

# Managing Adelaide's beaches

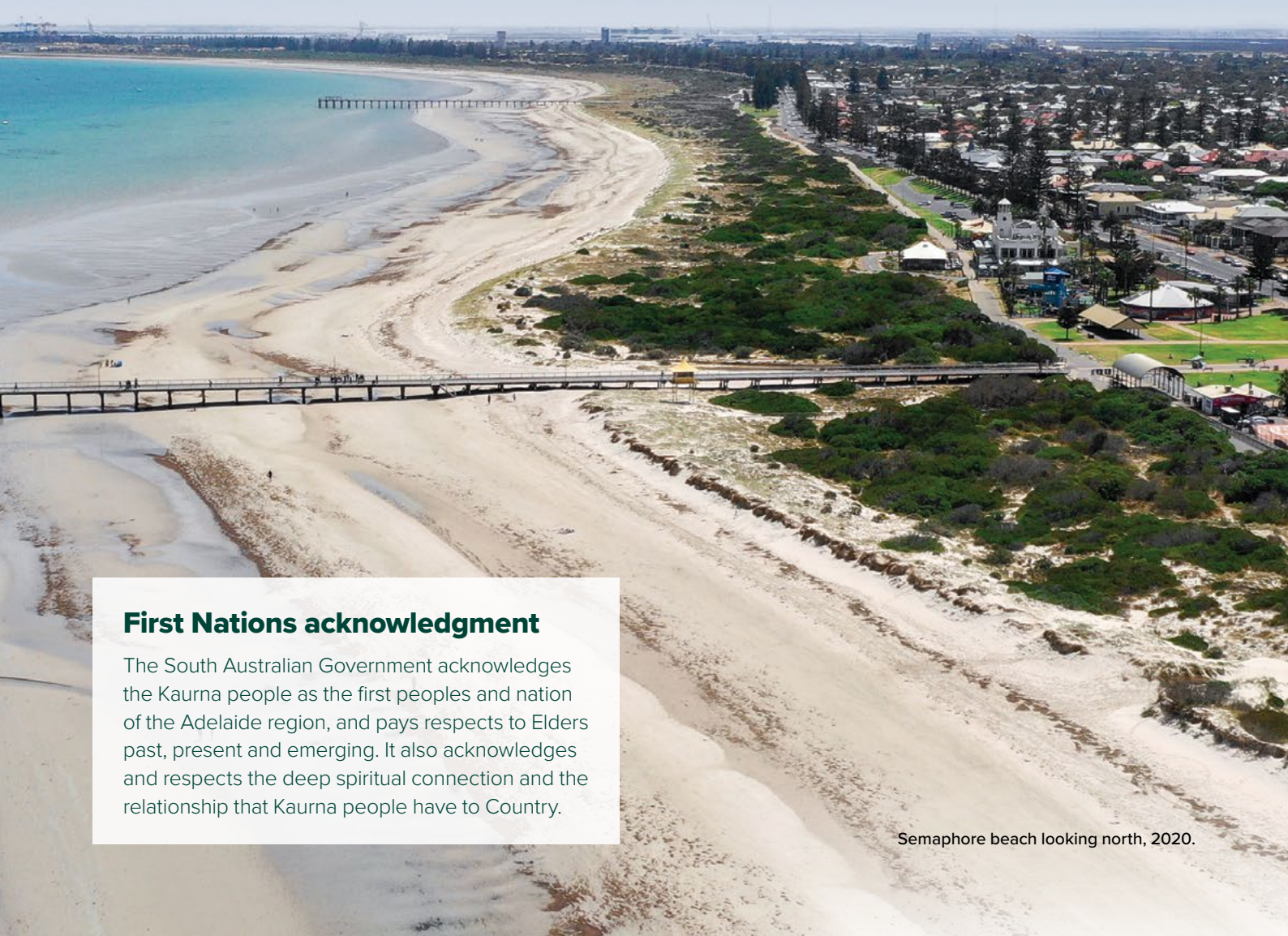
Past, Present and Future







Adelaide's stunning coastline  
**is loved by our community**  
and is **one of the most**  
**visited public places.**



### **First Nations acknowledgment**

The South Australian Government acknowledges the Kaurna people as the first peoples and nation of the Adelaide region, and pays respects to Elders past, present and emerging. It also acknowledges and respects the deep spiritual connection and the relationship that Kaurna people have to Country.

Semaphore beach looking north, 2020.





## Adelaide's coastline is one connected system with sand naturally moving northward by the wind and wave energy

A visit to the beach is part of the Australian culture. In Adelaide people of all ages come from far and wide to enjoy a dip in the water, a walk along the sandy beach and many other activities.

