

Blue Carbon Strategy for South Australia



Government of
South Australia



Blue carbon is brimming with potential and South Australia is poised to grab hold of the opportunities that it presents.

Developing blue carbon projects presents us with multiple benefits, from significant sequestration opportunities, to strengthened resilience of our precious coastline, to habitat restoration. It really is a win-win-win approach.

Because blue carbon is a relatively new concept, with methodologies still in their embryonic stages, South Australia is excellently placed to take a leadership role in policy development and research, so that projects can be supported by carbon financing.

Through our blue carbon strategy, the government will forge partnerships with industry, research and community stakeholders, increasing knowledge and understanding of this approach, and ensuring broad involvement.

I warmly acknowledge and thank the Premier's Climate Change Council for sharing my interest and commitment to pursuing the opportunities that blue carbon offers our state's precious environment.

David Speirs MP
Minister for Environment and Water

Acknowledgment of country

We acknowledge and respect the Traditional Custodians whose ancestral lands we live and work upon and we pay our respects to their Elders past and present. We acknowledge and respect their deep spiritual connection and the relationship that Aboriginal and Torres Strait Islanders people have to Country.

We also pay our respects to the cultural authority of Aboriginal and Torres Strait Islander people and their nations in South Australia, as well as those across Australia.



Blue Carbon Strategy for South Australia 2020–2025

The Blue Carbon Strategy 2020–2025 sets a path for the South Australian Government to establish a state-wide, evidence-based program of projects and research geared towards blue carbon ecosystem protection and restoration.

Coastal ecosystems provide a wide range of economic, environmental and livelihood benefits. Restoration and protection of coastal systems will enhance these benefits and improve resilience to climate change and help reduce greenhouse gas emissions. There is an opportunity to provide incentives through access to carbon markets and other financing mechanisms and to use blue carbon as a driver for improved policy and planning processes.

What is blue carbon?

Blue carbon is the carbon captured and stored in coastal ecosystems including seagrass meadows, saltmarshes and mangroves.

These ecosystems are carbon sinks, accumulating and retaining carbon in the plants themselves and, significantly, in the soils below. Over 95% of carbon in seagrass meadows is stored in the soils. The total amount of carbon stored within blue carbon ecosystems is called carbon stock.



Why is blue carbon important?

Protecting and restoring blue carbon ecosystems is important due to their carbon sequestration and storage potential, and because these ecosystems can become sources of greenhouse gas emissions if degraded or cleared.

Beyond the benefits of carbon storage, protecting and restoring coastal ecosystems offers additional positive benefits, or co-benefits¹, by:

