

Referrals Section (EPBC Act)
Approvals and Wildlife Division
Department of the Environment, Heritage and the Arts
GPO Box 787
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22 April 2009

To: The Director of Referrals
From: The Finnis River Catchment Group

**South Australian Department for Environment and Heritage/Water Management and Use/
Goolwa Channel, Finnis River & Currency Creek/SA/Emergency Response for the Crisis
Management of Acid Sulphate Soils**
EPBC Reference: 2009/4833

1. Executive Summary

We are in agreement that there is a crisis in the management of water in the River Murray, Lower Lakes and Coorong, and would add that there is a similar crisis in the management of Eastern Mount Lofty Ranges tributaries such as the Finnis River. We also appreciate the potential risks posed by the exposure of Acid Sulphate Soils (ASS) through lack of water and the need to manage the situation. We consider that there are grounds for the Referral to be a controlled action; and we are strongly opposed to the engineering solutions outlined in the Referral for reasons detailed below and request that alternative actions be taken.

2. Main Points

Controlled Action

It is not known how much water will in fact come down the Finnis River and Currency Creek this year. We do not have reliable records of how much water is currently entering and being extracted from the system. This means it is unclear whether the planned management of the water to protect matters of national environmental significance (NES) can take place and, even if it could, we see it as potentially detrimental to locations and species of national environmental significance. It is clear that the construction of the proposed regulators and the pumping of water out of Lake Alexandrina will impact upon Ramsar sites and matters of national environmental significance under the EPBC Act, including:

- The Fleurieu Peninsula Swamps, which are listed as ‘Critically Endangered’ (sections 18 and 18A of the EPBC Act)
- Lake Alexandrina listed as a wetland of international significance (sections 16 and 17B of the EPBC Act)
- EPBC listed species (refer to our response to Section 3 of the Referral below pp xxx)

In addition, the proposal will affect other Ramsar sites (e.g. the Banrock Station Wetland Complex and the Riverland Ramsar site) because birds will seek alternative nesting sites. Pressure in one part of the system does not mean that other parts of the system are not affected.

Connection of the Finnis River to Lake Alexandrina is important for many species both in and near the river and the lake. No fish ladders are proposed for any of the regulators so fish movement will be restricted. The natural flow of the Finnis River is north of Hindmarsh Island. The planned regulators on the Finnis and at Clayton will disrupt this and have negative affects on Ramsar wetlands, particularly near Mundoo Island. In addition, unintentional disturbance of ecosystems near constructions sites is underestimated in the Referral. We believe construction activities and the barriers they create will both have a negative impacts on matters of NES. If any of the bodies of water were to disconnect naturally, natural mechanisms would remain in place for a speedy recovery. Blocking off the Finnis River and Currency Creek will impede recovery of the rivers and the lake and therefore of locations and species of national significance. For all these reasons, the Referral should be considered a controlled action.

Flaws in the proposed actions

- At present, the waters of the Finnis and the Currency Creek catchments are controlled by the SA Government above the railway line. Below this point, the water is allocated by the Australian Government and can be traded with people who have River Murray licenses.

- Last year environmental flows from the Finnis River were crucial to the revival of many species in the Lakes and Lower Murray. If the proposals for the regulators go ahead, this type of revival will no longer be possible.

- The current River Murray allocations below the railway line do not take into account the diminishing size of the water available from the Finnis River.

- If a weir pool is created, all efforts that might be made (should be made) further upstream to restore flows to the river and the environment could be lost through poor management or trading of Finnis River water below the railway line.

- If the amount of Acid Sulfate Soils (ASS) in the lower parts of the Finnis River and Currency Creek is true and treatment is deemed necessary, then a pool treated with lime may result in a mass killing, whereas a connected system is more robust.

- Disturbance of ASS is one of the major risks. Engineering works will involve considerable disturbance of soils and increase the risks of sulfidic materials becoming toxic.

Alternative actions

- First and foremost, more water must be allowed to enter the system both upstream of the Lower Murray Lakes and in the tributaries which enter the system south of Wellington. For this to happen, all levels of government must recognise the Murray Darling Basin is a complex interconnected system in crisis and act accordingly.

In the short term, we demand immediate enforcement of prescription in the Finnis Catchment, withdrawal of permission to extract water granted since October 2003, and publication of the Water Allocation Plan (WAP). We would also like to see immediate greater restrictions on water use both locally and throughout the Murray Darling Basin and increased water buy-backs. In the long term, we would also like to see a re-assessment of how water use is managed, particularly “stock and domestic” allocations. It is essential that governments put in place legislation and agreements which ensure environmental flows are restored to the River Murray and its tributaries before ANY extraction or water trading takes place.

