

SUBMISSION - STATE PLANNING POLICIES FOR SOUTH AUSTRALIA, 2018

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INTRODUCTION

I wish to thank the State Government for the opportunity to have input into planning policies that are of the utmost importance.

<https://yoursay.sa.gov.au/decisions/state-planning-policies/about>

The following comments on the Have Your Say State Planning Policies video sum up what is very important. *“Water is the source of life. It is the source of productivity. It is the source and core element of biodiversity.”*

This appears to have been overlooked on a number of occasions in relation to the Natural Resources Management Act that is currently being overhauled and transgressing to Landscape South Australia Act. It is important to also include in the State Planning Policies, the following areas of the **NRM Act 2004**, and **The Climate and Greenhouse Reductions Act 2007** in line with what has been quoted above from the video. If those words are to be taken seriously, then areas of conflict between resources and agricultural land, the question of clean water and food security through protection and exemption of these areas would surely be resolved, and a lot of work, as well as uncertainty would be greatly reduced.

The Insurance Council of Australia (ICA) identified that some risks including storm surge, landslip and sea level rise that are not generally covered by insurance products. This is further complicated by the fact that no common definitions of risks (inclusive of storm surge, landslip and sea level rise) are adopted across the insurance industry. Policies generally deal with “saltwater risks or action of the sea” via exclusions. Also, a multinational insurance company Insurance Australia Group (IAG) has said that Australia is facing an “insurance gap” because land values are not currently insured”. Land value on the coast forms a significant component of overall property value. Coastal buildings may be protected by insurance to some extent. Land values of properties are not insured. It is also highly likely that legal actions may be brought against the local government councils.

I believe that water and climate change should be at the forefront of future planning by Government. I have included important aspects of the NRM Act 2004 The Climate Change And Greenhouse Emissions Reduction Act 2007, as I believe that any planning needs to be inclusive of these parts.

THE NRM ACT 2004

Chapter 2, 7 - objects, (2) and (3)

For the purposes of subsection (1), ecologically sustainable development comprises the use, conservation, development and enhancement of natural resources in a way, and at a rate, that will enable people and communities to provide for their economic, social and physical well-being while:

- (a) sustaining the potential of natural resources to meet the reasonably foreseeable needs of future generations: and
- (b) safeguarding the life-supporting capacities of natural resources: and
- (c) avoiding, remedying or mitigating any adverse effects of activities on natural resources.

(3) The following principals should be taken into account in connection with achieving ecologically sustainable development for the purposes of this Act:

- (a) decision-making processes should effectively integrate both long term and short term economic, environmental, social and equity considerations;
- (b) if there are threats of serious or irreversible damage to natural resources, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

In other words, the precautionary principal should be used and the natural resources i.e. water and soil, should not allowed to be put at any risk.

(c) Decision-making processes should be guided by the need to evaluate carefully the risks of any situation or proposal that may adversely affect the environment and to avoid, wherever practicable, causing any serious or irreversible damage to the environment:

(d) the present generation should ensure that the health, diversity and productivity of the natural environment is maintained or enhanced for the **benefit of future generations**.

Division 2 Water Allocation plans

76 - Preparation of water allocation plans

(4) (c) in providing for the allocation of water take into account the present and future needs of the occupiers of land in relation to the existing requirements and future capacity of the land and the likely effect of those provisions on the value of the land: and

NRM Act 2004 Chapter 7 - Section. 124 (3) (B) (i) (ii)

1. (b) a person must not take water from a watercourse, lake or well that is not prescribed if to do so
(i) would detrimentally affect the ability of another person to exercise a right to take water from the watercourse or lake or from the same underground aquifer;

NRM Act - Division 2—Water allocation plans

76—Preparation of water allocation plans

(6) If the taking, or the taking and use, of water from a water resource has, or is likely to have, a detrimental effect on the quantity or quality of water that is available from another water resource, the water allocation plan for the first mentioned resource must take into account the needs of persons and ecosystems using water from the other resource as well as the needs of persons and ecosystems using water from its own resource.

UNCERTAINTY OF GROUND WATER MODELLING AND PUMPING.

I attend presentations when I can at the National Groundwater Centre for Research and Training, which is based in Adelaide and headed up by Professor Craig Simmons. Professor Simmons won South Australian Scientist of the Year in 2015. 6 hydrologists took part recently in one presentation on the uncertainty of groundwater modelling and groundwater pumping. This presents key issues. Modelists cannot provide certainty. There is groundwater uncertainty because of allocation, demand, use, eflows and other management initiatives. We don't know what emissions are going to do because of climate change. Rainfall predictions will all be wrong in some way. Actual future climate, aquifer recharge, pumping, etc. will differ from scenarios. Traditional guidelines are not the best starting point. We don't know what is going to happen in the future.

There are an infinite number of prediction scenarios that could be run in relation to pumping tests, recharge, etc. Pumping rates also change over time. Changes in recharge and pumping regimes could invalidate model predictions. The question is asked, how well did the model predict the drought three years later? Models assume wrongly that pumping is going to be the same for the next 30 years. Clients are now asking more complex questions. **Wrong modelling impacts economic and ecological areas. There is no capacity to deal with uncertainty.** The amount of recharge in aquifers continues to change. The chance of three average years of weather conditions including rainfall, occurring in a row, is very low. Modellers should be quantifying how much their predictions may be wrong. **Therefore it is important for Government to take**

into account that because there is uncertainty of groundwater modeling, it is impossible for mining and petroleum companies to predict what will happen to groundwater resources as the result of their activities. It is imperative that prime agricultural land (4.6% of the state), overlapped by most valuable cropping land (4.7%) must be protected and exempted from any mining and petroleum activities, when planning for our State, to ensure that there is water and food security for our population, both now and for future generations.

THE CLIMATE CHANGE AND GREENHOUSE EMISSIONS REDUCTION ACT 2007

This is an “Act to provide for measures to address climate change with a view to assisting to achieve a sustainable future for the State; to set targets to achieve a reduction in greenhouse gas emissions within the State; to promote the use of renewable sources of energy; to promote business and community understanding about issues surrounding climate change; to facilitate the early development of policies and programs to address climate change; and for other purposes.”

The objects of this Act include

(a) to assist in the achievement of ecologically sustainable development in the State by addressing issues associated with climate change and, in particular—

(i) by setting a target (the SA target) to reduce by 31 December 2050 greenhouse gas emissions within the State by at least 60% to an amount that is equal to or less than 40% of 1990 levels as part of a national and international response to climate change; and

(ii) by setting related targets (the renewable electricity targets)—

(b) to promote commitment to action within the State to address climate change through—

(i) the development of specific targets (as appropriate) for various sectors of the State's economy; and

(iii) the development of policies and programs for the reduction of greenhouse gas emissions and for other relevant purposes; and

(c) to encourage energy efficiency and conservation; and

(d) to promote research and development with respect to the development and use of technology to reduce or limit greenhouse gas emissions or to support adaptation to climate change, including by developing ways to remove greenhouse gases from the atmosphere; and

(e) to encourage the commercialisation of renewable energy and of technologies that will reduce or limit greenhouse gas emissions or support adaptation to climate change; and

(g) to encourage and facilitate business and community consultation and early action with respect to issues surrounding climate change; and

(h) to support measures to facilitate adaptation to circumstances that will inevitably be caused by climate change, including by supporting measures that will improve the ability of the community, species and ecosystems to deal with the effects of climate change; and

(i) to provide for reporting on progress being made within the State to meet the SA target, and other specific or interim targets associated with reductions in greenhouse gas emissions, and to meet targets associated with the use of renewable electricity; and

(j) to promote action within South Australia that provides consistency with national and international

schemes designed to address climate change, including schemes that relate to emissions trading and emissions reporting: and

(k) to enhance the ability of the State to contribute to, and to respond expeditiously to, national and international developments associated with issues surrounding climate change.