Adelaide essentially has one long beach running 28 km from Kingston Park to Outer Harbor. To keep these beaches sandy they need to be managed.

Learn about the history of how Adelaide's beaches are managed and what's being done to secure the future of our coastline.

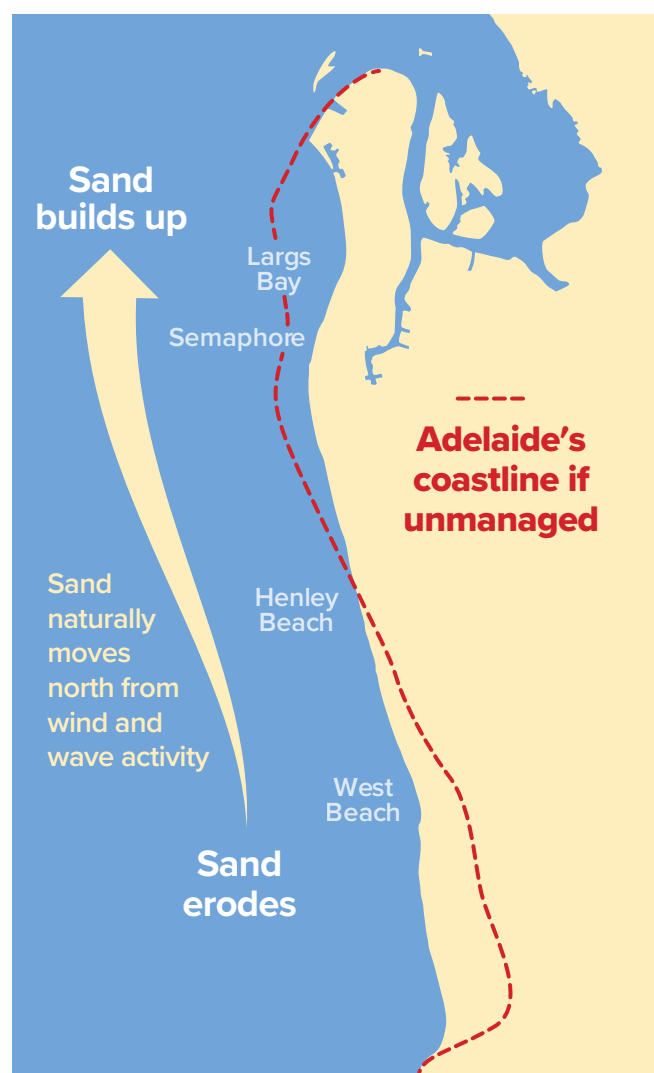
Adelaide's beaches have been actively managed for almost 50 years.

Sand is moved from where it builds up to areas of erosion.

Without moving sand some of our favourite beaches would erode to rock and clay.

The approach for managing Adelaide's beaches is based on decades of research, monitoring and international best practice.

### What if Adelaide's beaches weren't managed?





This image from 1936 shows the build up of sand that created the Le Fevre Peninsula. The sand originated from the southern beaches.

1800–1900

1900–1970

1970–2005

2005–2018

2018–2023

2023–future

## 1800 to 1900

Adelaide's metropolitan coast is a dynamic, evolving system with more sand moving north than is being supplied from the south.

For thousands of years the Kaurna people sustainably cared for the land and waters of the Adelaide region. They travelled frequently, with summer camps along the Port waterways and Largs Bay and Semaphore. They lived in the west by the sea in the summer and in the foothills for the winter.

In the 1830s following European colonisation the 30km stretch of sand dunes from Seacliff to Outer Harbor was used for building materials, grazing land, timber for fuel and residential development. There was limited knowledge about coastal processes at this time and sand would have appeared in abundant supply.

### By the late 1880s:

- Adelaide's beach sand was being used for mining, building and other activities
- There was limited understanding about coastal processes
- Virtually no sand was being transported onto the beaches from further south or offshore.

### Geological history

From approximately 18,000 to 6,500 years ago, sea levels in Gulf St Vincent rose by 130 metres, submerging sediments that had been deposited by rivers and streams.

When sea level stabilised between 7,000 to 5,000 years ago, waves pushed the sediments ashore, forming Adelaide's metropolitan beaches and sand dunes.

Over the last 4,000 years the sand supply has declined to the point where virtually no sand is being transported ashore.



Largs Pier Hotel and jetty, circa 1886.

## DEEP DIVE

Learn more about the history of Adelaide's coast  
[environment.sa.gov.au/coasts](https://environment.sa.gov.au/coasts)



Glenelg foreshore following a storm in 1953 that caused damage estimated at more than \$33 million.

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## Coastal development

In the early 1900s Adelaide's roads, houses and other infrastructure were built along the foreshore on coastal dunes before the important role the dunes play in coastal processes was understood.

