Natural Resources Management Plan 2015–2025

Have Your Say

Discussion paper No 5: Coastal Waters and Estuaries

for their future...

This discussion paper is part of a series covering all of the 'Big Issues' raised by the community during meetings and workshops about the new Kangaroo Island NRM Plan. It provides a summary of the current state of knowledge about the issue, suggests courses of action and identifies who might work together with us in addressing it.

We now invite your comments, suggestions, criticisms and ideas.

Introduction

Kangaroo Island (including the Pages Isles) is a region of considerable conservation significance for marine flora and fauna. The coastal waters of Kangaroo Island (KI) are recognised as being among the most biologically diverse of any along the southern Australian coastline. This is in large part due to KI's complex oceanic environment, which is subject to the influences of the warm Leeuwin current, flowing in from Western Australia (but originating in Indonesia), the cold Flinders current from Tasmania, strong tidal currents in the narrow bottleneck of Backstairs Passage, and an upwelling zone off the southwest coast that enriches coastal waters with plankton, fuelling a food web that supports fish, shellfish, seals, seabirds and whales. In addition, being an island, with coastlines facing all points of the compass, there are a great variety of microhabitats and local scale oceanographic conditions around the Island, varying from the high-energy, southern and western coasts, battered by Southern Ocean swells and dominated by inshore rocky reef systems to the sheltered northeast-facing coastline where protected bays harbour seagrass meadows and soft bottom communities.

Reef surveys and seagrass monitoring programs carried out over the past ten years indicate that, by and large, KI's inshore marine environments are in very good condition. Rocky reef fish and invertebrate communities are diverse and algal canopy cover is high at all surveyed reefs along the north coast. Seagrass meadows are generally continuous, extensive and lush within most inshore bays and lagoons around the sheltered east-facing coastline. The exception is Western Cove in Nepean Bay where reports suggest large areas (approximately 3000 ha) of seagrass have been degraded or lost. This is believed to have resulted from excessive nutrients and sediments being discharged into Western Cove by the Cygnet River, which drains a predominantly agricultural catchment constituting over 12% of the land area of KI.

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Kangaroo Island is also renowned for its significant, and in some cases expanding, colonies of seals, top-order predators that are important for regulating marine food webs. Long-nosed (previously New Zealand) fur seal populations have been increasing for the past 25 years from a point of near extinction during the sealing era of the early 1800s. Recently, there have been regular sightings of Australian fur seals on the Casuarina Islets for the first time in many years, however the colony of endangered Australian sea lions at Seal Bay is not increasing and there are indications that pup production may be slowly declining. Other top-order predators include coastal raptors, whose breeding refuges and food sources need to be protected.

Sightings of common and bottle-nosed dolphins are common around KI and there are a number of resident pods of dolphins known along the north coast. It is also quite common to spot migrating southern right and humpback whales in winter on their way to calving areas in the Great Australian Bight. Blue whales are known to aggregate to feed on rich plankton blooms in the upwelling zone located off-shore from Kangaroo Island in the Murray Canyons area.

There are 25 estuaries on KI harbouring mixed saltmarsh, mudflat and seagrass communities. More than half (15) are listed as wetlands of national significance. The saltmarsh community on KI amounts to 11% of the State total (70 km^2) but much of it is contained within freehold title and used for agriculture and urban settlement.

Ecosystem services[1] (the benefits people derive from functioning ecosystems) are increasingly being recognized as essential to sustainable human well-being. Oceans and coasts provide a significant portion of ecosystem services. We need to significantly improve our understanding and modelling of the complex interconnections between ecosystems and sustainable human well-being to allow us to make better management decisions. Kangaroo Island's pristine waters also support the local economy, particularly the tourism sector, recreational and commercial fishing, and aquaculture industries. They provide the community with a beautiful daily backdrop, define the island's character, and provide the opportunity for recreation, relaxation and connecting with nature.