Regarding the development of specific targets (as appropriate) for various sectors of the State's economy, sea level rise should be a main priority, given the figures in the issues paper that are predicted to cost South Australia as the result of sea level rise building and infrastructure impacts. Businesses and communities should be made aware of the impact of fossil fuel usage on climate change and sea level rise predicted to affect South Australia. This Act could be argued that what is expected to be acted upon and enabled, leaves no space for further gas production areas to be opened up in South Australia, including the SE of SA.

The Act is expected to be guided by principals including:

(a) the use, development and protection of the environment should be managed in a way, and at a rate, that will enable people and communities to provide for their economic, social and physical well-being and for their health and safety while—

(i) sustaining the potential of natural and physical resources to meet the reasonably foreseeable needs of future generations; and

(ii) safeguarding the life-supporting capacity of the environment; and

(iii) avoiding, remedying or mitigating adverse effects of activities on the environment;

(b) proper weight should be given to both long and short term economic, environmental, social and equity considerations in deciding all matters relating to environmental protection, restoration and enhancement;

With all planning, the government should embrace this important Act, to meet requirements as listed here. This cannot be achieved without the reduction of the fossil fuel industry, and the swap over to renewables, to avoid catastrophes or lessen impacts, including sea level rise.

Under interpretation, greenhouse gas emissions are defined as emissions of carbon dioxide, methane, nitrous oxide, hydro fluorocarbons, sulphur hexafluoride, or any other gas brought within the ambit of this definition by the regulations.

Under Part 2, (7) The Minister must, as soon as practicable after - (b) taking action under subsection (6), prepare a report on the matter and cause a copy. I believe the minister is responsible for taking action to reduce green house gas emissions, therefore reduce the amount of gas being produced, including banning petroleum activities in the SE of SA.

Under Part 3—Administration

Division 1—The Minister 6—Functions of Minister

(1) The functions of the Minister under this Act are amongst other things, to *(c) to develop, adopt or promote policies or programs that are relevant to addressing climate change and the effects of climate change in accordance with the objects of this Act (and taking into account any specific requirements under this Act);*

I believe that the function of the Minister is to reduce the amount of fossil fuels used, and allow no further petroleum activities in the South East of South Australia. Section (g) also states *“to promote the commercialisation of renewable electricity technology and to support initiatives to develop a scheme to*

promote the generation and use of renewable electricity within the State, including by providing incentives to encourage South Australians to feed electricity generated from renewable sources into electricity grids;”

In this same section – *“(n) to provide reports and to publish other information associated with climate change or initiatives or activities to address climate change, and to support public education in relation to climate change;”* Therefore the public should be educated on the impacts of fossil fuel use and sea level rise.

This is further backed up by *“(7) (j) information on any relevant rates, trends or impacts associated with climate change, with particular reference to any identified or assessed impacts of climate change on South Australia or any expected future impacts of climate change that have emerged or become increasingly relevant during the reporting period.”*

Under the section on the Premier’s Climate Change Council, 11—*Functions of Council*

- (2) The Council has other functions conferred by the Minister.*
- (3) (iii) costs associated with reducing or limiting climate change or greenhouse gas emissions, or with mitigating the effects of climate change or greenhouse gas emissions; and*
- (iv) costs associated with failing to take action to address climate change;*

Therefore the Minister has an obligation to both the Parliament, and the public to show the costs if fossil fuel use is not reduced, including allowing further production of fossil fuels in the SE of SA, thus enhancing sea level rise.

Under Part 4—Policies, programs and other initiatives

14—Policies

- (1) The Minister should seek to develop—*
- (a) policies that will assist in—*
- (i) reducing or limiting climate change or greenhouse gas emissions, or mitigation the effects of climate change or greenhouse gas emissions.*

So in other words, the Minister has an obligation to curb the use of fossil fuels, knowing full well that fossil fuels are a primary cause of greenhouse gas emissions, thus impacting climate change and sea level rise.

- c) policies that otherwise seek to secure the objects of this Act.*

In other words, the policy of reducing greenhouse gas emissions must be adhered to, which ties in the Petroleum and Geothermal Energy Act 2000, as far as fossil fuels. Surely, when the world is facing a serious time as far as climate change, the Climate Change and Greenhouse Emissions Reduction Act 2007 MUST override other Acts, apart from the NRM Act 2004 and take priority.

- (2) The Minister must, in acting under this section—*

- (a) seek to achieve consistency with policies adopted by the Government to promote sustainability within the State; and (b) develop a policy or policies that demonstrate the Government’s leadership in dealing with climate change through the management and reduction of its own greenhouse gas emissions, and through the development of related reporting mechanisms, in a manner that is consistent with the objects of this Act;*

Sustainability within the state also, I believe, means sustaining our food bowl and water, and sustaining our agriculture and doing what ever is necessary to limit greenhouse gas emissions to help reduce climate change. Sustaining agriculture, also means sustaining agriculture economically.

- (f) seek to take into account other relevant frameworks, policies, programs and initiatives.*

BIODIVERSITY

“South Australia’s unique biodiversity contributes to our quality of life, supports our economy and provides life supporting functions such as clean air, water and arable land. Maintaining and enhancing a healthy, biologically diverse environment ensures greater resilience to climate change, increases productivity and supports a healthy lifestyle.

The planning system must enable the recognition and preservation of ecosystems that help safeguard the prosperity, vitality, sustainability and liveability of our state. This includes mitigating the undesirable impacts of biodiversity loss; helping businesses and industry capture new and emerging market opportunities; and increasing our resilience to challenges such as climate change.”

To ensure that the Government adheres to these quotes, as per the draft State Planning Policies for SA, 4.6% prime agricultural and 4.7% most valuable cropping land must be exempt from any resource activities including mining and petroleum activities. Given the wide spread droughts across Australia presently, we must be able to provide for now and future generations, especially in these times of adversity, and protect the food bowl that we can produce from.

“The planning system has a role to play in ensuring ecological systems are maintained and enhanced by:

- *identifying and protecting areas of high conservation value and avoiding incompatible adjoining land uses*
- *assessing the cumulative impact of development on biodiversity*
- *holistically considering development design and standards to avoid, minimise and offset negative impacts on biodiversity*

When environmental values are considered early in the planning process, development in environmentally sensitive areas can be avoided and cumulative impacts are able to be better managed. Opportunities should also be found to restore, enhance and extend our ecosystems through recognising and protecting areas for potential biodiversity gain.

Objective

Biodiversity is valued and conserved, and its integrity within natural ecosystems protected.”

For these objectives to be reached, again mining and petroleum activities must be exempt from these areas. 74% of protected areas can have petroleum activities and mining. I think this should be looked at and reassessed for the planning. This needs to be revisited and questions need to be asked why areas were set aside for protection in the first place. Resource activities should not be allowed in these areas under any circumstances.