The development along the foreshore and dunes effectively "locked up" the bulk of the sand that had previously been supplying beaches to the north. Adelaide's southern beaches soon became starved of sand and vulnerable to storm damage.

Our beaches and dunes are a dynamic system, constantly changing in response to short and long term weather patterns.

By building on the sand dunes we have interrupted this natural system – sand from the dunes that would normally replenish the beach after storms is no longer available. As a result, storms eroded the beach and there was no dune to replace it.

### Storms wreak havoc

Major storms in the 1940s, 50s and 60s caused extensive damage to the coast and infrastructure. During this time the community became aware of the need to protect both public and private property from the impacts of natural coastal processes. Protection works such as seawalls were put in place to retain the foreshore and beaches.

### By the 1960s:

- The Adelaide coast was in poor shape - unplanned structures littered the coast and the dunes were unmanaged and unstable
- Sand supply was not sufficient to maintain the beaches and dunes
- Pollution caused seagrass loss
- Property and infrastructure were at risk.



West Beach prior to significant development, 1937.



Storm damage at Somerton Park, 1953.





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## A new era in beach management

The first major study of Adelaide's beaches was completed in the late 1960s. Now known as the 'Culver Report', the University of Adelaide study made the first estimates of how much sand is moved along Adelaide's beaches each year in the natural process known as littoral drift.

The Culver Report ushered in a new era of beach management, and led to the *Coast Protection Act (1972)* and the establishment of the Coast Protection Board.

Since this time Adelaide's beaches have been actively managed by moving sand from where it has built up to eroded beaches. This is called 'beach replenishment'.

### By the late 1990s:

- Despite many improvements, management of Adelaide's beaches continued to be challenging.
- These challenges included dwindling local sand sources, seagrass loss, rising sea levels, the need to bypass sand around the new harbours at Glenelg and West Beach and erosion "hot spots" at West Beach and Semaphore Park.
- The community was concerned about the noise and disruption caused by moving sand using trucks.

In 1997 the state government held a public inquiry into the management of Adelaide's beaches. The inquiry endorsed beach replenishment as the preferred management strategy and made recommendations for further studies to improve the existing management approaches.

These studies subsequently led to the adoption of the Adelaide's Living Beaches strategy in 2005.

Beach replenishment at Brighton with dredged sand from Port Stanvac, 1990. More than 1.1 million cubic metres (m<sup>3</sup>) of sand was added to the system in the 1990s.



### Bringing sand into the beach system

During the 1990s large volumes of sand were added to the southern beaches. The sand was dredged from offshore at Port Stanvac and pumped onto the beaches at Seacliff and Brighton.

The sand stabilised this section of coastline and rebuilt dune buffers for storm protection. This sand made its way northwards over the next decade, helping to stabilise the metropolitan coastline.



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## Adelaide's Living Beaches strategy

Following an economic assessment and social environmental impacts study, the *Adelaide's Living Beaches strategy 2005-2025* was introduced.

The new strategy maintained the approach of moving sand from areas of accumulation to areas of erosion. The main changes proposed were to recycle sand within shorter sections of the coast and to use a sand recycling pipeline instead of trucks to move the sand.

### What was delivered?

- A sand recycling pipeline from Glenelg to Kingston Park and the River Torrens outlet to West Beach Parks was built and operational by 2013.
- An offshore breakwater at Semaphore South was built to manage erosion at Semaphore Park and trap sand for recycling back to eroding southern beaches.

The northern sand recycling pipeline from Semaphore to the River Torrens Outlet was not constructed. Instead, trucks continued to be used to recycle sand from areas of accumulation at Semaphore to eroding areas at West Beach and Henley Beach South.

1985 BEFORE

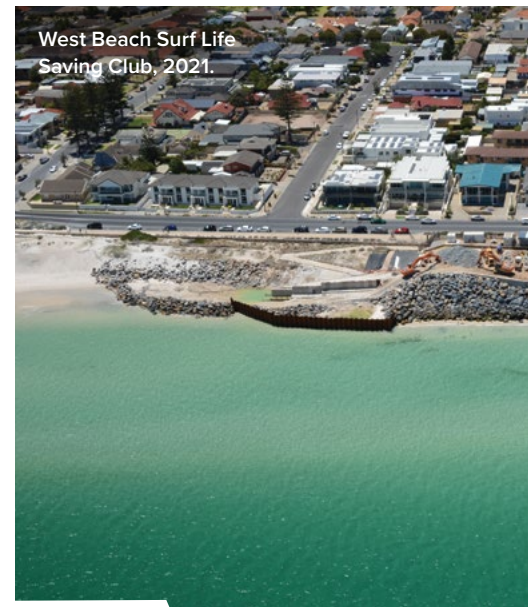


2018 AFTER



Dunes at Seacliff beach are now maintained year round by sand recycling using the Glenelg to Kingston Park pipeline.