- A different approach to the issue of risks associated with increases in the volume of sulfidic material in Acid Sulphate Soils (ASS) that is exposed to oxygen. This would include:
 - identification of ‘hot spots’ in the areas at risk and locally targetted action;
 - further and increased monitoring as recommended by the CSIRO (2009);
 - immediate trials of a variety of treatments as recommended by Earth Systems (2008a,b);
 - encouragement to increase mulching, propagation and planting in exposed soils using techniques of minimum disturbance;
 - action by the SA and Commonwealth Governments to manage fresh water in the system so that there is sufficient to submerge the ASS with fresh water. (The SA Government has the power to make an immediate environmental acquisition of water in the Finnis and Currency Creek catchments for this purpose and then provide a WAP that ensures continued covering of ASS as a priority.)

In particular, we would like an approach which gives more recognition and support for the natural processes which have been observed to be taking place by members of the community and scientists. Earth Systems (2008b) suggest that there are management options which can assist this process. Their key preferred options include “maintaining limestone saturation and an excess of organic matter within the lakes to ensure ongoing natural remediation processes” (Earth Systems 2008b, p.7). This process depends to a large extent on the deeper pools in Lake Alexandrina; so pumping even greater quantities of water out of this lake will potentially threaten this natural process.

Both the CSIRO (2009) and Earth Systems (2008a,b,) reports clearly point to our low level of understanding and the need for an increase in monitoring and assessment of lake and water chemistry to provide further scientific information before irreversible damage is caused by construction of more barriers which will inevitably interrupt what natural remediation processes are still left in the system.

3. Detailed responses to specific points

1. Summary of Proposed Action

1.1 The proposed action is described as an “emergency first response to mitigate adverse impacts of Acid Sulfate Soil sediment exposure in the Goolwa Channel and its tributaries”.

This statement reflects the Referral’s obsession with the Goolwa Channel. The Goolwa Channel is important but it is only a small part of the Lower Murray River, Lakes and Coorong. The Finnis River feeds into the whole system and often much of its water does not naturally flow into the Goolwa Channel.

This is not a first response. In fact there is a long list of related responses: dredging the Murray Mouth, construction of a Bund at Narrung, pumping water from Lake Alexandrina into Lake Albert, proposals for a weir at Wellington, proposals to allow sea water into the system. All these proposals and actions affect plants, microbes, insects, fish, birds, all living species and their ecological niches in the Lower Murray and its tributaries, Lake Alexandrina, Lake Albert and the Coorong. This is a huge, unique and extremely valuable area of Australia. The Commonwealth and State policies and actions (or inactions) further upstream are also highly relevant to the deterioration of conditions in the system. This is not a “first response”.

Further more, focusing only on ASS in the Goolwa Channel, Finniss River and Currency Creek region by creating weir pools will not solve anything. In fact it may increase the adverse effects of the ASS in the lower reaches of the Finniss River and Currency Creek blocking them off from greater movements of water and the more alkaline Lake Alexandrina. The proposed action may well aggravate ASS problems, increasing deterioration of the system from the bottom up.

It is essential that a long-term plan is put in place and that short and long-term actions are consistently monitored and reviewed at particular sites, in local areas and at the level of the entire interrelated complex system.

1.1d If the plan is to pump water out of Lake Alex then this water should be purchased from further upstream so that the net amount of water in the Lake is not depleted.

1.4 The size of the footprint is likely to extend well beyond the areas described in 1.4:

- Water and wind are likely to carry contaminants to other areas;
- Disturbance will increase likelihood of potential ASS being disturbed;
- A number of ecosystems will be disturbed around the sites
- owing to the large amount of silt and sand. construction is likely to be problematic and take longer and affect plants and wildlife

1.8 This is a very tight timeframe: Have tenders been received? Tenders for what? How much is SA Water already committed to? Since trucks seem to be already delivering rocks to set down points, we wish to question whether the appropriate Referral process is being followed.

1.9 Why is the answer 'NO'?

There are alternatives:

- Ensure more freshwater enters the system
- Alternative approaches such as the community based low intervention strategy (Appendix 1) focussed on bioremediation treatment of ASS hot spots
- Alternative timeframes
- Alternative actions
 - Focus on ASS hot spots for mulching, adding limestone, capping (Earth Systems 2008b)
 - Treat water (Earth Systems 2008a,b)
 - Revegetation
 - Reduce water extraction in tributaries

the Australian Government has already decided to allocate \$10 million for local job creation and bioremediation. This should be given a chance to work before irreversible damage is created through the construction of barriers to water flow.