[http://petroleum.statedevelopment.sa.gov.au/roundtable_for_oil_and_gas#Roadmap%20for%20UnconventionalGasProjectsInSA\(2012Edition\)](http://petroleum.statedevelopment.sa.gov.au/roundtable_for_oil_and_gas#Roadmap%20for%20UnconventionalGasProjectsInSA(2012Edition))

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7.5.1 Protected Areas with special natural, social or economic value, including areas proclaimed for protection or reserved for conservation purposes in South Australia include those administered by the Department of Environment, Water and Natural Resources under the *National Parks and Wildlife Act 1972*, *Crown Land Management Act 2009*, *Native Vegetation Act 1991* and *Wilderness Protection Act 1992*. Approximately 74 percent of onshore protected areas (Page 176) allow access for mineral, geothermal and petroleum exploration and development. While the legislation is designed for conservation purposes, there are provisions for joint proclamations and regional reserves both of which allow access for mineral and petroleum exploration and development. Where access is excluded, this excludes surface and subsurface access. Other parts of South Australia with special natural values and unique management arrangements include but are not limited to: • Marine Parks and adjacent areas under the *Marine Parks Act 2007*; • the

Adelaide Dolphin Sanctuary under the *Adelaide Dolphin Sanctuary Act 2005*; • the Arkaroola Protection Area under the *Arkaroola Protection Act 2012*; • the River Murray Protection Area under the *River Murray Act 2003*; • Prescribed water resources under the *Natural Resources Management Act 2004*; and • Vegetation Heritage Agreement areas under the *Native Vegetation Act 1993*. Refer to Chapter 5 in this Roadmap for details of how co-regulation is undertaken to abide by the objectives of all legislation, and in particular how instruments of the *Petroleum and Geothermal Energy Act 2000*, Statements for Environmental Objectives (SEOs), require all petroleum operations to protect natural, social and economic environments. **7.5.2 Woomera Prohibited Area** The Woomera Prohibited Area (WPA) covers an area of 127,000 square kilometres.

“Biodiversity describes all forms of life. There are three levels of biodiversity, genetic, species and ecosystem. All of these are important.”

“Regional Plans should implement state policies by identifying areas that have state or national environmental significance and are protected by legislation. This includes protected public lands such as conservation parks and marine parks; private protected lands (such as those under Heritage Agreements); areas of native vegetation; and listed wetlands. Any studies on the biodiversity value of areas should be considered and, where possible, corridors important for the movement of wildlife should be identified. Plans may also identify modified landscapes that have significant environmental values and can co-exist with other land uses such as primary production and tourism.”

Extremely valid statement, and again I refer back to the 74% that may be open to mining and petroleum activities.

CLIMATE CHANGE

“Climate change will impact all areas of our society. Our future prosperity, the liveability of our cities and towns, the health and wellbeing of our communities and the resilience of our built and natural environment all depend on how well we adapt to and mitigate the impacts of climate change.”

The way in which we manage our built environment will have direct and long-term implications for our ability to adapt to climate change and reduce greenhouse gas emissions and global warming.”

“Objective

Our greenhouse gas emissions are reduced and development that is climate-ready is promoted so that our economy, communities and environment will be more resilient to climate change impacts.”

I note that the draft State Planning Policies for South Australia do not mention fossil fuel in this section, and the fact that fossil fuel impacts climate change, therefore opening up of new gas fields, i.e. in the SE, is likely to put further stress on impacts of climate change.

CLIMATE CHANGE ISSUES

It is also important that key parts of The Climate Change and Greenhouse Gas Emissions Reduction Act should also be included in the State Planning Policies for South Australia. The world faces potable water shortages as never before. According to the Global Risks Report 2016 (World Economic Forum), failure of climate change mitigation and adaption, water crisis and biodiversity loss and ecosystem collapse are the greatest concerns.

<http://www.weforum.org/reports/the-global-risks-report-2016>

<http://water.usgs.gov/edu/watercycle.html>

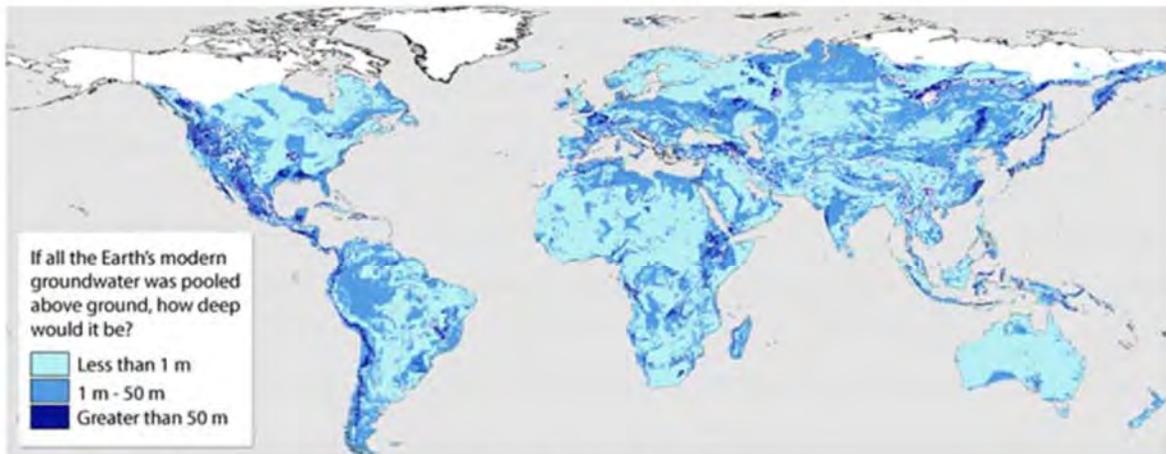
Of the world's total water supply of about 332.5 million cubic miles of water, over 96 percent is saline. And, of the total freshwater, over 68 percent is locked up in ice and glaciers. Another 30 percent of freshwater is in the ground.

<http://voices.nationalgeographic.com/2015/07/09/with-one-third-of-largest-aquifers-highly-stressed-its-time-to-explore-and-assess-the-planets-groundwater/>

Less than 6 per cent of ground water in the upper two kilometres of the Earth's landmass is renewable within a human lifetime, according to a new map showing the world's hidden groundwater.

"This has never been known before," said the study's lead author, Dr. Tom Gleeson of the University of Victoria in Canada. "We already know that water levels in lots of aquifers are dropping. We're using our groundwater resources too fast -faster than they're being renewed. Using data and computer models, an international group of hydrologists has produced the first data-driven estimate of the Earth's total supply of groundwater. Since we now know how much groundwater is being depleted and how much there is, we will be able to estimate how long until we run out

The study, published in the journal *Nature Geoscience*, estimated a total volume of underground water to be almost 23 million cubic kilometres, of which 0.35 million cubic kilometres is younger than 50 years old. Underground water is found beneath the Earth's surface and is recharged by rain, snow or water that leaks from the bottom of lakes and rivers. Its age can be a few months to millions of years. It can be found as deep as nine kilometres, according to the United States Geological Survey. "Since we now know how much groundwater is being depleted and how much there is, we will be able to estimate how long until we run out," Dr. Gleeson said.



Tom Gleeson, Kevin M. Befus, Scott Jasechko, Elco Luijendijk and M. Bayani Cardenas (2015). *Nature Geoscience*, DOI: 10.1038/NGEO2590.

INFOGRAPHIC: If all the Earth's modern groundwater was pooled above ground, how deep would it be? (Tom Gleeson, Kevin M. Befus, Scott Jasechko, Elco Luijendijk, M. Bayani Cardenas)

"Although water found closer to the surface is being renewed quicker than the water found deeper in the Earth, it is more sensitive to contamination and climate change, but it can also serve to temper climate extremes", he said. "Water found deeper in the Earth is often used for agriculture and industry. It can contain arsenic or uranium and is often more salty than seawater", Dr. Gleeson added.