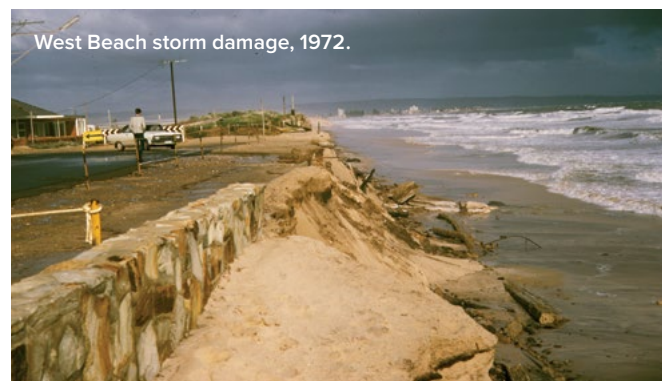
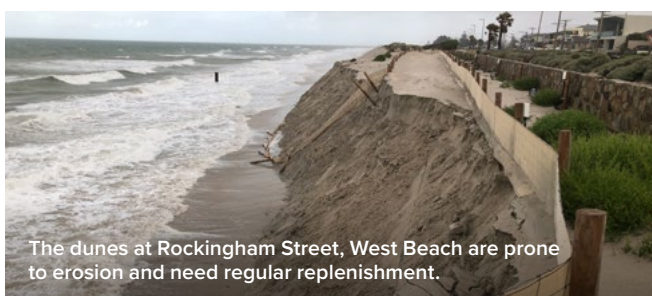
## What's the problem with West Beach?

West Beach has always been prone to erosion since beach monitoring started in the 1960s. By the late 2010s the erosion was profound.

- Beach levels at West Beach and Henley Beach South were at their lowest since records began.
- The sand recycling pipeline at West Beach was operating but survey data showed that the dunes at West Beach were continuing to recede.
- The loss of dunes placed coastal infrastructure at risk and regular replenishment is needed to protect the area.
- The erosion had progressed to affect Henley Beach South.

A study was commissioned in 2017 to review and better understand the coastal processes at West Beach and options to reduce the sand loss.

World leading experts in water and coastal management DHI delivered a report in 2018. The DHI findings informed a new investment in coasts – the *Securing the future of our coastline* project announced in 2019.



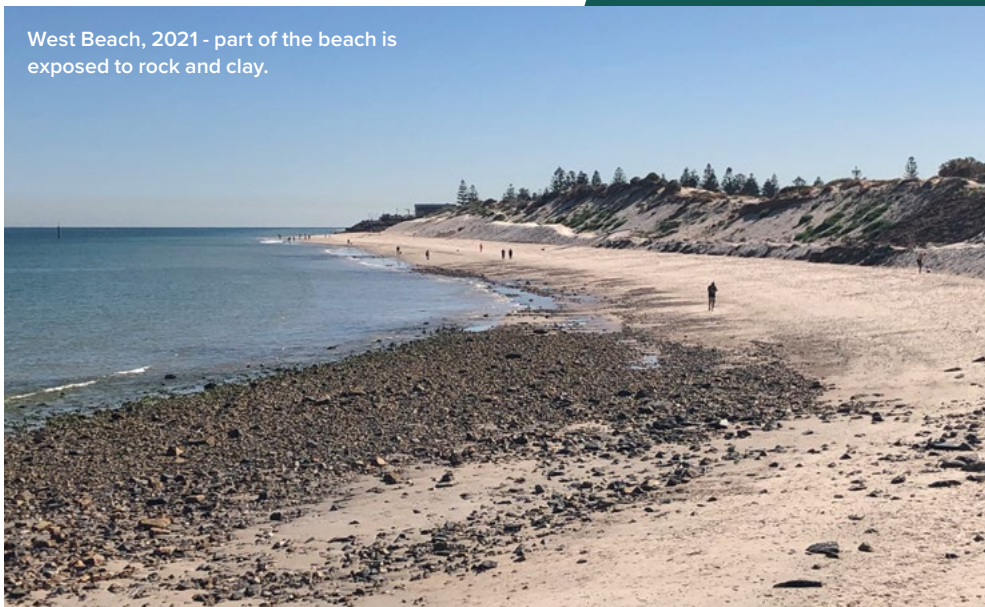
## What the DHI research found

- Using state of the art computer modelling and analysis of the beach monitoring data, DHI found that the natural rate of sand movement northwards out of West Beach was higher than previously estimated.
- DHI concluded that:
  - The average rate of littoral drift out of West Beach was approximately 100,000 - 115,000 cubic metres (m<sup>3</sup>) per year, not the previously estimated 50,000 - 70,000m<sup>3</sup> per year.
  - If current management activities were maintained, erosion will continue around West Beach and Henley Beach South, and progressively move north.
  - West Beach has lost significant volumes of sand in recent decades. In contrast, there has been a large increase in the amount of sand between Grange and Largs Bay.