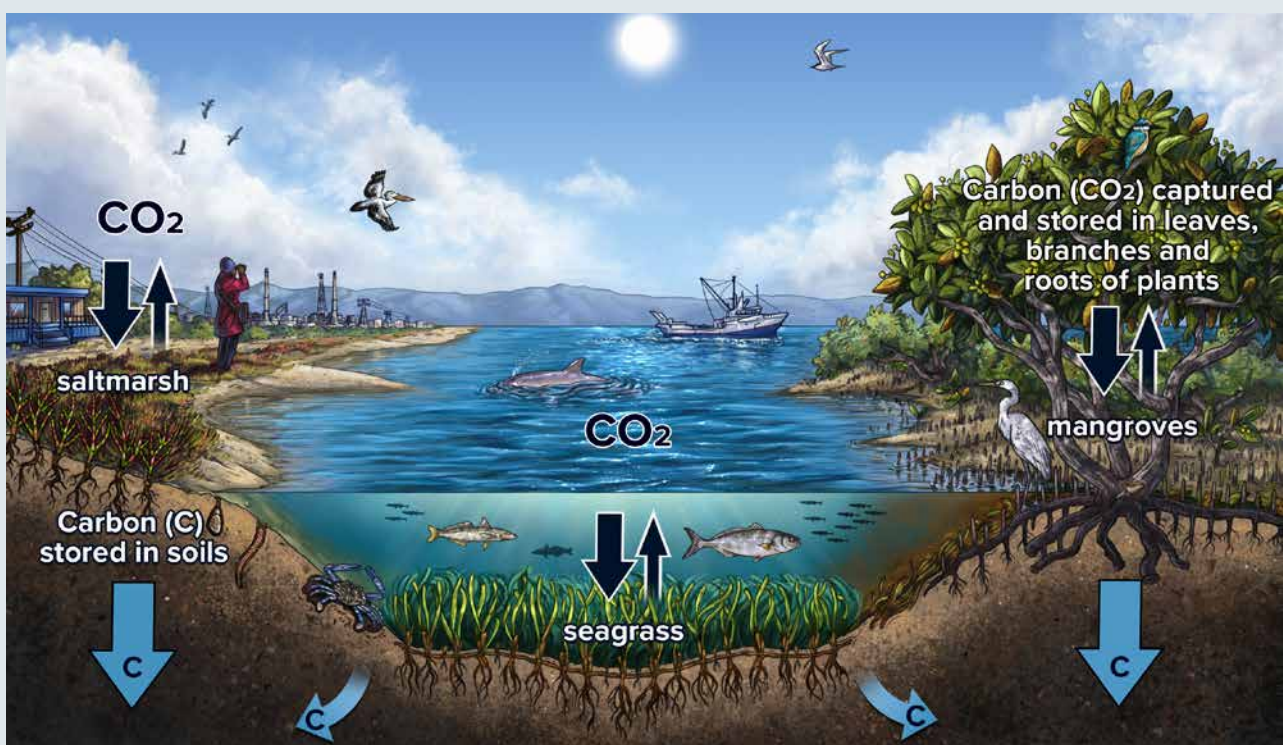
- supporting regional economies and coastal livelihoods from fisheries, aquaculture and tourism activities;
- conserving wetland habitats of international and national significance, including for threatened and endangered species and biodiversity;
- protecting shorelines and enhancing resilience to storm surges and rising sea levels;
- improving and maintaining water quality;
- caring for sea country of enduring and continuing cultural significance; and
- providing for coastal recreation and enabling communities to connect with nature.

The value of these co-benefits is considerable. Globally, the ecosystem services from mangroves alone are estimated to be worth at least US\$1.6 billion each year². The value of production of South Australia's marine industries, which depend on healthy blue carbon ecosystems, is estimated to be worth \$1.3 billion³.

Globally, blue carbon ecosystems play a key role in reducing greenhouse gas emissions, and are recognised as a nature-based solution for countries to help meet climate change commitments under the Paris Agreement. Australia is progressively measuring and reporting on blue carbon sinks and emissions sources in the National Greenhouse Gas Inventory which measures progress against our international targets.

Blue carbon ecosystems can store up to four times as much carbon per area as land-based forests⁴ and, if undisturbed, can store carbon in soils over hundreds or thousands of years. The carbon stored within Australian blue carbon ecosystems constitutes around 11% of worldwide blue carbon stocks⁵.

Blue carbon ecosystems are globally threatened with habitat loss and degradation from coastal development, pollution, and climate change impacts, including sea level rise. These threats can turn them from carbon sinks into sources of greenhouse gas emissions. An estimated one billion tonnes of carbon dioxide is being released annually from degraded blue carbon ecosystems, equivalent to 19% of emissions from tropical deforestation globally⁶.



Blue carbon ecosystems sequester carbon and provide other co-benefits such as biodiversity, water quality, shoreline protection and support coastal economies and livelihoods

Infographic: Rene Campbell.



Blue carbon in South Australia

South Australia's unique coastal environments are extensive and among the most biologically diverse in the world.

South Australia's coastline extends for over 5,000 km with blue carbon ecosystems covering over a million hectares. The diversity and extent of these systems position the state to take a lead in developing blue carbon projects that protect and restore these important habitats and prevent their ongoing degradation.

Seagrass is by far the most widespread blue carbon ecosystem in South Australia, accounting for over 96% of the total, and there are also substantial areas of saltmarsh and mangroves. On average, mangrove and saltmarsh ecosystems in South Australia store and accumulate a greater amount of blue carbon in their soils per hectare than seagrass ecosystems. Seagrasses, however, have a higher total carbon stock due to their extensive coverage.