"Groundwater can and should be thought of as a very useful buffer to climate extremes," he said. "If properly managed it flows to rivers during times of drought so it's a valuable and strategic resource for mitigating the extreme impacts of climate on water availability." According to the study, most groundwater is found in tropical and mountainous regions, with some of the largest deposits in the Amazon Basin, the

Congo, Indonesia and along the western borders of North and South America. Not surprisingly, the least amount is in arid regions such as Australia, the Sahara and Gobi Deserts and central North America.

CLIMATE CHANGE AND IMPACTS - CSIRO

On the CSIRO site under the title “CLIMATE CHANGE INFORMATION FOR AUSTRALIA”, information relating to Australia’s past, current and future climate is considered to help industries, governments and communities plan for and adapt to a variable and changing climate. The CSIRO believe that changes to the climate system have occurred and will continue to. Increases in greenhouse gases due to human activity having been the dominant cause of observed global warming since the mid-20th century, has been accepted by the international scientific community. The CSIRO believe that emissions of greenhouse gases will cause further warming and changes in all components of the climate system.

This represents a significant challenge in Australia to individuals, communities, governments, businesses, industry and the environment. Australia has already experienced increases in average temperatures over the past 60 years, with more frequent hot weather, fewer cold days, shifting rainfall patterns and rising sea levels. More of the same is expected in future.

The CSIRO worked with the Australian Bureau of Meteorology to produce the most comprehensive set of climate change projections for Australia ever released. Projections were done for eight distinct regions of Australia, each of which would be affected differently by climate change.

Research showed that most of the changes observed over recent decades will continue into the future. Projections suggest that for Australia:

Hot days will become more frequent and hotter.

Sea levels will rise.

Oceans will become more acidic.

Snow depths will decline.

Extreme rainfall events are likely to become more intense - already happening.

Seasonal-average rainfall changes will vary across Australia.

In southern mainland Australia, winter and spring rainfall is projected to decrease.

The time in drought is projected to increase over southern Australia.

There is high confidence in increasing potential evapotranspiration (atmospheric moisture demand).

There is high confidence in decreasing soil moisture in the southern regions (particularly in winter and spring) driven by the projected decrease in rainfall and higher evaporative demand.

There is medium confidence in decreasing soil moisture elsewhere in Australia where evaporative demand is projected to increase but the direction of rainfall change is uncertain.

Southern and eastern Australia are projected to experience harsher fire weather.

Tropical cyclones may occur less often, but become more intense.

Projected changes will be superimposed on significant natural climate variability.

<http://www.csiro.au/en/Research/OandA/Areas/Oceans-and-climate/Climate-change-information>

“PRINCIPLES OF GOOD PLANNING - OUR RESILIENT COMMUNITIES AND ENVIRONMENT”

Coastal environment

Water security and quality

Natural hazards

Emissions and hazardous activities “

Where there are fault lines, limestone and cavernous systems, and risk of seawater intrusion, these natural hazards should be taken into account. Mining and Petroleum activities in food bowl areas where these

geological hazards are present, pose a risk to water security and quality.

Professor Bill Fisher is the past president of the American Association of Petroleum Geologists, member of the National Academy of Engineering and serves currently as a member of the National Petroleum Council. I attended one of his lectures when he visited Adelaide and had the opportunity to discuss these issues with him. He stated the following: ***“If drilling near faults, and there is a high enough amplitude on vertical fracture patterns this can cause leakage up into the aquifers”***. Much of South Australia’s food bowl, especially the South East, has many known and unknown faults.

Flaring has been taking place during gas exploration in the SE. I recently had a meeting with the EPA, and asked them to name the colours in the flaring of Haselgrove 3. They admitted hydrocarbons were present. Most gas has mercury present which has to be separated at gas processing plants. Already, the SE clean and green image has been tarnished with a picture of flaring right next to a vineyard.



NULTY SUBSIDED HYDROLOGY OBSERVATION DRILL HOLE PUT DOWN IN 1982 BY WMC

This drill hole, pictured above, is on the property of the Nulty family. It was commissioned by Western Mining Inc. to be drilled in 1982 in limestone. The drill had never been inspected since, and it is highly likely that none of the drill holes or hydrology observation holes in the Kingston SE area (950 of them) have never been audited since 1982. Please note the hole at the side of the casing. The hole was around 30 x 46 cm at the top and went down for 20 meters to the unconfined aquifer. As the water levels in the aquifer drops, the limestone roof may be exposed. There may be a weakness in the roof, which allows the subsidence to occur. This is the most likely scenario of why the earth around the casing collapsed. This is in limestone country. Much of the South East has limestone. There is no proof that inspections have been done of the other 950 drill holes including 92 that were cored.

“OUR INFRASTRUCTURE AND MOVEMENT SYSTEMS

- *Strategic transport infrastructure – Energy”*

One of the big issues with mining on valuable agricultural land is transport corridors and infrastructure. This takes away areas of food production. It also raises concerns with odd shaped paddocks as the result of the transport corridors passing through properties, and the farmers may not have the room to cover all areas of the paddocks and may find turning their booms may encounter much difficulty. There is also the issue of stock crossing the transport corridors.

PRIMARY INDUSTRY

“South Australia’s agricultural, forestry, fisheries and aquaculture industries are fundamental to our prosperity and identity. Along with their associated tourism and service industries—and the infrastructure that supports their production and marketing—primary industry value chains are major generators of economic activity and employment throughout the state.

The land, water and marine resources used by primary production are subject to increasing demands and more complex community expectations. The industries themselves are also experiencing continual pressure for change. As a result, primary industry’s contribution to the state and regional economies cannot be taken for granted. These circumstances require a land use planning framework that is relevant and responsive to industry needs and aspirations, and that is capable of:

- *protecting key assets and securing emerging strategic opportunities”*

I have referred to food and agriculture in various parts of this submission. What seems to be omitted is the **Livestock Production Assurance Program and National Vendors Declaration**. Farmers are required to fill out these forms, before they can move any stock or sell it, to state that there is no stock contamination. If gas or mining activities cause contamination, the farmers cannot move or sell their stock. This affects our clean & green image and our export markets. Nor would the city people want to eat contaminated food.

- *“creating local conditions that support new and continuing investment in primary industry while seeking to promote co-existence and avoid land use conflicts”*

I have discussed this issue state-wide with many farmers, and generally farmers believe that mining or petroleum and agriculture **cannot** coexist. There are issues of dust contamination, lights, noise and contamination of air, soil and water where there are any resource activities present. Farmers do accept extractive mining for roads and buildings.

“Land use planning must play a role in creating local conditions that support competitive businesses and allow them to grow, adapt and evolve. This is becoming difficult in some parts of South Australia, with some previously stable primary industry locations experiencing competition for resources from new industries, and encroachment by other sectors. Such circumstances require land use planning to anticipate multiple land use scenarios and enable the co- existence of industries.”

There are currently no rights in South Australia for farmers to say no to these unwanted resource industries in their areas.

“Policies

1. *Identify and protect key primary production assets and secure strategic opportunities for future primary industry development.*
2. *Create local conditions that support new and continuing investment in primary industry while seeking to promote co-existence with adjoining primary industries and avoid land use conflicts.*
3. *Enable primary industry businesses to grow, adapt and evolve through technology adoption, intensification of production systems, business diversification, workforce attraction, and restructuring.”*

Again, I re-iterate there will be conflicts with any proposed co-existence of farming and mining or petroleum activities. It is not only the agricultural economy, and physical health that may be impacted, but also mental impacts. I know of at least one suicide a few years ago in South Australia, because of a proposed copper mine. There have been documented suicides and attempted suicides in Queensland because of the gas industry and the stress it has put on farmers. This has caused huge stress for farmers across S.A.

