,

Samuel K Dawson BAS (Hons)
Secretary Caldera Environment Centre
On behalf of Paul HopE Hopkins,
Coordinator Caldera Environment Centre .