1.10 It has come to our notice that some precautionary testing is taking place. It seems likely that the EPA will need to be involved.

1.11

It is ridiculous to say that this action is a stand alone one. It is very clearly part of a suite of actions taken or to be taken by federal and state governments, including the building of the

weir at Pomanda Island and the introduction of sea water into the Lakes. This suite is itself part of a larger action by the federal government that is a political one and that is to support the privatisation and commodification of water and to prefer the profit-making and exploitation of water over the continued existence of the creatures that depend on it for their survival.

Misleading interpretation that this is not part of a larger action. It is clearly related to the proposal for a temporary weir at Pomanda Island, the dredging of the Murray Mouth, the Bund at Narrung and the proposal to flood the Lakes with sea water.

1.12 Since when has the water behind the barrages been described as a “Barrages weir pool”? This reflects the vision of the government.

It is stated that “(i)mplementation of actions identified in this strategy is based on specific triggers relating to water level and water quality” (p.6). However, there is no evidence that the government is doing anything substantial to try and bring water down the Murray River and its tributaries so that these trigger levels are NOT reached.

This is indicative of a view that denies the reality of the Murray Darling River system and wishes to replace it with a constructed, engineered reality where natural systems are managed, controlled, divided up, killed.

The list of referrals also show that the SA government has no plan to actually do anything that will help out environmental systems.

The document repeats that the aim is to “mitigate the effects of low water levels in the Lower Lakes” (p.6). However, all the proposed actions will ensure lower levels in Lake Alexandrina.

2. Detailed description of proposed action

2.1 Purpose

It is noted that the purpose is to “minimise the extent of acid generation and to prevent acidification of the water bodies in the Goolwa Channel, Finniss River and Currency Creek, South Australia.” (p. 7) This begs the question: What about LAKE ALEXANDRINA?

What happens if the drought continues?

What happens if the drought continues? – referral makes the assumption that there will be water coming down the rivers . They do talk about stopping pumping but they can only use the River Murray water which is up to the train bridge on Finniss. Above that is unprescribed river water. Who has jurisdiction over the Finniss (lower reaches MDBA) and above train bridge subject to WAP and hence very important that the WAP be available. How can the proponent know how much water is coming down the Finniss and Currency without a WAP>

How will water be manipulated to get levels that they are talking about ie assume rain.

Further, it is precisely the connectivity of the system and the complex mixing of waters that may prevent acidification.

***** CSIRO and Earth systems doubts ***

ASS in the F and the C - resubmerging them is under the control of the State through environmental acquisition of water in the short term and through a WAP that guarantees sustainable end or river flows.

Proposal

The "SA Government proposes to protect key areas containing high value environmental assets and infrastructure" (p.). It is not clear which particular assets the Referral is directing us to. There are "high value natural assets in the F and C estuaries and the Goolwa Oxbow. It appears that the assets in the F and C, like Black Swamp and Blue Lagoon are to be sacrificed to protect those in the Goolwa Oxbow (not to mention Lake Alexandrina). The Finniss Catchment Group maintains that there are many valuable plant and animal species in the Fi catchment and interruptions to flows into the Lakes will have adverse effects on the River. Loss of valuable assets will be accelerated up the River and throughout the catchment area.

(A) The height of the regulator at Clayton is "yet to be finalised" (p.7) - Using what criteria? How does this fit in with the timeline (1.8)? 2.5m AHD seems to be extremely high; what is the reason for this? Previous to European settlement the levels of the Lakes varied from 0.3 AHD to -0.5. Surely the aim of this weir pool should be a maximum of 0.3.

The pool will be filled by pumping from Lake Alexandrina "before the Goolwa Channel hydrologically disconnects" (p.7). What happens if it naturally disconnects (as seems possible) BEFORE the proposed constructions and pumps are in place?

(B) & (C) The proposed regulators on the Finniss River and Currency Creek are intended to "capture first flush inflows" (p.7). These first flushes are the most contaminated, so salt, silt and pollutants will settle behind the "regulator". In addition, we believe that the Referral may be over-estimating how much water will actually flow down the Finniss River in the first flush given the increased extraction in recent years further upstream both from the river and groundwater. Many of the calculations on page 8 are dependent on uncertain timing of rainfall and uncertain amounts of water flowing down the Finniss River and Currency Creek.

if the weir are constructed the reduction of the flows to the lakes should be compensated for by the Aust Govt purchasing and providing an equivalent amount of water to the lakes each year.