EMPLOYMENT LANDS

“Providing a suitable supply of land for employment uses is critical to support job growth. The planning system needs to support the diversification of our economy into a range of sectors and remove barriers to innovation. It is critical that the right signals are sent to the market to attract interest and investment across South Australia.”

In 2015 – 2016, the value of agricultural production in the South East was \$3.2 billion. This represented 51% of the total gross value of agricultural production in South Australia.

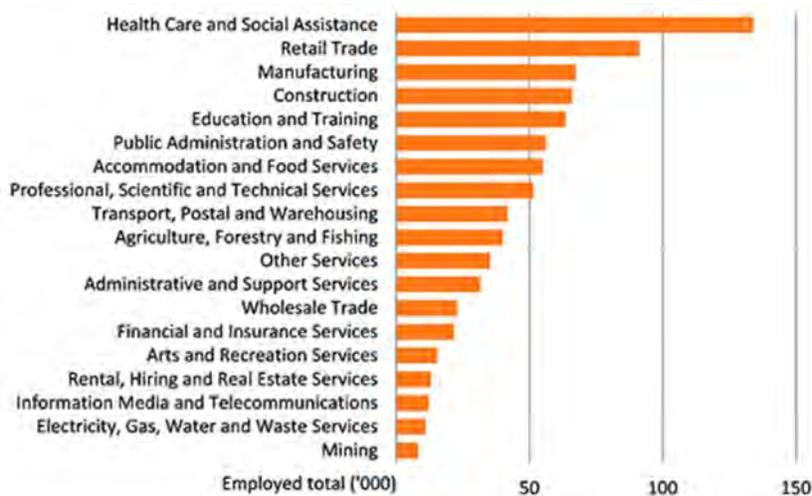
<http://agriculture.gov.au/abares/research-topics/aboutmyregion/sa#employment>

In 2016–17, the gross value of agricultural production in South Australia was \$7.2 billion, which was 12 per cent of the total gross value of agricultural production in Australia (\$61 billion).

The most important commodities in South Australia based on the gross value of agricultural production were wheat (\$1.2 billion), followed by cattle and calves (\$609 million) and sheep and lambs (\$579 million). These commodities together contributed 33 per cent of the total value of agricultural production in the state.

As seen below, agriculture, forestry and fishing are way above mining employment that sits at the bottom. The agricultural industry and importance, based on these figures, must not be compromised.

Employment profile, South Australia, May 2018



“The protection of viable and established industry from encroachment by incompatible adjoining development is critical.” This statement is correct, however, I do not agree with the rest of the paragraph, as evidenced in this submission.

“KEY RESOURCES

Our valuable mineral and energy resources are the property of the Crown and are managed by the state on behalf of all South Australians. The mineral and energy resources sectors will continue to fuel economic development, support the growth and development of our communities, and provide an income stream to help fund infrastructure and support construction affordability.”

Again as far as prime agricultural and most valuable cropping land, I re-iterate, mineral and energy resources sectors should not be allowed to compromise the agricultural and food bowl sector.

COASTAL ENVIRONMENT

“The South Australian coastal environment Objective has high aesthetic, social, environmental and economic values. It includes beaches, dune systems, tidal waters, wetlands and cliffs. The natural features of the coastal environment also provide vital habitat, contribute to our biodiversity and play an important role in protecting development and human occupation from flooding and erosion.

The interface between sea and land is dynamic and is subject to coastal hazards such as flooding, erosion, sand dune drift and acid sulphate soils. The impact of climate change and ongoing sea level rise has increased the risk for coastal developments and threatens the viability of tide-dependent ecosystems.”

SEA-LEVEL RISE

As the result **rising** sea levels will impact the population, environment and infrastructure. **It must be taken into account that insurance covers housing, but as I understand, not land, so what are the plans for Government in regard to relocation for people, when sea level rise or inundation occurs, and the land and houses are under the sea?** On the CSIRO site, under the title of “PLANNING FOR SEA-LEVEL RISE, the following information is revealed. *“Around the world, rising sea levels, as a result of human induced climate change, are already having an impact.”*

The CSIRO recommend that Government, industry and the community need to work together to consider how best to plan for rising sea levels that will affect coastal communities, industries and ecosystems. Risks to population, infrastructure and the environment need to be reduced.

“In Australia the consequences of sea level rise will include increased flooding of low-lying coastal, including tidal, areas and are likely to result in coastal erosion, loss of beaches, and higher storm surges that will affect coastal communities, infrastructure, industries and the environment.”

Our coastline is becoming more developed with people and industries. Around 85% of the population lives within 50 km of the coast. Beaches, coral reefs and other tidal systems such as estuaries, and wetlands are all likely to be affected by sea level rise.

<http://www.csiro.au/en/Research/OandA/Areas/Oceans-and-climate/Sea-level-rise-planning>

SEAWATER INTRUSION

PRELIMINARY INVESTIGATION OF SEAWATER INTRUSION INTO A FRESHWATER COASTAL AQUIFER: LOWER SOUTH-EAST, SEPTEMBER 2012: This document states the following ***“This fresh groundwater aquifer is vulnerable to salinisation by seawater intrusion due to over exploitation of the resource and climatic changes, which may respectively cause the lowering of the groundwater hydraulic head, and reduced recharge into the unconfined aquifer.”***

If there are any changes in pressures, such as sea level rise and extreme weather conditions accompanied by king tides, I believe it would be safe to assume, that because there is already proven interconnection between the sea and the aquifers, that it is likely that the risk of seawater intrusion could be further increased. As sea levels rise, or where there are storm events, which propel inundation of seawater, there will be reverse flow of creeks, drains and rivers, exacerbating salt problems and sending this inland through these water systems.

ILLUSTRATION OF AQUIFERS EXTENDING UNDER THE SEA, IN THE SOUTH EAST

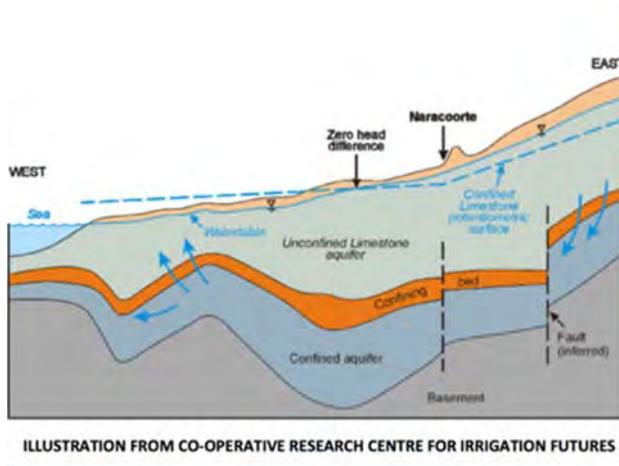
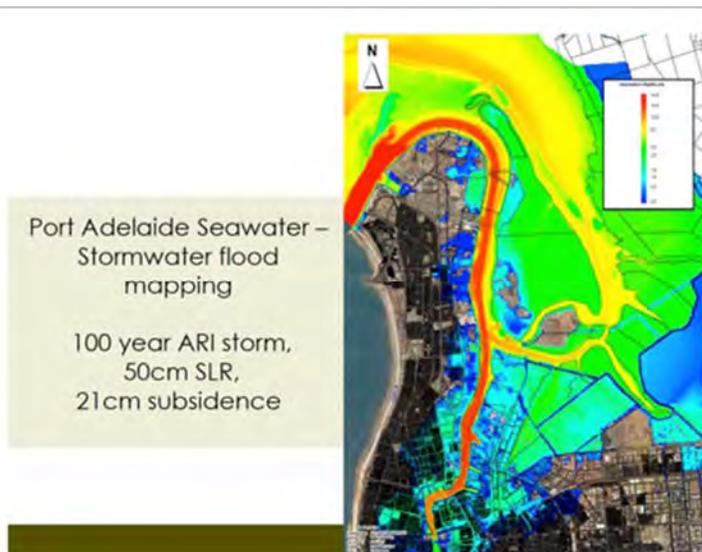