Along the metropolitan coast, seagrass is important in reducing erosion and helping protect Adelaide's beaches. The globally important tidal wetlands of the Adelaide International Bird Sanctuary National Park, Winaitiyinaiyti Pangkara, to the north of Adelaide, are important migratory shorebird sites, and contribute to the state's tourism industry. Similarly, the Coorong and Lakes Alexandrina and Albert Wetland, covering some 140,500 hectares, is a long-recognised Wetland of International Importance under the Ramsar Convention on Wetlands.

Aboriginal South Australians have relied on these ecosystems for thousands of years, with some coastal areas now known to be amongst the most densely populated regions of pre-colonial Australia. Consequently, these ecosystems have very strong cultural, economic and spiritual significance to coastal Aboriginal nations of South Australia.

Areas along South Australia's coastline that provide high environmental, economic and social value often coincide with areas that have high blue carbon stocks, such as the Upper Spencer Gulf and Gulf St. Vincent. Protecting and restoring these ecosystems improves productivity and ensures sustainability of South Australia's local livelihoods and regional economies that rely on high-value coastal industries.



Ways for South Australia to realise blue carbon opportunities

South Australia can realise blue carbon opportunities by developing and implementing evidence-based policy, projects and research through partnerships and engagement with the South Australian community, the coastal industries that rely on healthy blue carbon ecosystems, and national stakeholders.

Unlocking finance for blue carbon projects through carbon markets and other mechanisms

The Strategy's intent is that future blue carbon projects in South Australia be supported by carbon financing from blue carbon credits, developed under the Australian Government's Emissions Reduction Fund. Since 2014, the Emissions Reduction Fund has provided financial incentives for Australian businesses and natural resource managers to adopt new practices and technologies to reduce greenhouse gas emissions. Projects accredited under the Fund can receive carbon credits for each tonne of carbon reduction achieved. Carbon credits can then be sold to create a revenue stream.

This type of carbon financing could potentially incentivise blue carbon projects in South Australia. However, at the present time, the methodologies to enable inclusion of blue carbon projects in the Fund are still being explored. As part of the Blue Carbon Strategy, the South Australian Government will seek partnerships with the Australian, State and Territory Governments and stakeholders in the scientific and business communities, to build the evidence base, and realise the opportunities, for including blue carbon under the Emissions Reduction Fund.

Other innovative mechanisms to finance carbon sequestration projects are being developed and trialled throughout the world. Green bonds (and more recently, blue bonds), carbon insetting, payment for ecosystem services and private-public partnerships of various kinds, are increasingly used to finance carbon sequestration and climate-resilience activities. For example, the green bond market is only a decade old and is already well established with over US\$500 billion labelled green bonds, issued by over 600 financiers⁷. The various financing models can be assessed and trialled for applicability to blue carbon demonstration projects in South Australia.

Blue carbon pilot demonstration projects

Blue carbon demonstration projects will provide a testing ground to advance scientific and technical knowledge, to gain an understanding of practical implementation challenges and, importantly, to grow the industry and community partnerships on which the success of blue carbon project implementation will depend.

In South Australia, there are opportunities to protect, restore and enhance blue carbon ecosystems by implementing coastal restoration projects that re-establish natural tidal flows to enable wetland restoration, or by modifying infrastructure to allow for landward movement of saltmarsh and mangroves as sea level rises. In addition, reducing discharges of pollutants to coastal waters can prevent further degradation of seagrass meadows. Preliminary assessments have shown the most feasible types of blue carbon projects for South Australia and their likely locations. Further detailed project assessments will be needed in partnership with key stakeholders.

Blue carbon research

Blue carbon research is an exciting and fast-developing area of scientific, economic and policy inquiry. The Goyder Institute has delivered blue carbon research focused on understanding carbon stocks and sequestration rates in South Australia's coastal ecosystems. This pioneering research was conducted in partnership between Flinders University, the University of Adelaide, Edith Cowan University, CSIRO, EPA and SA Water.