Construction (p.9)

How can we be sure that environmental damage has been accurately predicted and that costs will be maintained near the estimated amount when it is so "difficult to calculate/estimate the exact volume of material that will be used." (p.9)

There is considerable silt and soft clay that will be displaced. If the results are anything like the experience at Narrung, the regulators will be expensive environmental disasters. the weir built at the narrung Narrows has problems with cracking and shifting and the steel sheet piles have had to be welded together to try and hold the structure in place.

Construction of the regulators involves disturbance. “Preventing exposure of sulfidic minerals to oxidation prevents acid generation. Care should be taken to avoid of minimise disturbance of acid sulfate soils wherever possible” (Earth Systems b, p.17).

Decommissioning

The referral states the “trigger for decommissioning will be undertaken on an adaptive basis” (p.10) The 0.75 AHD level is artificial and not likely to occur. If there is no political will to take firm action to reduce over allocation and restore environmental flows to the Murray River, the basic trigger for removal of the proposed regulators will never be reached and the river will continue to die from the bottom up.

IF decommissioning did ever take place, there is very inadequate planning of details of how it would happen. Will the materials be returned to the burrow pit? What will be the effects of more disturbance at the decommissioning sites and where the materials are dumped. All movement of materials runs the risk of disturbing soil profiles (including ASS), spreading weeds and diseases and disrupting ecological processes.

Water quality monitoring

The Referral correctly states that “the Goolwa Channel currently has some buffering capacity” (p. 10). Actions aimed at good management could enhance this buffering capacity in the Goolwa Channel and in Lake Alexandrina. However, construction of the regulators will have the opposite effect of diminishing or eliminating buffering capacities and putting in barriers to their recovery.

The Earth Systems (2008b) report points out the risks in creating artificial freshwater ponds. “If the sulfidic minerals have already begun to oxidise this technique may mobilise acidity” (Earth Systems 2008b, p.18). The CSIRO (2009) recommends further monitoring and Earth Systems (2008b) found “insufficient water quality data exist for Lake Alexandrina (Milang) to establish a clear trend” (Earth Systems 2008b, p.35). It is therefore necessary to have more scientific information before decisions are made.

“In July and August of 2008 good rains in the Eastern Mount Lofty Ranges enabled good environmental flows down both the Finniss River and Currency Creek. These flows saved the Lakes last year, provided relief for turtles from the dreaded deadly tubeworms, and induced many native species including birds, fish and invertebrates to breed.” (Jones 2009)

Native fish management

It is noted that no fish ladders have been incorporated into the design of the proposed regulators; and if the proposals go ahead EPBC listed native fish on Hindmarsh Island will become isolated from the rest of the system. Further, it is natural for the FR to flow through to the Mundoo wetland which is habitat for hardyhead fish. These will be threatened by the proposals.

The native fish are part of an ecological system. Although it is true that, without more water coming into the system, more of the water bodies will disconnect and native fish will be disadvantaged,

they will still have more chance of recovery if the regulators are not built. These constructions will create deep pools which will advantage predatory species such as red fin and all fish in Lake Alexandrina will be put in further danger than they are at present. In addition, the methods of capture and translocation may save a few individuals but not the ecosystems that they are presently inhabiting. These methods will also inevitably involve some deaths and should only be used as part of a better plan to save their ecological homes.

Application of limestone and other neutralising material

We call upon the South Australian Government to pay more attention to other management options to prevent, control and treat acidity arising from acid sulfate soils exposure. We support the approach of reducing acidity in “critical areas” (p.11). This may be done through bioremediation and low intervention strategies with emphasis on assisting natural processes of revegetation.

Well-managed application of limestone and other neutralising material could assist the natural remediation process (Earth Systems 2008b). It is suggested that the process can “benefit from the maintenance of carbon saturation in lake waters and sulfate reducing bacterial (SRB) activity in basal lake sediments” (Earth Systems 2008b, p.6). Thirty potential management options are considered in the Earth Systems report which suggests that supporting continuation of the natural remediation process “could primarily be achieved by:

- Limestone addition to lakes if necessary to maintain carbonate saturation; and/or
- Organic matter (\pm iron oxide) addition to lakes if necessary to maintain vigorous SRB activity in basal lake sediment” (Earth Systems 2008b, p.7).

These and other more reversible management options should be investigated further with the aid of scientists. The Referral reports that the South Australian Government is taking steps towards adding limestone slurry to water, considering alternative neutralising materials and establishing vegetation on the exposed sediments (p.12). Results should be closely monitored and more finance forthcoming to aid these approaches to improving the situation.

Background

The Referral again states that it “relates to an emergency first response” (See comments relating to 1.1 on page 3 above).