Illustration from the Co-operative Research Centre for irrigation futures, showing how the Dilwyn aquifers, including the confined aquifer, extend under the sea

IMPACT OF CLIMATE CHANGE ON DEVELOPMENT & CONSERVATION OF SOUTH AUSTRALIA'S COAST

Rob Tucker has written a document for DEWNR on 'THE IMPACT OF CLIMATE CHANGE ON DEVELOPMENT AND CONSERVATION OF SOUTH AUSTRALIA'S COAST'. Please see the chart from this document, on estimated sea level rise over the last 20 years in relation to climate change. Higher sea levels can mean: Increased severity and frequency of sea flood events and increased coastal erosion. In the report, it is stated that major developments must consider 'full range possible climate change and sea level rise affects'. Fossil fuels are having a major impact on climate change.

I believe the urgency for renewables is present.



The picture above is a model of a Port Adelaide Seawater-Stormwater flooding map for a 100 year Average Recurrent Interval storm, resulting in 50 cm Sea Level Rise and 21 cm subsidence. The red colour is 18.5 metre inundation depth, orange represents 15 metre inundation depth, yellow is 5 metre, green is 3 metre and aqua 0.5 metre inundation depth.

NATIONAL-SCALE VULNERABILITY ASSESSMENT OF SEAWATER INTRUSION: SUMMARY REPORT

This report was released by the Australian Government National Water Commission in August 2012. On page 10 /182 Australian coastal aquifers are vulnerable to seawater intrusion (SWI) that is described as the landward encroachment of seawater into coastal aquifers. This leads to degrading of the water quality and reduction of available freshwater. *“The increasing demands for fresh water in coastal areas and the anticipated impacts of climate change (such as sea-level rise and variations in rainfall recharge) may result in increases in the incidence and severity of SWI.”*

Page 13/182 Low-lying areas that may be susceptible to surface inundation by seawater due to sea-level rise were identified using a Digital Elevation Model. *“Areas with an elevation less than one metre AHD (Australian height datum, an approximation of mean sea level) were considered highly susceptible to future seawater inundation, which is likely to cause substantial losses to freshwater resources for unconfined aquifer systems.”*

Case study areas of aquifers and integrated vulnerability rankings showed high rankings in areas of SA, NSW, Vic, WA and Qld. Areas in SA included Adelaide with T1 and T2 aquifers, Le Fevre with Q1, T1 and T2 aquifers, Port MacDonnell Tertiary Sands Aquifer, Port MacDonnell Gambier Limestone aquifer, Willunga with the Port Willunga Formation Aquifer and also the Maslin Sands Aquifer, the Uley South Wanilla Sands Aquifer and also Bridgewater Formation Aquifer and the Willunga Quaternary Aquifer. Seawater intrusion had already occurred at some of the case study sites around Australia.

On page 15/182, All Australian states and the Northern Territory coastal aquifers, according to available data, are threatened by seawater intrusion. Page 17/182 As well as increasing demands for fresh water in coastal areas of Australia, sea water intrusion is also a concern with the anticipated impacts of climate change, such as sea level rise and variations in rainfall recharge. This may result in more incidents and more severe impacts of seawater intrusion.

On page 18/182, *“this study could be described as an assessment of the vulnerability of Australian freshwater coastal aquifers (system and attribute of concern to seawater intrusion as a consequence of over extraction and sea-level rise and/or recharge – discharge variations associated with climate change (hazards) in the present and future (temporal reference)”*

“The Intergovernmental Panel on Climate Change (IPCC) has defined vulnerability in the specific context of climate change as the degree to which a system is susceptible to, or unable to cope with, adverse effects of climate change” (IPCC 2007) Barnett et al (2007).

By combining vulnerability definitions for the purposes of the report for this study, one of the key points of exposure to hazards is seawater intrusion as a result of groundwater extraction and climate change.

On page 23, apart from groundwater extraction for agriculture and domestic use, seawater intrusion may occur naturally, including from, tsunamis, flooding, and climate variability. Although not listed in this document, we cannot say that tsunamis won't occur in the open ocean area of the South East as the result of an earthquake (naturally occurring or triggered through petroleum activities). As the result of the various incidents that may occur, resulting in seawater intrusion, as I understand, this can lead to alteration of the hydrology of an aquifer system.

On page 25/182, the impacts of reduced groundwater recharge may increase in the future as a consequence of the anticipated climate change-induced reductions in rainfall. The aquifer water quality, as the result of low groundwater recharge will be exacerbated by increased groundwater extraction during droughts – this is another reason that unconventional gas should be banned in the SE of SA, due to the high volumes of water that are required. Even if water is obtained from deep down, the aquifer water will be higher in salt and

contaminants, as previously explained.

Page 26/182 *“Sea-level rise, in response to a changing global climate, can also change the position of the transition zone. Climate change predictions by the IPCC indicate a possible rising sea level of 59 centimetres (plus 10–20 centimetres for ice sheet melt) by 2100 (IPCC 2007), which would lead to the inland migration of the freshwater–saltwater interface (Werner and Simmons 2009). In order to re-establish equilibrium with fresh groundwater in response to rising sea levels, the transition zone is expected to move landward and intrude coastal aquifers. Based on prehistoric cases of the influence of sea-level rise, SWI may cause a landward shift in the transition zone that does not return to its original position and may be difficult to remediate, emphasising that prevention of SWI is a better option than post-intrusion remediation (Barlow 2003).”*

“In addition to the subsurface impacts, sea-level rise may also result in the permanent surface inundation of low-lying coastal regions and increase the frequency and intensity of temporary inundation through the occurrence of storm surges. This could result in the intrusion of salt water into freshwater reserves by movement of the interface, similar to tidal changes (discussed below), or by downward seepage.”

According to page 100/182, it is noted that there are many knowledge gaps. Implications to seawater intrusion, as the result of climate change and climate variation and their implications are not well understood on a national scale. More research needs to be undertaken on the effects of future sea-level rise, over-extraction and population growth on coastal groundwater resources. So, in other words, preservation of our potable aquifers is critical, as well as reduction in greenhouse gas emissions caused by fossil fuel extraction.

On page 101/182, I was surprised to learn that there is no information about offshore hydrogeology, including offshore aquifers. As I understand, there is lack of information regarding the detailed coastal aquifer settings around Australia and consequent groundwater-oceanic water interactions in these unknown aquifers. Although this inquiry is around hydraulic fracture stimulation in the SE, this very critical information (or lack thereof) should not allow the Government to ratify offshore oil and gas activities in South Australian waters. I understand from this report that things are being put in place, but if lack of information re hydrology under the sea is unchanged since this report was written, it is a national disgrace – resources are urgently needed in this area for future planning and development. Perhaps Government would do well to correct this, and stop propping up an unwanted industry with heavy subsidies.