Threats

Major threats to marine and estuarine environments on KI are:

- Climate change impacts such as ocean warming, acidification and sea level rise
- Land-based pollution, particularly sediment and nutrient runoff in rivers and stormwater
- Marine debris[2], especially plastics (including micro-beads) and discarded fishing gear
- Over[3]-fishing[4]
- Offshore oil[5] and gas exploration and drilling for fossil fuels, including seismic surveys[6]
- Potential construction of a deep water port (for forestry) and increased shipping
- Biosecurity risks, especially the spread of marine pests such as the European fanworm and European sea squirt
- Inappropriate use of beaches and dunes (vehicles and dogs) threatening shorebirds and coastal ecosystem integrity

[1] Costanza R, Anderson S, Bohensky E, Butler J, Edyvane K, Howe S, Kirkman H, Kubiszewski I, Pert P, Stoeckl N, Sutton P, and Walshe T. 2014. *Ecosystem Services From Healthy Oceans and Coasts*. White Paper to Support the National Marine Science Plan

[2] CSIRO. 2014. *Marine debris: Sources, distribution and fate of plastic and other refuse – and its impact on ocean and coastal wildlife*. Oceans and Atmosphere Flagship

[3] http://overfishing.org/

[4] Fisheries Research and Development Corporation

[5] McCormick L. 2015. *Five Years and Counting: Gulf Wildlife in the Aftermath of the Deepwater Horizon Disaster.* National Wildlife Federation

[6] Weilgart, L. 2013. *A review of the impacts of seismic airgun surveys on marine life.* Expert Workshop on Underwater Noise and its Impacts on Marine and Coastal Biodiversity. Convention on Biological Diversity

Naturally, given the global connectivity of the sea, some of the major problems facing Kangaroo Island's marine environment are universal[7] and are a small reflection of the perilous state of the world's oceans[8]. This is certainly the case for the massive problem of marine plastics pollution as well as climate change-associated effects such as ocean acidification and warming. These impacts are difficult for us to combat alone. We can however contribute in some measure and by various means to minimising greenhouse gas emissions in our corner of the planet.

Over the past few years, there have been a number of seismic surveys conducted by Bight Petroleum in the area to the south-west of KI to explore offshore oil and gas reserves. Seismic surveys use repeated air gun explosions that are highly invasive to marine species, particularly those that rely on sound communication, such as sealions[9], dolphins and whales[6]. They destroy planktonic eggs and larvae[10] in the immediate vicinity of the explosions, which could potentially affect regional fisheries production[11]. Apart from this, further exploitation of fossil fuel reserves may not be the wisest choice given the overwhelming threat posed to earth's climatic and oceanographic systems by their utilisation. These systems regulate all of the essential cycles that underpin our natural resources — including the ones we rely on for food and fibre.

Kangaroo Island has an emerging problem with marine pests. These are translocated to KI from infected ports and marinas around Adelaide and other parts of the state (e.g. Marina St Vincent at Wirrina on the Fleurieu Peninsula). Several infestations of European fanworm and European sea squirt have been discovered at Kingscote, American River, Christmas Cove and in the Bay of Shoals in the past seven years and, despite a number of efforts to raise awareness of the issue, they continue to arrive attached to the hulls of visiting yachts. It is important to be vigilant and sustain eradication efforts at this point in the 'invasion cycle' when numbers are still low and the problem is contained and potentially manageable.