There is a failure at both state and federal levels to devise an appropriate strategic plan for the Murray Darling Basin. In addition, there is failure of the South Australian State Government to enforce prescription and keep to their own timetable to deliver a Water Allocation Plan (WAP) for the Finnis River. In October 2003, the Finnis Catchment Group was informed by Minister John Hill that a WAP would be delivered for the area in 2005. It is now 2009. The Referral observes that the Murray-Darling Authority “has noted the long term deterioration of the Lower Lakes, Coorong, Finnis River and Currency Creek systems over the last three years’ (p.12). If an appropriate WAP had been in place since 2005, the situation might not have deteriorated so fast and so far. It is not true that it is “not within South Australia’s capacity to maintain the water quality or the ecological health of the whole of the Lower Lakes” (p.12). They have input into how the Murray Darling Basin is managed and control over tributaries running into the Lower Lakes.

The State Government appears to be promoting “worst case conditions” by inaction on over-allocation in South Australia and interstate. Much is based on modelling but there are many unknowns. For example, it is predicted that there will be “effective disconnection of the Goolwa

Channel and the tributaries from the broader Lake Alexandrina by October – November...” (p.13) and plans related to this Referral are based on these dates. However, disconnection might well occur before that date.

Current Situation

The statement that the CSIRO found “2,000 hectares of sulfuric material has already been exposed in the Lower Lakes region” (p.14) is misleading. The CSIRO only studied 38 soil profiles from easily accessible sites (CSIRO 2009, p.5). Are these truly representative of the hydrological and geomorphological conditions? The CSIRO also inserts an “*Important Disclaimer*” which advises that the information is in the form of “general statements” and that they may be “incomplete”.

The urgency of the current situation is correctly identified in the Referral:

- “significant decline in this Ramsar site with the majority of indicators indicating a decline in ecological character and the need for urgent intervention” (p.12)
- “.the release of sulfuric acid into the Lower Lakes and connected water bodies will render the water unsuitable for any purpose and cause considerable stress on aquatic ecosystems and the ecological character of this Ramsar site” (p.14). However, the uncertainties in the situation are not fully acknowledged. This release of sulfuric acid may not occur. The CSIRO calls for “analysis and understanding of water transport, flow regimes, lateral transport of acids and solutes and the role of groundwater” (CSIRO 2009, p.1). Its recommendations (CSIRO 2009, p.19 - 20) outline the need for considerably more monitoring. This underlines the fact that we lack sufficient scientific information about this complex unique water system.

the problem is about low water levels not ASS.

In the first paragraph it states that large amounts of acid have been formed already. This is not true. On the Finniss there are only a few spots where you can find acid, and where that has occurred there has been no migration of it into the water body. The majority of the Finniss estuary does not show acid, especially where there is natural vegetation occurring. The proponents of this action need to differentiate between the **potential** of acid production and the **reality** of it. And to differentiate between a *theory* about ASS and the truth on the ground. For example pH levels in the Finniss at the Winery Road ford are at normal levels (7.5) and have not shifted from this for some years.

A regulator on Goolwa Channel near Clayton

We wonder why the regulator needs to be so high.

Future water levels to maintain sediment saturation at the end of summer

Varying levels need to be encouraged so that further ASS are not created. Ref Bruce and Mike for figures on evaporation there will be no natural winter inflows from CC and FR unless the SA Gov implements a WAP that guarantees end of river flows.

The notion of dealing with any shortfall by utilising surplus off-peak capacity in the proposed irrigation pipeline makes the assumption that there is water available and that it is of a standard to

be useful and makes the assumption that the Pomanda Weir is in place.. Who will pay for this water?

Low level regulators on the

The proposal seems to be focussed on keeping toxic water in the Finniss and Currency weirpools and keeping it out of the Goolwa Channel. It does not take into account the high value environmental assets that are in the lower reaches of the Finniss and the Currency.

how will ecological collapse be averted in the FR and CC?

Vegetation Management

The historic operating level of the lakes was not as shown in the proposal. Before white people arrived the lake level varied from 0.3m AHD to -0.5m AHD. The 0.75m AHD level is an artificial one.

To say that the salinity in the Finniss River is 40000 EC and climbing rapidly is to misrepresent what is actually happening. At Winery Road in March 2009 the EC reading was 3170 with a pH of 7.5. (Waterwatch, Finniss Catchment Group, March 2009) This area is still functioning quite well but will be highly compromised if a weir is built. The suggested value of 5000EC shows that the weir will be a negative for this area of the Finniss.

On page nineteen the proposal says that a study is underway to research the response of the seed bank to the saline water produced by the weir, so clearly the government do not have much idea about the parameters. To say that the risk of causing significant detrimental impact on matters of NES is low is plainly false. This is a RAMSAR site and it will be cut up into small pieces and a saline and possibly toxic weirpool will be produced.