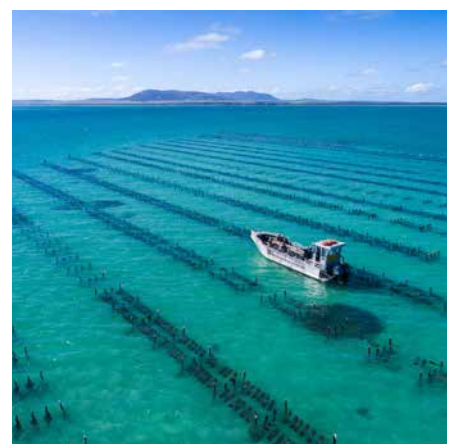
Further research is now needed to address key gaps, including additional measurement and mapping of the various blue carbon ecosystems across the state, along with ways to recognise and value co-benefits. This research is explicitly targeted at understanding the nature and extent of blue carbon opportunities in South Australia, and delivering the evidence that will enable our state to capture opportunities through the potential development of blue carbon Emissions Reduction Fund methods. Through this research, blue carbon solutions will be a centrepiece of South Australia's approach to greenhouse gas mitigation and climate change adaptation.

Blue carbon partnerships, engagement and communication

The Blue Carbon Strategy recognises that partnerships, community and industry engagement and communication are key for South Australia to realise the full potential of future blue carbon opportunities. Blue carbon policy, projects and research will depend on the knowledge, experience and skills brought together by engaging with the South Australian community, Aboriginal people and organisations on sea country, the coastal industries that rely on healthy blue carbon ecosystems, and national stakeholders.

Integration with coastal policy, planning and management strategies

An approach that integrates South Australia's Blue Carbon Strategy with coastal management policy and strategies at national, state, regional and local levels will help account for the myriad other uses and benefits of these natural assets in land-use planning and management and coastal conservation.



What will the Blue Carbon Strategy achieve?

Objective 1:

Connect blue carbon ecosystem restoration to carbon markets and other finance mechanisms

Key outcome:

Blue carbon financing drives blue carbon projects

Objective 2:

Deliver research to quantify blue carbon and co-benefits

Key outcome:

Improved blue carbon and co-benefit valuation for project development

Objective 3:

Identify and implement blue carbon demonstration projects

Key outcome:

Blue carbon project feasibility is demonstrated

Objective 4:

Integrate blue carbon into coastal policy, planning and management strategies

Key outcome:

Blue carbon is a key factor in coastal decision making

The South Australian Government will take the lead in driving the scientific investigations, implementing projects and creating the partnerships needed to realise blue carbon opportunities in South Australia. The Blue Carbon Strategy has identified four key objectives and related key outcomes:

Objective 1: Connect blue carbon ecosystem restoration to carbon markets and other finance mechanisms

Key incentives for blue carbon projects are the ability to generate carbon credits from coastal restoration activities to realise financial returns. Revenue streams from credits could provide financial incentives to undertake blue carbon projects that capture and store carbon and that have a diverse range of valuable co-benefits for local communities, coastal industries and the environment. A potential revenue stream opportunity arises from companies, or other organisations, seeking to reduce emissions or achieve carbon neutrality through purchasing blue carbon credits from South Australian blue carbon projects.

At the present time, land-based carbon sequestration projects, such as native vegetation regeneration on conservation reserves and farms, are eligible under the Emissions Reduction Fund and have project methods to estimate the carbon benefits. However, projects in coastal environments have a range of factors that make them more challenging to accurately measure and have confidence that they are able to permanently store carbon. The Australian Government is currently assessing the feasibility of blue carbon project methods in partnership with other state and territory governments, research

Actions:

- 1.1 Support blue carbon Emissions Reduction Fund method development through the Australian Government's Blue Carbon Roadmap.
- 1.2 Explore and assess models for financing South Australian blue carbon demonstration projects.

providers and industry groups through a national Blue Carbon Roadmap. The Government of South Australia will lead and contribute expertise to support the development of blue carbon methods for use in South Australia, underpinned by method trials and data-driven models that accurately estimate stocks and sequestration rates.

In order to progress blue carbon projects, South Australia will investigate all mechanisms for financing blue carbon projects. There are several options that have been emerging in recent years, including green (or blue) bonds, insetting, payment for ecosystem services (PES) and innovative public-private partnerships.



Objective 2: Deliver research to quantify blue carbon and co-benefits

The extent and diversity of coastal ecosystems in South Australia, and the prospects for blue carbon projects, means that South Australia is well placed to lead in developing blue carbon opportunities. Further targeted research is needed to explore the technical feasibility of this potential, provide the evidence base to develop blue carbon Emissions Reduction Fund methods, and improve capacity to value co-benefits of blue carbon projects.