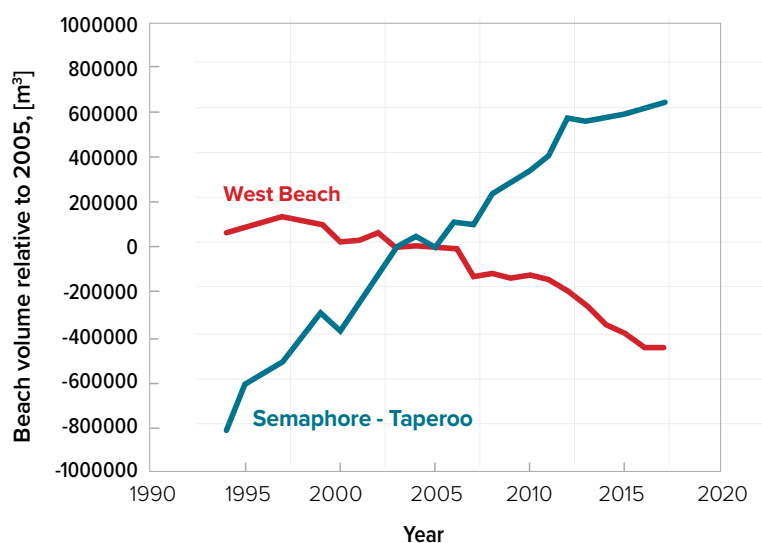




West Beach, 2021 - part of the beach is exposed to rock and clay.



## Sand volumes at West Beach and Semaphore



### West Beach

Around 600,000 m<sup>3</sup> of sand has been lost from West Beach since 1994 as it has drifted northwards.



### Semaphore, Largs Bay, Taperoo

More than 1.4 million m<sup>3</sup> of sand has built up in Semaphore, Largs Bay and Taperoo since 1994.

## Why not build groynes to hold sand on beaches?

Structures like groynes, breakwaters and seawalls can be used to help trap sand and protect infrastructure. But these structures have their downsides. They are costly to install, require large quantities of sand, trap seagrass wrack, can be a safety hazard, are visually unappealing, interrupt recreational beach use and can cause the coast on the northern side of the structure to become starved of sand.

Structures were considered during the evaluation of options for West Beach and DHI undertook modelling of the affect they would have on the coast. Recycling sand was selected as the best option.

By focusing on moving sand, long sandy beaches can be achieved without the additional cost and side-effects of expensive structures.