The proposal also implies that the environmental degradation will continue regardless. However the state of the lower reaches of the Finniss River and the Currency Creek is contingent on end of river flows that are determined by the SA government. The M-DBA storages are irrelevant.

Currently the salinity At Winery Road in March 2009 the EC reading was 3170 with a pH of 7.5. (Waterwatch, Finniss Catchment Group, March 2009). on p. 19 the Referral state that salinity is projected to climb to 7,000-10,000 EC this tripling of the salinity at winery road will clearly be detrimental to EPBC listed species.

The Referral predicts “dessication, salinisation and acidification in subsequent years” (p.19)

if there is desiccation as predicted, the existence of Acidification will become irrelevant. the key to raising water levels is for the state gove to implement a WAP that guarentees end-of -system flows.

Additional measures for a multi-faceted approach to ensure ongoing saturation of sediments

We appreciate the Government’s concern to manage the system for the community’s benefit. However, statements like protecting “at least some of the higher value environmental assets and

infrastructure” (p.19) raises the question of whether the government has given up on other assets of value. This reflects an approach which picks and chooses different locations, flora and fauna and fails to address the issues relating to the natural living system as a whole interrelated body. If humans have a future on this planet, a top priority must be to preserve biodiversity. The Government repeats that its preferred position is for a freshwater solution but no action is taken to bring this about.

Focus in the Referral is on licensed irrigators. Increases in extraction of water from the Finnis River and CC in recent years has to some extent been due to increases in stock and domestic water use. We request that the State Government review its policies with respect to regulations on stock and domestic use.

Engineering design

It is stated that “the Goolwa Channel profile will remain unchanged from construction”. How can this be the case?

As already noted in XXXX above, we question the need for a weir of this size and are concerned about the soil and ecological disturbance the engineering activities will entail. If these are only concept designs and subject to change, how can they be assessed? more information is required.

2.2 Alternative locations, time frames or activities that form part of the referred action

This section needs to include the alternative actions like purchase of water for the River Murray, bioremediation, other ASS treatments, and the creation of sensible Water Allocation Plans by the SA government for the Finnis River and Currency Creek catchments.

long term plan

2.3 Context, planning framework and state /local requirements

Environmental Protection and Biodiversity Conservation Act 1999 (Commonwealth)

The building of the weirs will clearly impact on matters of national environmental significance and as such should be seen as a “controlled action” which would require assessment under the EPBC Act. Please refer to my lists in Chapter Three.

Murray-Darling Basin Agreement 2008 (inter-governmental)

Under clauses 49 and 50, MDBA approval should be sought prior to construction.

Living Murray Icon site Management

This needs to be needs to be acted upon.

Development Plans (State and local government)

An Environmental Impact Statement should be sought for this development. What is highlighted in this section is how both state and federal government apparently have a great number of plans, strategies and agreements about the River Murray and the Lakes and Coorong. Why is nothing done about them?

ACT ON

Environment Protection Act

It is an offence to deposit

The EPA needs to take action to ensure that rocks and soils are not deposited into the system

What is highlighted in this section is that there is a lot of legislation but no actions

2.4 Environmental impact assessments under Commonwealth, state or territory legislation

In the second paragraph formal public consultation is mentioned. In fact there has been an appalling lack of consultation on the part of the government. They seem to think that calling a meeting and telling us what is going to happen is consultation. In Appendix K there is an attempt to show what happened at two meetings. I was there, in one of the groups and yet by looking at the notes in Appendix K what I said has been massaged out of the text. This is characteristic.

2.6 A staged development or component of a larger project.

This proposal is clearly part of a suite of actions including the building of the weir at Pomanda Island, the construction of the causeway to Pomanda Island, the letting in of seawater into the lakes, the construction of a pipeline for irrigators.

3. Description of environment and likely impacts

3.1d Listed threatened species and ecological communities

A member of the Finnis Catchment Group has cross referenced the listed EPBC species primarily with the local book *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.

Species listed as in the local area as follows: -

Birds

Southern Giant Petrel

This bird has been seen on Hindmarsh Island and at the Finnis ford. (p32. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Orange Bellied Parrot

This critically endangered species is assumed to forage near Hindmarsh Island and the Coorong. However it has been seen locally at Dog Lake and Ferries MacDonald Conservation Park (p60. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Red-lored Whistler

This bird has been seen at Chauncey's Line, Wundersitz's Scrub, and Snake Island. (p75. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Painted Snipe

This bird has been seen at the Goolwa rubbish dump, Tucker's Swamp, Tolderol Game Reserve and Milang. (p51. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Mt Lofty Ranges Southern Emu-wren

This bird is known from the Finnis Estuary, Black Swamp, Currency Creek and Tookayerta Creek and Finnis. (p67. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Shy Albatross

This bird has been found at Goolwa Beach. (p35. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Amphibians

Southern Bell Frog

This frog has been seen and heard at Langhorne Creek, Mosquito Creek, Tolderol game Reserve, (p94. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.) Also Narrung and Wellington and Pelican Lagoon.