Values for carbon stocks and sequestration rates are variable and depend on coastal location, physical features of the landscape (geomorphology), habitat type and species of vegetation present. An understanding of the long term history of land use and carbon build up from soil accumulation in the area is also important for assessing carbon stocks and predicting carbon sequestration potential.

Blue carbon research undertaken to date in South Australia has focussed on coastal wetlands near Adelaide and along the samphire coast to the north, as well as further sites at the upper end of Gulf St Vincent and Spencer Gulf. Research activities have mainly focussed on assessing

the standing stocks of carbon in soils, with less knowledge on carbon sequestration rates, carbon captured in vegetation and rate of greenhouse gas emissions.

Research through the Climate Action Research Impact Area of the Goyder Institute has contributed substantially to understanding the blue carbon potential in South Australia. A Blue Carbon Research Agenda report has been developed through the Goyder Institute-led partnership to identify critical knowledge gaps and propose further research. Targeted site investigations on the types of processes and factors driving carbon stocks and sequestration in different coastal ecosystems can fill data gaps for particular regions, reduce uncertainty, inform project development and, importantly, blue carbon methods. State-wide mapping and measurement are needed to fully assess the stocks and condition of blue carbon ecosystems in the state and identify priority areas for blue carbon restoration projects.

Exploring strategic research partnerships on blue carbon in South Australia through collaborative programs, such as Co-operative Research Centres,

Actions:

- 2.1 Identify funding pathways and partners to deliver research priorities identified.**
- 2.2 Progress the Blue Carbon Research Agenda recommendations.**
- 2.3 Develop a state-wide map of blue carbon stocks and sequestration rates.**
- 2.4 Improve valuation of co-benefits for inclusion in blue carbon project assessment.**

or partner projects with industry and not-for-profit organisations, can provide the funding needed to deliver blue carbon research.

Understanding the value of co-benefits in blue carbon project assessments, such as the value to fisheries, or water quality improvements, can help determine priority project locations that achieve multiple benefits. Valuing co-benefits can also attract investment partners who have an interest in supporting research projects that align with their organisation's strategies and activities.

Objective 3: Identify and implement blue carbon demonstration projects

Demonstration projects provide information for addressing scientific, policy and operational knowledge gaps in progressing blue carbon methods under the Emissions Reduction Fund. Demonstration projects can also show the benefits and costs of blue carbon projects and provide case studies to illustrate the business case for investment.

A preliminary assessment of suitable blue carbon project types and their locations has been undertaken. The assessment found that the re-introduction of tidal flows to create or restore saline wetlands (mangroves and saltmarsh) is a highly feasible project activity in a range of locations. Carbon sequestration gains can be made by removing barriers, such as bunds or seawalls, to re-establish tidal flow in areas previously occupied by mangroves and saltmarshes, as demonstrated by the Goyder Institute Salt to C project at Dry Creek (see case study). Other feasible project types include land use planning activities that allow landward migration of mangroves and saltmarshes in the face of rising sea levels, and seagrass protection and restoration measures.

In addition, the benefits of co-locating aquaculture facilities and blue carbon projects, such as the benefit of siting oyster reefs next to recovering seagrass meadows, are options to be explored.

More work is required to determine optimal locations for blue carbon projects to target investment in areas where blue carbon benefit is high, opportunity costs are low, restoration or protection is most needed, activities are cost-effective, and projects have a high likelihood of success. Key stakeholders will be consulted in determining site selection criteria, including state and local governments, Aboriginal, regional and community groups.

These stakeholders can play a key role in implementing projects and supporting ongoing monitoring. Project sites can also be included in existing or planned coastal restoration projects, where opportunities exist.

Partnerships for private sector investment in demonstration projects can be sought by those who have an interest in the research needed to develop potential blue carbon methods under the

Actions:

3.1 Identify optimal sites for blue carbon projects in consultation with key stakeholders.

3.2 Implement pilot projects to demonstrate feasibility, including costs and benefits.

3.3 Partner with the private sector to progress and scale-up blue carbon demonstration projects.

Emissions Reduction Fund and other opportunities. Greater certainty regarding technical, economic and operational feasibility and risks, costs and benefits, scalability and long term success rates will lower the risk for investors. In the future, as blue carbon credits become available on the carbon market, demonstration projects could be scaled up to realise commercial return, and credits could attract price premiums due to their high co-benefit value.