Current Management Responses

There are currently a number of management actions and controls in place on KI:

- There are four Marine Parks in KI waters regulating activities that can occur within their boundaries.
- The KI NRM Board has developed a Coastal Lands Assessment tool that is used by KI Council to respond to development applications in the coastal zone.
- The KI NRM Board has signed a Memorandum of Understanding with the Northern and Yorke, and Adelaide and Mount Lofty Ranges NRM Boards regarding cross-regional management of Gulf St Vincent. This has led to collaborative projects on marine pests, marine debris and sea- and shorebirds, including little penguins.
- The KI NRM Board is responsible for addressing land-based impacts on the marine environment. The Board is currently running a Catchment to Coast project that is addressing the issue of seagrass loss in Western Cove through the monitoring of seagrass meadow cover and condition, and focussing on water quality improvements in the Cygnet River catchment. This project is funding on-ground works such as fencing of riverside vegetation and construction of stock crossings and off-stream watering points to reduce sediment and nutrient loads entering the watercourse. Seagrass in Nepean Bay is also monitored to detect change.

[7] International Programme on the State of the Ocean. 2013. *The State of the Ocean 2013: Perils, Prognoses and Proposals*. International Union for Conservation of Nature

[8] http://www.stateoftheocean.org/

[9] Prideaux, M and Prideaux, G. 2015 *Australian sea lions (Neophoca cinerea): the need for a revision of offshore oil and gas exploration assessment*. Wild Migration Technical Report Series, Australia

[10] http://www.beachapedia.org/Seismic_Surveys

[11] https://www.norskoljeoggass.no/PageFiles/6574/Effects%20of%20seismic%20surveys%20on%20fish,%20fish%20catches%20and%20sea%20mammals.pdf?epslanguage=no

» Marine biosecurity is being addressed through another Board-funded project (Too Good to Spoil, Too Precious to Lose). Marine pest surveillance is active at key island entry ports and there is a strong focus on community education and awareness through direct liaison with recreational boat owners and clubs and marina owners and operators.

» There are some significant non-government organisation activities associated with marine environments. The KI Shorebirds Group has been monitoring seabird and wader numbers at several important feeding and breeding sites for about eight years and has also undertaken a number of community projects to protect beach-nesting birds, as well as to educate the community about shorebird conservation issues. Dolphin Watch has been operating on KI for ten years, collecting data about island dolphin populations and educating the community, especially school students. The Friends of the Sea undertake annual reef censuses that are contributing to the understanding of the biodiversity on KI's northern coastline.

Climate Change

Climate change is impacting on the ocean and marine ecosystems in a number of significant ways[12]. These include:

» The oceans are warming — as atmospheric temperatures rise, the ocean absorbs heat, becoming warmer. Much of the heat generated by global warming thus far has been captured by the oceans. Changes in ocean temperatures are leading to alterations in ocean currents[13] (e.g. the Leeuwin current that flows south along the coast of WA and east into SA is speeding up whilst the Atlantic meridional overturning circulation is slowing down[14]) and changes in marine species distributions (e.g. tropical parrot fish are moving south into more temperate waters) with subsequent impacts on the ecosystems that they move out of and into. Warmer oceans also mean more frequent and severe extreme weather events such as hurricanes and cyclones, as recently experienced with Cyclones Pam[15] and Nathan.

» Sea level rise is projected to be in the range of 0.2 m by 2030, 0.7 m by 2070 and over a metre by 2100 — sea level rise is primarily as a result of ocean warming and hence expansion. It is also driven by the melting of polar ice and glaciers around the world, which is now happening faster than anticipated[16] and that could contribute to a more rapid sea level rise than previously thought. The rate of sea level rise has doubled in the last decade and may increase even further if positive feedbacks that are currently not accounted for in the climate change projections kick in. Rising sea levels need to be considered together with king tides and increasing storm surge. A 0.2 m rise turns a one in 100 year event into a one in 5–10 year event. Houses and infrastructure such as roads, jetties and even the Kingscote airport will be impacted. Natural habitats will need to retreat inland, e.g. frontal dunes will be cut away and low lying areas will become permanently flooded.