Mammals

Southern Brown Bandicoot

This mammal has been located in Strathalbyn, Cox's Scrub and McHarg's Creek. (p15. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Eastern Long-eared bat

This bat has been identified "in both upstream and downstream areas of the proposed temporary weir" draft EIS Pomanda Island (p 7-25)

Ray-finned fishes

Murray Hardyhead

This fish has been recorded in the Finniss River and the Angas River. (p99. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Yarra Pygmy Perch

Hindmarsh Island, Goolwa Channel, Finniss Estuary have been sites of this fish.

Murray Cod

Once common enough in Lake Alexandrina to sustain a commercial fishery, Murray Cod have been located in the lakes, at Pomanda point, in the Bremer River and at Narrung. (p105. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Also in the Finniss River. (Jim Llewelyn 2008, personal communication)

Plants

Fat-leaved Wattle

This wattle occurs near Finniss by the railway line and Nurragi Reserve.

(p154. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Neat Wattle

This wattle occurs at Monarto, Ferries McDonald National Park, and in the Milang to Goolwa area.

(p154. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Small Western Spider-orchid

This orchid occurs at Finniss, Hartley and the Nurragi Reserve.

(p170. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Greencomb Spider-orchid

This orchid occurs at Dunn Heritage Area and Nurragi Reserve

(p170. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Osborn's Eyebright

This Euphrasia is recorded in two peat bog swamps

(p188. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Silver Daisy-bush

This bush occurs at "20 locations, half of them in the vicinity of Milang", Nurragi Reserve and heritage Areas near Hartley and Finniss.

(p126. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Maroon Leek-orchid

This orchid is located at the mouth of the Finniss River and at Nangkita.

(p174. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Fleurieu Leek-orchid

This has been found at the mouth of the Finniss River. (p174. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Pale Leek-orchid

This occurs at Scott Conservation Park

(p174. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Sandhill greenhood orchid (*Pterostylis arenicola*)

This has been found at Tailem Bend. Langhorne Creek and Potter's Scrub in the Coorong. (p175. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Metallic Sun-orchid

This plant has been located at Wundersitz Heritage Area

(p178. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Ecological Communities

The following are known in this area

Iron-grass natural temperate grassland of South Australia

Iron grass (and its associate plants) is described as common throughout many areas around the Lakes and Coorong, including Black Swamp, Hindmarsh Island, Goolwa Swamp, Sir Richard Peninsula, lower Finniss River, Tookayerta Creek, Milang, Chauncey's Line, Langhorne Creek. (p 162. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Peppermint box grassy woodland of South Australia

Peppermint box is described as "the most common tree in dry woodland in this area" and occurs with its associates from Goolwa to Ashbourne, Milang to Strathalbyn, Chauncey's Line to Langhorne Creek. (p 167. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Swamps of the Fleurieu Peninsula is a threatened ecological community.

3.1 (e) Listed Migratory Species

The following are a list of listed migratory species seen in the local area.

White Bellied Sea Eagle

This bird has been sighted at Snake Island, the Finnis Estuary, the northern side of the lake, red gumswamps south-east of Langhorne Creek, and over Strathalbyn. “There have been suspicions of breeding in Borrett’s Swamp and at ‘Nalpa’. (p41. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.) This bird is on the list of birds sighted from Wellington Lodge (K McFarlane, 2009 email communication)

White-throated Needletail

This bird has been seen at Milang, Langhorne Creek and Woodchester. (p65. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Rainbow bee-eater

“This is the most regular and reliable of our migratory bush birds, arriving in most springs during the last week of September or the first week of October....In most years sufficient birds come in the next few weeks for them to be fairly common throughout much of the district.” Seen in Belvidere, Langhorne Creek, Mulgundawa through to Ashbourne, Paris Creek, Strathalbyn. (p66. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Orange Bellied Parrot

This critically endangered species is assumed to forage near Hindmarsh Island and the Coorong. However it has been seen locally at Dog Lake and Ferries MacDonald Conservation Park (p60. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Mt Lofty Ranges Southern Emu-wren

This bird is known from the Finnis Estuary, Black Swamp, Currency Creek and Tookayerta Creek and Finnis. (p67. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Great Egret

This bird is described as “still widespread”. (p38. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.) This bird is on the list of birds seen at Wellington Lodge over the last four years (Email, K.McFarlane).