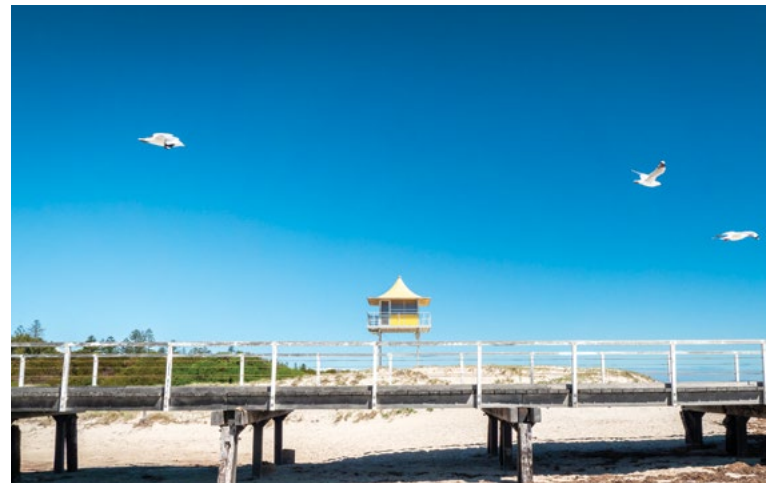
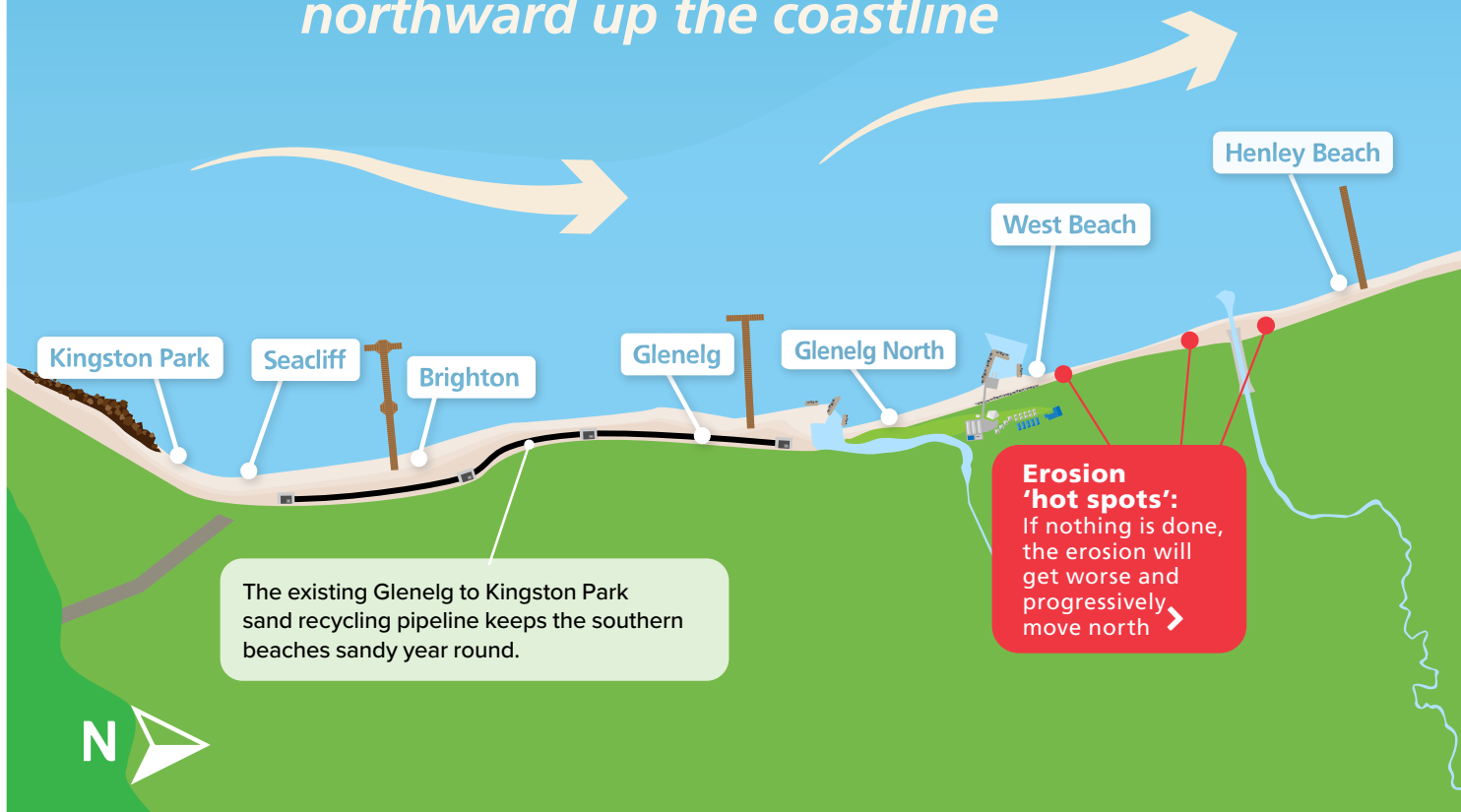