[12] Hobday, AJ, Okey, TA, Poloczanska, ES, Kunz, TJ and Richardson, AJ (eds). 2006. *Impacts of climate change on Australian marine life: Part A*. Executive Summary. Report to the Australian Greenhouse Office, Canberra, Australia

[13] http://www.upenn.edu/pennnews/news/deep-ocean-current-may-slow-due-climate-change-penn-research-finds

[14] http://www.nature.com/nclimate/journal/vaop/ncurrent/full/nclimate2554.html

[15] Climate Council. 2015. *Damage from Cyclone Pam was exacerbated by climate change.* Climate Council Briefing Statement.

[16] http://news.nationalgeographic.com.au/news/2014/12/141204-antarctic-ice-melt-sea-level-climate-environment-science/

» Ocean acidification and hypoxia[17] — rising levels of atmospheric CO_2 result in more CO_2 being taken up by the ocean. This is lowering the pH of the water[18], making it more acidic. As the ocean warms, it becomes less able to absorb calcium, which is used by marine creatures (e.g. shellfish) to produce their shells and skeletons. Molluscs and crustaceans such as abalone, oysters, and crayfish along with coral and plankton that form shells from calcium carbonate are all at risk. Ocean acidification may also have direct effects on fish behaviour and physiology. Rapid changes in chemical and physical conditions in the ocean have already affected the distribution and abundance of marine organisms and ecosystems. This problem is further compounded by hypoxia or inadequate levels of oxygen in the ocean, coupled with the ongoing effects of pollution and over-harvesting, all leading to the potential collapse of the marine food chain with devastating consequences for the 400 million people around the world who depend critically on fish for their food.

The above clearly have serious ramifications for life on Kangaroo Island, with social and economic impacts as well as the obvious environmental ones.

Strategies and priorities

It is important to note that the NRM plan is intended to guide and coordinate the efforts of all stakeholders in the region and responsibility for its implementation is a joint one.

» Continue to invest in actions to improve marine biosecurity, encompassing education, surveillance and emergency preparedness.

» Continue to invest in actions to reduce agrichemical, sediment and nutrient inputs to watercourses and rehabilitate riparian zones.

» Continue to invest in actions to reduce storm water runoff and effluent seepage into coastal waters.

» Continue to investigate and monitor the Island's marine environment in order to better understand it and to detect change in marine conditions and biodiversity.

» Encourage compliance with Council by-laws with respect to driving on beaches and keeping dogs on leads.

» Remove rubbish and debris from beaches and discourage littering and disposal of waste from vessels.

» Seek protection from fossil fuel exploration and exploitation.

» Seek an end to plastic packaging around consumer goods and investigate the options for KI moving towards a zero waste policy.

» Encourage compliance with recreational fishing bag limits and identify and promote opportunities for the recreational fishing sector to further promote stewardship of the marine and coastal environment.

» Raise awareness about the value of coastal environments both from an environmental and a socio-economic perspective.

[17] http://www.cisl.cam.ac.uk/Resources/Climate-and-Energy/Climate-Change-Implications-for-Fisheries-and-Aquaculture.aspx

[18] http://www.pmel.noaa.gov/pubs/PDF/feel2899/feel2899.pdf

Partners

» Department of Environment, Water and Natural Resources

» Research agencies

» Non-government organisations

» Kangaroo Island Council

» Primary Industries and Regions SA

» Industry

» Community, including special interest groups such as fishers, surfers, Friends of the Sea, and Dolphin Watch

What are your thoughts?

1. Have all the key issues relating to this big issue been adequately captured and understood?

2. Are there any gaps or misinterpretations?

3. What is the overall trend in relation to this issue — are matters improving or deteriorating, how fast and why?

4. In order to address this challenge, will the 'business as usual' approach work, or is adaptation (substantial change) or transformation (complete rethink of how we do business and how we tackle this issue) needed?

5. Do you agree with the strategies and priorities listed and/or do any need adding?

6. Who are the partners that need to collaborate to address this challenge?

Images: Oil spill from Solar I oil tanker Guimaras Island, Philippines 2006, HP Villa, http://www.elaw.org/book/export/html/1281; dolphin, A Schofield.

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