Cattle Egret

Sighted at Finnis, Milang, Langhorne Creek. (p38. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Sharp-tailed Sandpiper

This bird is described at Tolderol Game Reserve, Goolwa Barrage, Murray Mouth and most of the wetlands.

(p50. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Sanderling

Seen at the Murray Mouth and Goolwa Beach.

(p50. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Curlew Sandpiper

This bird is seen at Tolderol Game Reserve, Mosquito Point and the lake margins.

(p50. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Red-necked Stint

Seen at Tolderol Game Reserve

(p51. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Latham's Snipe

Found at Mosquito Point and in the wetland adjacent to the shacks at Milang, ("where they can be found every summer") and once at Tooperang Hall. (p47. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.) Definite sightings by locals in Milang last summer (Karyn Bradford 2009).

Latham's Snipe is on the list of birds seen at Wellington Lodge in the last four years. (email. K. McFarlane)

Pacific Golden Plover

This bird has been seen at the Tolderol Game Reserve and Mosquito point, Goolwa Barrage and the Murray Mouth.

(p54. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Painted Snipe

This bird has visited locally at Milang, Tolderol game Reserve, Tucker's Swamp, Finniss and the Goolwa rubbish dump. (p51. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Common Greenshank

Described as "moderately common"

(p50. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Fork-tailed Swift

Has been sighted at Milang and Langhorne Creek. (p65. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Southern Giant Petrel

This bird has been seen on Hindmarsh Island and at the Finniss ford. (p32. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Caspian Tern

This bird is described as “ranging widely throughout the area”, breeding at the Nalpa salt lake, and Bird Island.

(p57. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Little Tern

This bird has favoured the Murray Mouth and breeding on Bird Island. Also inland at Mosquito Point. (p56. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

Shy Albatross

This bird has been found at Goolwa Beach. (p35. *Natural History of Strathalbyn and Goolwa Districts*, compiled by Strathalbyn Naturalists Club Inc., published by same, November 2000.)

4.

4. Conclusion

5. References

CSIRO (2009) Preliminary Assessment of Acid Sulfate Soil Materials in Currency Creek, Finnis River, Tookayerta Creek and Black Swamp Region, South Australia. CSIRO Land and Water Science Report CLW 01/09, January 2009

Earth Systems (2008a) Lower Murray Lakes Project, Management Options for Acid Sulfate Soils in the Lower Murray Lakes, South Australia, Stage 1 - Preliminary Assessment of Treatment Options

Earth Systems (2008b) Lower Murray Lakes Project, Management Options for Acid Sulfate Soils in the Lower Murray Lakes, South Australia, Stage 2 - Preliminary Assessment of Prevention, Control and Treatment Options

Other points

- Finnis River is over-allocated (How much is relevant?)
 - WAP not yet delivered
 - No enforcement of moratorium evident
 - Prescription \Rightarrow use by those with licenses
 - Continued growth and development \Rightarrow > dams,
 - Increase in population = increase in stock and domestic
 - Request public register?

“There are insufficient data to confirm whether sulfide oxidation and precipitation are the key processes affecting lake sulfate concentrations” (Earth Systems 2008, p.39)

option 10 Cap exposed sediments (p.47)

Add organic matter to lakes Options 11 - 15 pp 47-48

Add organic matter to to exposed sediments Options 16 - 18

add organic matter to rivers Option19

“critical data gaps in our understanding of the lake acidification process” (Earth Systems 2008, p. 66)

Preferred ASS management strategy (p69)

- “ maintain or ensure limestone saturation within the lakes;
- redress potential shortfalls or imbalances in the mass of available organic and inorganic carbon iron within basal lake sediments
- modify the exposed to minimise and control acidity generation. Potential control measures include:
 - Keep exposed sediments wet (install and fill trenches with limestone and water)
 - Keep exposed sediments wet (install perforated pipes and irrigate banks)
 - Keep exposed sediments wet (install and use irrigation systems)
 - Cap exposed sediments
 - Add organic matter to lake (revegetate upwind shores)
 - Add organic matter to exposed sediments (revegetate exposed sediments)

Recommend p70

“more rigorous assessment of the available lake and river chemistry to develop a better understanding of the processes influencing chemical changes”

CSIRO

Communication focuses on ASS with little or no regard to other interacting factors such as an

Different areas need different approaches and some of the ‘hot spots’ or most problematic areas of exposed sediment may need to be treated in ways described in Options 6-8, 10 and 18 described by Earth Systems (2008b, pp.62-3)