# Adelaide's coastline

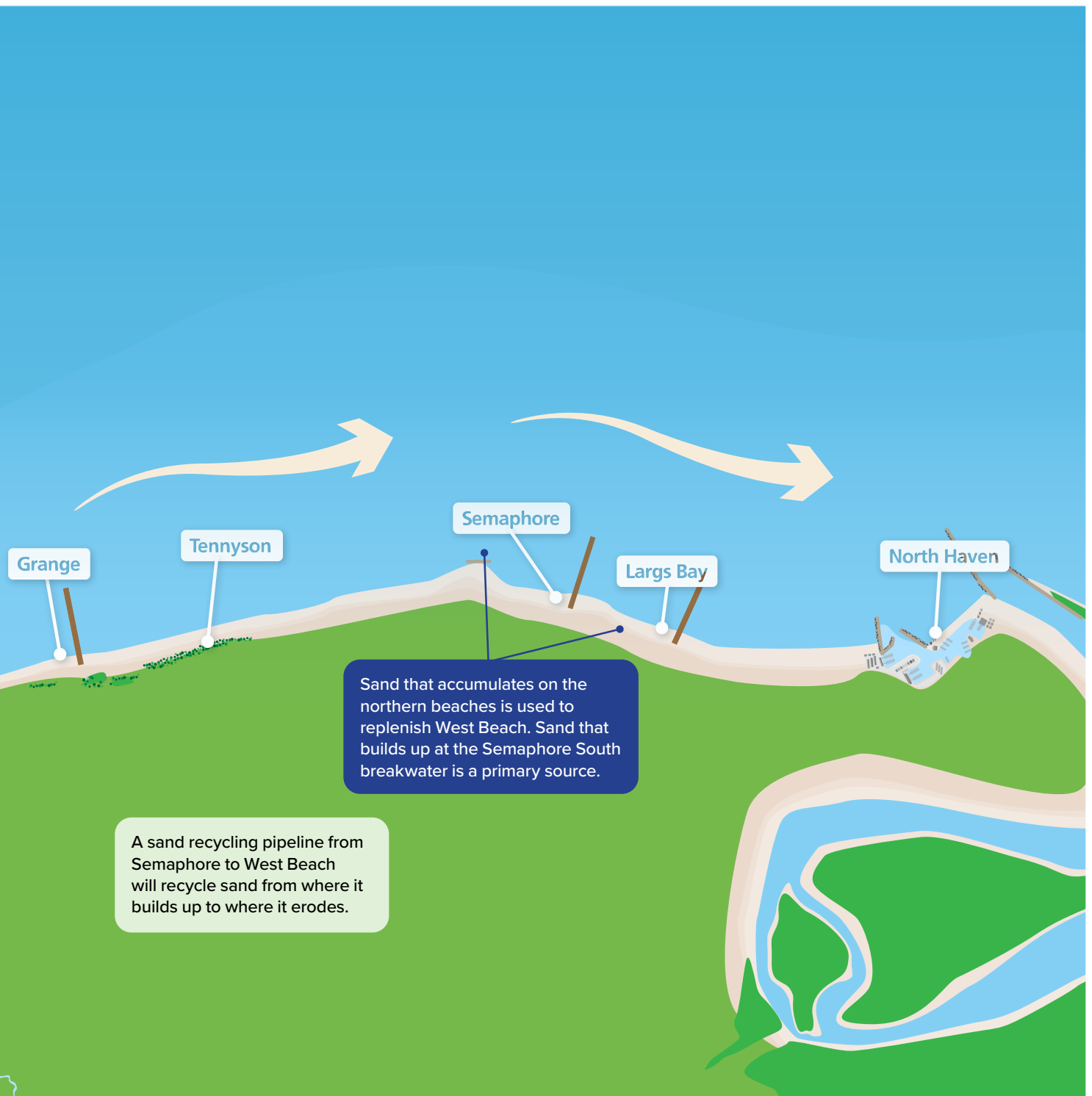
Adelaide's coastline is one connected system, but some of our beaches are experiencing significant erosion.

Sand is a finite resource – it needs to be shared equitably along our coastline so we can all enjoy Adelaide's stunning coastline.

*Sand naturally moves northward up the coastline*











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## Securing the future of our coastline

The state government has committed \$48.4 million to the *Securing the future of our coastline* project. The project will:

- Construct a sand recycling pipeline from Semaphore to West Beach to move sand from beaches where it builds up.
- Deliver a large quantity of sand (500,000 m<sup>3</sup>) to West Beach from outside of Adelaide's beach system.
- Restore sand dunes using best practice techniques and native plants in partnership with local councils and coastal community groups.

Before the pipeline is built and external sand is delivered, sand is being moved by truck to protect West Beach.

The project is being delivered over a four year period to 2023. DHI is a world leading expert in water and coastal management and completed the research that has guided the *Securing the future of our coastline* project.

### When will the pipeline be built?

Construction will commence in 2021/22 after the design and approval phase.

The pipeline is expected to be operational by 2022/23.



### External sand

Up to 250,000m<sup>3</sup> of sand will be delivered to West Beach from land-based quarries in 2021. Using quarry sand for the first phase of the mass replenishment will ensure that large volumes of sand are delivered to West Beach before the end of 2021.

Investigations of other potential sand sources continues.



## Community engagement

The government is working closely with a community reference group on the project.



There will continue to be opportunities for broader community input during the design and delivery of the project.

## Environmental assessments

All the appropriate environmental assessments are being undertaken prior to constructing the pipeline. Impact assessments by independent experts are also being undertaken.

An independent assessment of the impact of moving sand from the northern beaches confirmed that the beaches will recover and continue to grow despite the short term impacts of moving sand.