Natural tidal flow was re-established at the Dry Creek Salt Field by construction of a new culvert

Case study:

Restoring the Dry Creek Salt Field: a blue carbon opportunity for South Australia

The Dry Creek Salt Field, located 30 minutes from the CBD adjacent the Adelaide International Bird Sanctuary, is an area of important coastal habitat that has been cut off from the sea for decades. Environmental and blue carbon benefits of tidal restoration are being explored in a small trial site in the salt field.

Following the salt field's closure, a small pond was isolated from the rest of the salt field and reconnected to the sea via a tidal creek. Through the construction of a culvert to allow movement of water under an existing access track, the natural flow of the creek was re-established.

The creek now delivers water flows to the degraded site and the process of restoration has begun.

So far, rapid restoration of the water and soil quality has been observed and, for the first time in decades, vegetation, fish and invertebrates are beginning to reinvade the pond.

Blue carbon stocks and the build-up of carbon since reconnection have been measured and show that tidal reconnection can lead to carbon sequestration. The research provides an evidence-base for potential Emissions Reduction Fund method development and the business case for future blue carbon projects across the state.

Photos: Right top, before tidal flow was re-established to the project site. Right below, one year after tidal flow was re-established.





Objective 4: Integrate blue carbon into coastal policy, planning and management strategies

In addition to being carbon sinks, blue carbon ecosystems are significant contributors to local, regional and state economies through provision of ecosystem services and other co-benefits. The direct and indirect value of these ecosystems, and the services they provide, should be accounted for in coastal policy, planning and management strategies.

The State Planning Policies for South Australia set out a framework for land use that aims to improve the liveability, sustainability and prosperity of the state. The State Policy for coastal environments includes a policy to “Recognise and protect the high carbon storage values of areas such as mangroves and salt marshes” (Policy 13.9). The protection of blue carbon ecosystems and carbon stocks at the landscape level, and blue carbon sequestration potential of particular locations, can be incorporated into land-use planning processes and instruments, such as the State Planning and Design Codes.

Similarly, community outreach and capacity building tools, such as blue carbon project case studies and

guidelines, can raise awareness and facilitate incorporation of blue carbon benefits into planning and investment strategies of local councils and regional planning organisations. This includes catchment management planning that aims to reduce discharge of damaging pollutants to blue carbon ecosystems.

To further bolster protection of carbon stocks, loss of blue carbon can be accounted for through vegetation clearance offsetting under the *Native Vegetation Act 1991* Significant Environmental Benefit scheme. The replacement of lost carbon under coastal and marine vegetation clearance approvals could be promoted as a voluntary blue carbon offset alongside the biodiversity offset requirement. Carbon sequestration by blue carbon projects can also be recognised in South Australia’s greenhouse gas emissions reduction achievements.

South Australia can also play a role in incorporating the knowledge and experience gained through the actions in the Blue Carbon Strategy into supporting protected wetland management at the international level.

Actions:

- 4.1 Enable blue carbon ecosystem protection through state planning frameworks and develop planning tools and guidance for local and regional planning.**
- 4.2 Promote and enable voluntary blue carbon offsetting for coastal and marine vegetation clearances.**
- 4.3 Support protected wetland management under the Ramsar Convention on Wetlands blue carbon resolution.**

A recent blue carbon resolution under the international Ramsar Convention on Wetlands encourages estimation of carbon stocks and protection and restoration of coastal blue carbon ecosystems, including by substantially increasing support to projects and research aimed at their conservation and protection. South Australia can lead by example against this resolution in both blue carbon measurement, research and coastal management.

End notes

¹Co-benefits of blue carbon projects are positive outcomes that are additional to the greenhouse gas emissions avoided or carbon captured and stored. Co-benefits are wide-ranging in their nature, yielding positive environmental, economic, social and cultural impacts. These are often referred to as ecosystem services.