19http://www.nwc.gov.au/_data/assets/pdf_file/0014/23162/85-Seawater-intrusion.pdf

DEFINING THE SEA LEVEL RISE PROBLEM IN SOUTH AUSTRALIA – SA Govt Paper

In June, 2014, the Local Government Association of South Australia in partnership with the Climate Change Unit, Water & Climate Change Branch, Department for Environment, Water and Natural Resources, and Coast Protection Board released a very important document entitled **“DEFINING THE SEA LEVEL RISE PROBLEM IN SOUTH AUSTRALIA, ISSUES PAPER – URPS.”** On page 7/149, it is stated that all South Australians will be affected because of environmental, economic and social systems that are threatened by sea level rise. The document discusses warming oceans, melting glaciers and ice sheets causing the sea levels to rise around the world at an increasing rate because of the global warming climate systems. Direct impacts on the coastal environment and infrastructure will increase coastal management costs. These areas and their amenities will be devalued. This will impact the provision of public services, business, industry, eco system services, in turn, impacting the health and well being of communities.

It is stated that the government must make decisions about sea level rise and determine acceptable and unacceptable levels of risk. As it is scientifically well documented, including by the CSIRO as previously explained, that the fossil fuels are a large factor impacting climate change, therefore the government should act accordingly and decide that proceeding with unconventional gas in the SE of SA qualifies as an unacceptable level of risk.

On this same page it is stated that there are current examples of decisions being made that are placing communities and assets at risk of coastal hazards, risks that are being exacerbated by sea level rise. Organizations and officers of those organizations have raised concerns that poor decisions are being made. **In April 2013, a sea level rise forum was hosted by the then Premier.**

On page 15 a recent report by the Intergovernmental Panel on Climate Change (IPCC) reconfirmed that warming of the global climate system is unequivocal. Global average sea levels have risen over the last century, and more quickly in recent years. Our state is vulnerable to sea level rise. **Data collected at Port Stanvac shows that sea levels have risen at an average rate of 5.1mm per year since 1992, compared to 1.5mm per year over the previous century (calculated from tidal records). If the climate were to stabilize through global climate change mitigation efforts, sea levels will still continue to rise for many centuries, posing a risk to coastal areas both in itself, and in combination with other climate change caused risks such as more frequent storm surges.** Please see the next section on the storm damage at Kingston SE in July 2016.

When one really considers the facts and that the 5.1 mm rise per year has only occurred in the last 24 years, is this government report too conservative, and not allowing for the fact that in the next 20 years, the sea level rise could be much greater than the average of 5.1 mm, and could even be 10 mm per year or more, accounting for melting of polar ice caps and glaciers?

On page 19 it is stated that global emissions currently are in excess of the highest emissions scenario considered by the IPCC. The IPCC believes that the global average sea level rise will likely be in the range of from 0.45 metres up to 0.81 metres from around 2018 – 2100. Geoscience Australia and the Commonwealth Department of Climate Change and Energy Efficiency have mapped projected sea level rise in parts of South Australia, including from Outer Harbour to south of Marino. Areas of Yorke Peninsula have also been mapped out. I am also aware that studies have been done in the area of Kingston SE.

On page 21 it is stated that during storm surge events, the impacts of sea level rise will be seen. Coastal erosion will accelerate above natural rates. As the sea level rises, low-lying areas will be permanently inundated as the sea level rises. The combined impact of sea level rise with storm surge and catchment inflows will exacerbate coastal inundation, erosion, land subsidence, loss or damage to coastal wetlands and saltmarshes, and saltwater intrusion to groundwater systems. These cumulative impacts can be further exacerbated by various influences including factors that are both climate-related and non-climate related.

On page 22, it is stated that the effects of sea level rise resulting from climate change include storm surges resulting in flooding from the sea, erosion, backwater effect as the result of flooded rivers, wetland loss, salt water intrusion into surface water and ground water and also land subsidence (both of which I previously discussed in my submission).

2 pages on is a map from page 23. The total estimated replacement cost of assets when the SA coast is exposed to a 1.1 metre sea level rise, predicted by 2100, and based on data sourced in 2011, is expected to be around \$46 billion. It is interesting to note the impacts estimated on some specific district council areas, as the result of the 1.1 metre estimated sea level rise by 2100. These include the following:

City of Port Adelaide Enfield – up to 506 commercial buildings, 692 light industry buildings and up to 45 km of rail will be at risk.

City of Charles Sturt – 141 commercial buildings, 14,100 residential buildings will be at risk.

City of Holdfast Bay – 121 light industry buildings, up to 1000 residential buildings will be at risk.

District Council of Port Pirie – 171 commercial buildings and 2000 residential buildings will be at risk.

Coorong District Council – up to 730 km of roads will be at risk.

Kingston District Council – up to 330 km of roads, up to 70% of all residential buildings will be at risk.

District Council of Robe – 50% of all residential buildings will be at risk.

District Council of Grant – up to 35% of all residential buildings will be at risk.

The Sea Level Rise Problem along South Australia's Coast

A summary of key economic, environmental and social issues

Sandy beaches are at greatest risk of erosion as a result of sea level rise and increased storm intensity.
Up to **47%** of South Australia's beaches are classified as sandy.

Salt marsh and samphire flats are important carbon sinks. Like mangroves, they can naturally migrate as sea levels change however barriers such as roads, seawalls and levees restrict this natural adaptation and ability to retreat.

Mangroves provide habitat and breeding areas for local and migratory birds, crustaceans and commercially important fish species. Whilst mangroves can naturally migrate as sea levels change, barriers such as roads, seawalls and levees restrict this natural adaptation and ability to retreat.

Port Augusta City Council
Up to **134** commercial buildings
Up to **24km** of rail at risk by 2100

Port Pirie Regional Council
Up to **171** commercial buildings
Up to **2000** residential buildings at risk by 2100

District Council of Yorke Peninsula
Up to **2000** residential buildings will be exposed by 2100 (20% of total)

Increased investment in sand pumping at metropolitan beaches will be required

Coorong District Council
Up to **730km** of roads at risk by 2100

Kingston District Council
Up to **330km** of roads
Up to **70%** of all residential buildings at risk by 2100

District Council of Robe
Up to **50%** of all residential buildings at risk by 2100

District Council of Grant
Up to **35%** of all residential buildings at risk by 2100

Foreshore areas are key gathering points for communities across South Australia. Numerous community events and activities are held at beaches and foreshores every year. Beaches and foreshores are a key recreational asset in all coastal communities. As temperatures increase and the incidence of heatwaves, there will be increased demand for access to the coast.

More than 1 million visitors to South Australia visit our beaches and coastal areas every year. Investment in infrastructure including hotels, restaurants, cafes and other visitor destinations is significant and contributes to the local and regional economy. Sea level rise will impact how we use the coast and the activities that are located there.

Shack settlements along Eyre and Yorke Peninsulas and in the South East will be more vulnerable with rising sea levels. Protection works will be required, land zoned to restrict development or retreat plans put in place.

Increased risk to public safety during storm events due to coastal inundation

Increased incidence of damage to infrastructure such as jetties, foreshore areas, beaches, stairs, public toilets buildings and stormwater systems due to inundation during storm events.

Community expectations to access and live close to the coast will be challenged

Key industries and state significant economic generators are located in coastal locations including Port Adelaide and Le Fevre Peninsula.

City of Port Adelaide Enfield
Up to **506** commercial buildings
Up to **692** light industrial buildings
Up to **45km** of rail at risk by 2100

The Adelaide coastline is highly valued for recreation and amenity. Sea level rise will impact how and when we can use the beach and activities located in proximity to the coast.

City of Charles Sturt
Up to **141** commercial buildings
Up to **14,100** residential buildings at risk by 2100

Increased risk to public safety due to cliff erosion and destabilisation.