## Is the pipeline the best solution?

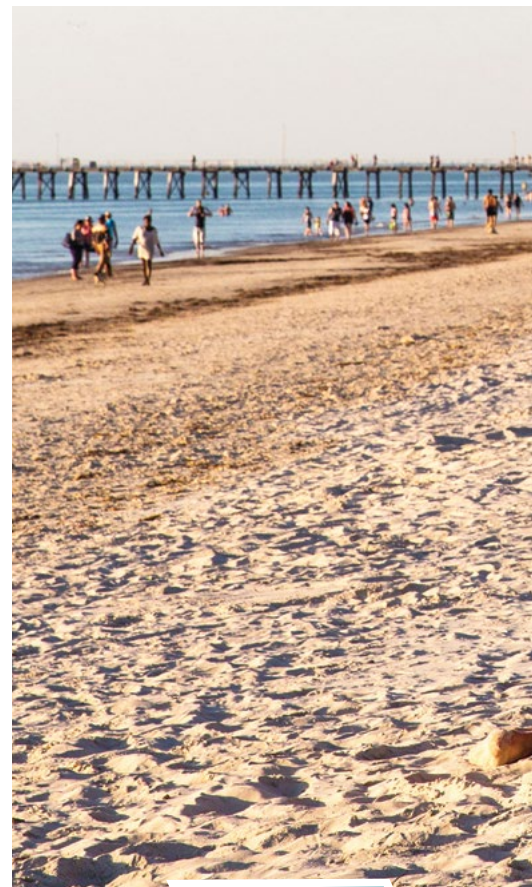
Pipelines are used successfully in many places around the world to keep beaches replenished, including the Gold Coast.

Pipelines provide more flexibility in managing our beaches – with multiple intake and discharge locations allowing sand to be collected from where it builds up and delivered to locations most at need.

The success of the Glenelg to Kingston Park pipeline demonstrates how well this approach works on Adelaide's beaches.

Pipelines also reduce the use of trucks for sand recycling, making it safer for the community as well as reducing noise and congestion on our roads.





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## The future of Adelaide's beaches

To retain Adelaide's sandy beaches that our community and visitors love we need to keep actively managing them.

Managing Adelaide's beaches is a long term proposition. Strategies need to be responsive to short term impacts such as major storm events and seasonal variation, and also adaptive and capable of addressing longer term changes such as rising sea levels.

The economic value of having healthy, sandy beaches and dune systems has been examined in detail. The benefits far outweigh the ongoing management costs.

The *Securing the future of our coastline* project will provide the necessary infrastructure to manage Adelaide's sandy beaches for decades to come.

## DEEP DIVE

Learn more about the government's plan to secure the future of our coastline at

[environment.sa.gov.au/coasts](https://environment.sa.gov.au/coasts)

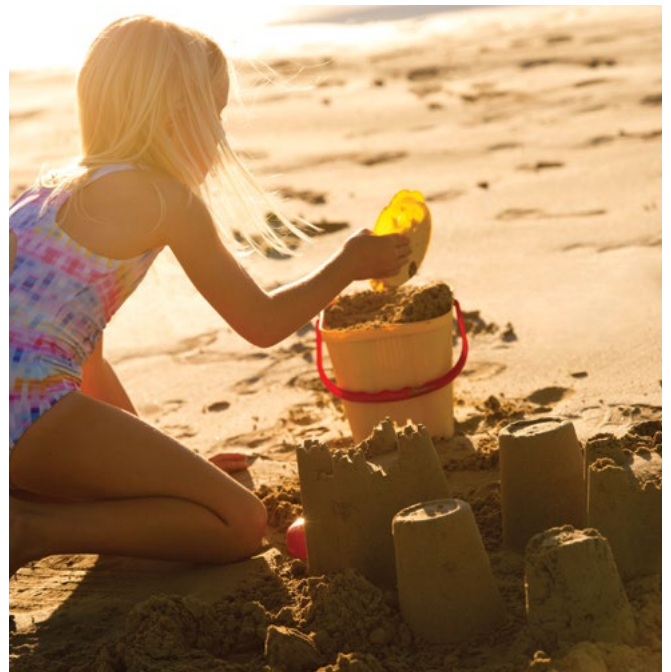




## Some of our partners

The Coast Protection Board is the statutory body that provides strategic oversight of coastal management across South Australia. The Board sets directions based on research, mapping and evidence including that on sea level rise, to inform, consult and coordinate others involved in coastal management to achieve its objectives.

The Board and the Department for Environment and Water work with Green Adelaide to manage Adelaide's beaches longer term. The department also works with local government, community groups, businesses and universities.





## Stay informed



Visit the coast website to learn more:  
[environment.sa.gov.au/coasts](http://environment.sa.gov.au/coasts)

## Questions

### Contact the coast team on:

T: (08) 8124 4928

E: [DEWcoasts@sa.gov.au](mailto:DEWcoasts@sa.gov.au)



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Cover image (black and white): Henley Beach jetty, 1968.



Government  
of South Australia