²www.thebluecarboninitiative.org/

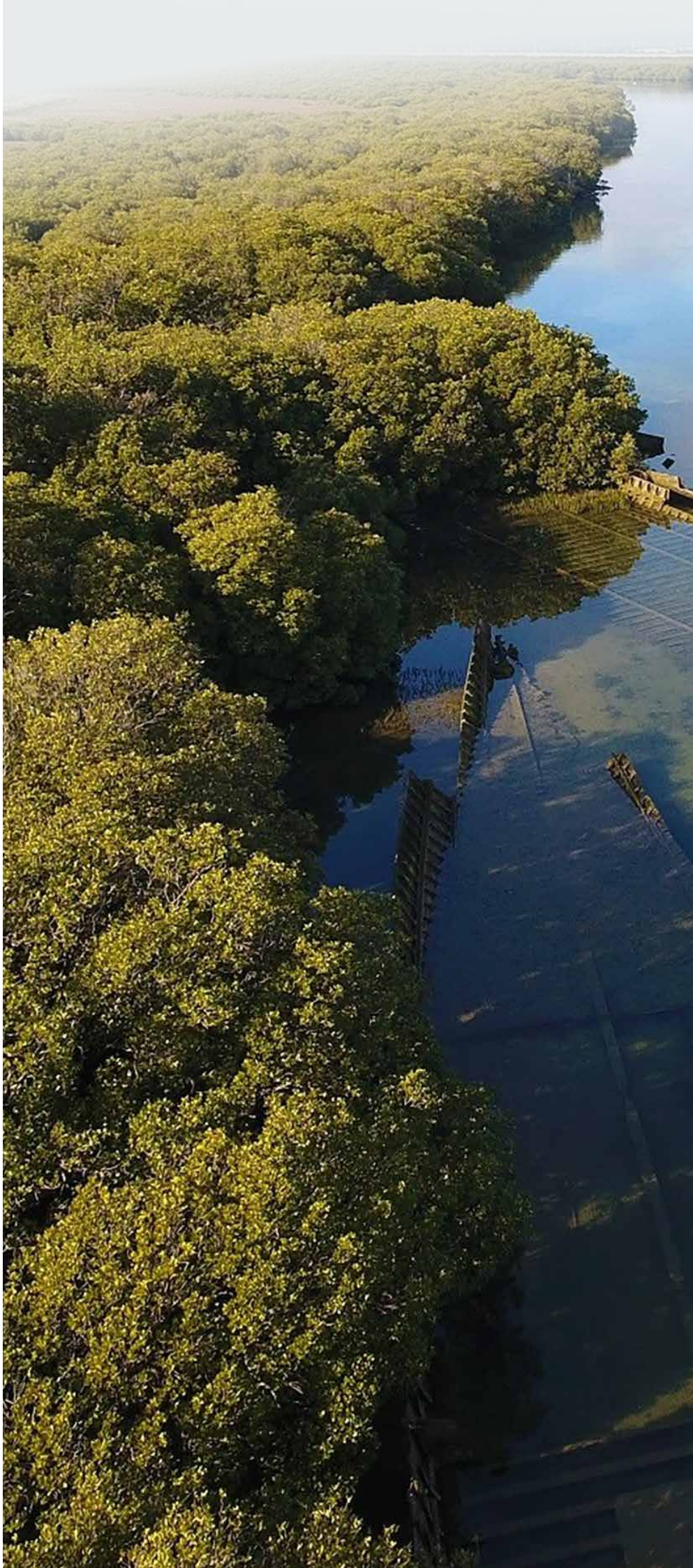
³Deloitte Access Economics (2017). The economic contribution of South Australia's marine industries

⁴International Blue Carbon Initiative – https://bluecarbonpartnership.org/wp-content/uploads/2016/11/ENV001_fact_sheet_V05.pdf

⁵Serrano et al (2019) Australian vegetated coastal ecosystems as global hotspots for climate change mitigation. <https://www.nature.com/articles/s41467-019-12176-8#Sec7>

⁶International Blue Carbon Initiative – https://bluecarbonpartnership.org/wp-content/uploads/2016/11/ENV001_fact_sheet_V05.pdf

⁷IUCN (2019) Blue Bonds: Financing Resilience of Coastal Ecosystems: Key Points for Enhancing Finance Action. https://www.4climate.com/dev/wp-content/uploads/2019/04/Blue-Bonds_final.pdf





More information

www.environment.sa.gov.au



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