City of Holdfast Bay
Up to **121** light industrial buildings
Up to **1000** residential buildings at risk by 2100

Total Estimated Replacement Cost of Assets exposed to 1.1m SLR in South Australia

Commercial Buildings	Up to \$27 billion
Light Industrial Buildings	Up to \$1.2 billion
Residential Buildings	Up to \$7.4 billion
Roads	\$9.5 billion
Rail	\$900 million

TOTAL REPLACEMENT COST

\$46 billion

Data Source: Commonwealth of Australia (2011) Climate Change Risk to Australia's Coast: a first pass national assessment

Previous page - Diagram from 'DEFINING THE SEA LEVEL RISE PROBLEM IN SOUTH AUSTRALIA, ISSUES PAPER – URPS'

On page 25 the estuarine, near-shore and coastal ecosystems that provide natural protection and coast stabilization will be threatened by sea level rise. These systems usually provide natural protection and coast stabilisation. I understand if these natural protection barriers disappear, then more severe damage and associated massive economic costs will be much greater. Salt flats and marshes and mangroves are found between the low and high tide levels. Changes in tide levels will impact these ecosystems. Migratory bird breeding areas, fish and crustaceans are dependent on these areas. Salt flats and marshes are important carbon sinks as well. I understand this is likely impact both commercial and recreational fishing.

Page 26 discusses the rise of sea temperature and acidity of the sea and detrimental effects on the ecology. Sediment deposition, sea grass being smothered and inhibited growth are issues. I understand that without healthy and abundant sea grass, fish breeding and feeding grounds in turn are affected. Again seawater intrusion into ground water systems is discussed as the result of sea level rise, affecting potable groundwater near the coast.

In 2009 the Australian Government had an inquiry into climate change and management of the coastal zone. A document was released called "National Cooperative Approach to Integrated Coastal Zone Management: Framework and Implementation Plan". Even though this report was released, **it appears that the Federal or State Governments have not made any significant commitments up to date, and therefore it is extremely important that the State Planning Policies for South Australia take all of this into account.**

On page 44, the Coast Protection Act 1972 defines the coastal zone as State waters to 100 metres inland from the high water mark (HWM), and provides for the conservation and protection of the beaches and coast of South Australia through establishment of the Coast Protection Board. Under Section 14 of the Act, the functions of the Coast Protection Board are to: Protect the coast from erosion, damage, deterioration, pollution and misuse; Therefore, one could argue that if the coast line is being put at risk through erosion, damage, deterioration, pollution and misuse; because of sea level rise, because of climate change which is exacerbated by the use of fossil fuels and this needs urgent addressing.

On page 58 and further pages is the "30-Year Plan for Greater Adelaide 2010". On page 59 the document mentions that policy must include taking measures to protect coastal development. On page 69 the minister is required to develop policies, under the Climate Change and Greenhouse Emissions Reduction Act 2007 that promote or implement adaptation to climate change impacts.

On page 78, the objects of the current Natural Resources Management Act 2004 (NRM Act) are to promote sustainable and integrated management of the State's natural resources, and provide to protect the State's natural resources. Under the NRM Act, the Natural Resources Council and the Regional Natural Resources Management (NRM) Boards have legislative responsibility to plan for the management of natural resources in a holistic integrated way for the whole state for all aspects of NRM. Coastal, estuarine and marine environment planning is the legislative responsibility of the NRM board. It must plan for both the land and the State water limits, which are 3 nautical miles out. As this is an issues paper on sea-level rise including impacts from climate change (exacerbated by fossil fuel use), then this needs to be seriously considered by the Government who should consider this huge responsibility and act upon it, and do what is best for the state in the long run.

On page 84 - I quote the following: *"Flood and extreme weather as a result of climate change will be experienced in the coastal zone. Sea level rise as a result of climate change will exacerbate risk of flooding and extreme weather events for which emergency management planning is undertaken.*

On page 94 - **The Insurance Council of Australia (ICA) identified that some risks including storm surge, landslip and sea level rise that are not generally covered by insurance products. This is further complicated by the fact that no common definitions of risks (inclusive of storm surge, landslip and sea**

level rise) are adopted across the insurance industry. Policies generally deal with “saltwater risks or action of the sea” via exclusions.

Also, in response to the inquiry, multinational insurance company Insurance Australia Group (IAG), has said that Australia is facing an “insurance gap” because land values are not currently insured”. Land value on the coast forms a significant component of overall property value. Coastal buildings may be protected by insurance to some extent. Land values of properties are not insured. It is also highly likely that legal actions may be brought against the local government councils.

On page 97 it is quoted **“The State Government is also potentially liable for climate change related actions,”** and given that the governments have all levels have been many warnings on climate change and the dangers of fossil fuels, this is not surprising. If someone has been given a warning, as I understand, and does not act on the warning, then they have placed themselves in a culpable position.

On page 111 it is obvious also that the Commonwealth Government is also aware of sea level rise as the result of climate change, as there was an inquiry recommending a national role in distributing information between the research sector, local governments and other stakeholders. I assume this also includes the taxpayers.

<https://www.lga.sa.gov.au/webdata/resources/files/Sea%20Level%20Rise%20Problem%20Definition%20Paper.pdf>

“WATER SECURITY AND QUALITY

Water is one of South Australia’s most valuable natural resources. Access to a safe and reliable water supply supports healthy living, our premium food and wine industries, mining activity, and advanced manufacturing. It is therefore vital that we continue to ensure the security and quality of our water supplies, sources and ecosystems.

Our evolving population and diversifying economy, combined with reducing rainfall and competition for traditional water supplies, requires us to continually plan for water security. We need to further reduce our reliance on the River Murray, diversify our water supplies and increase our water use efficiency.

We also need to ensure that land use planning integrates current and future water availability into decision making. This includes considering what impacts and opportunities future development will have on available water supplies. In situations where a future development’s water demand is likely to exceed available supply, we need to investigate all feasible options by weighing up the social, economic and environmental considerations.”

I refer to the sections in this submission on water.

NATURAL HAZARDS

“Natural hazards are an integral part of the South Australian landscape and as we continue to grow and develop we need to plan for and mitigate risks from those hazards that have the potential to impact on people, property, infrastructure, our economy and the environment.

The costs to community, business and government of responding to and recovering from natural hazard events is significant. Land use planning has an important role to play in guiding development to reduce the impact of natural hazards rather than relying solely on response and recovery.”

I refer to the sections of natural hazards in this submission, including seawater intrusion and sea level rise under the section on Coastal Environment. I have included limestone, subsidence and faults under the topic of PRINCIPLES OF GOOD PLANNING - OUR RESILIENT COMMUNITIES AND ENVIRONMENT.

EMISSIONS AND HAZARDOUS ACTIVITIES

***“Protecting communities and the environment from exposure to industrial hazards and site contamination is fundamental to the creation of healthy cities and regions. At the same time, it is critical that South Australia’s industrial and infrastructure capacity and employment levels are preserved.*”**

Whilst South Australian industries generate significant economic value for the state, these same industries, including waste depots and essential infrastructure, also typically have legitimate emissions to the air, land and water; or store and manage hazardous materials.”

I recently had a meeting with the EPA, and I believe, that while the EPA are doing their best, there is probably underfunding for this vital work. I believe that there are areas, especially around mining and petroleum activities, where important information is lacking. Waste water and solid waste from these activities remains problematic.

CONCLUSION

I have not covered all aspects in this submission for the Draft State Planning Policies for South Australia, due to time constraints. I have provided much evidence here why climate change, water and food security must be accounted for at the highest level of any planning, should Government planning deem to be successful.

“Healthy water is fundamental to our way of life and environment. It underpins our economy and growth in population which are critical to South Australia's future prosperity.”

Quote from SCOTT ASHBY, Former Chief Executive, Department For Water, South Australia