Gladstone
Healthy Harbour
Partnership

stewardship REPORT 2022

GLADSTONE HEALTHY HARBOUR PARTNERSHIP

Healthy Harbour, Healthy Future

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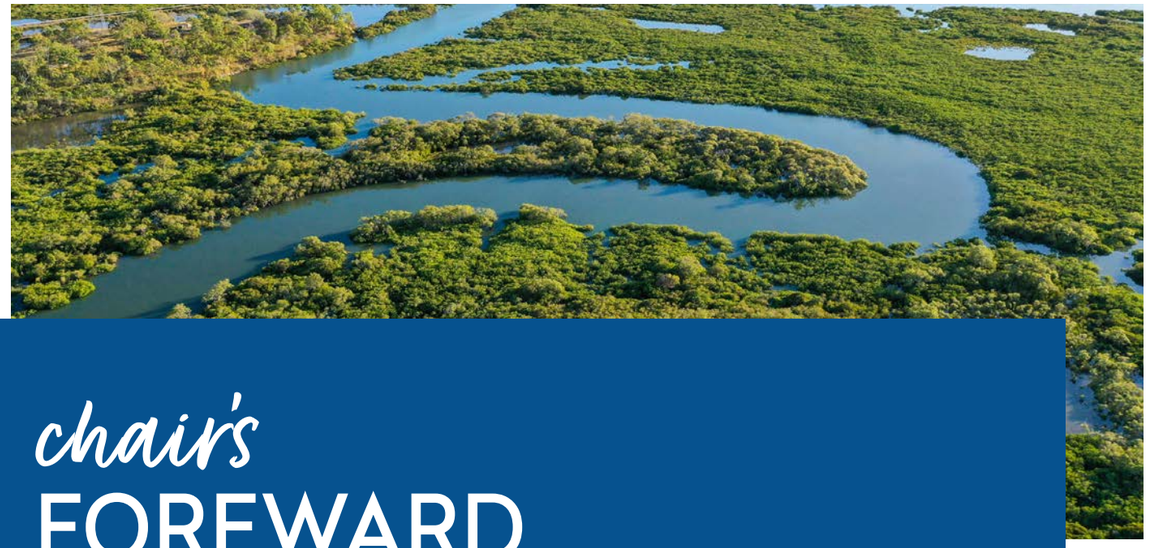
This document is a collection of local Stewardship activities, demonstrating what has been achieved, over the past years, to contribute to the continuing good health of the Gladstone Harbour.



chair's FOREWARD

A MESSAGE FROM THE GLADSTONE HEALTHY HARBOUR PARTNERSHIP CHAIR

The Gladstone Healthy Harbour Partnership was formed in 2013 with the purpose of developing a report card and improving monitoring and understanding of the harbour. The fact that it was initially formed and has produced annual reports since then is evidence of the importance of the harbour to the community and different stakeholders.

The Report Card focuses on monitoring the health of the harbour, it does not capture the various actions that the community, industry, government and other stakeholders themselves invest into maintaining its health.

The Stewardship Report fills this gap, and complements the report card by showing the level of commitment of the Gladstone community to protecting their core asset. The outcomes support each other, with the Report Card communicating the condition of the harbour each year, and the Stewardship Report the extent and diversity of organised and voluntary actions taken to improve its condition. Just as healthy ecosystems are supported by a web of ecosystem services, maintaining a healthy environment requires a network of management actions and guidelines supported by an active and engaged community.

This Stewardship Report gives insights into the strength of this for the Gladstone Harbour.

Prof. Iain Gordon
GHHP CHAIR

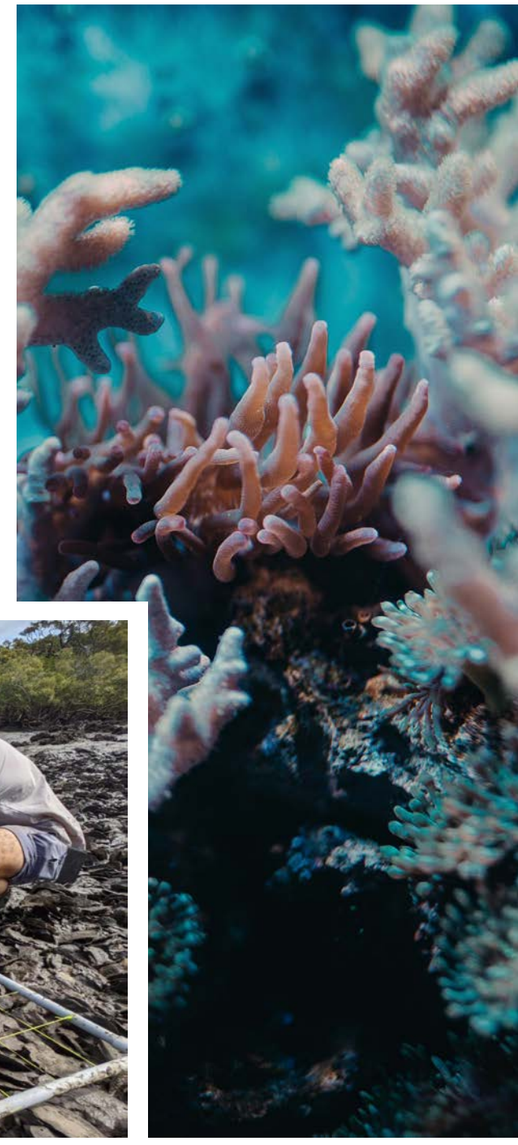
what WE DO

AS A PARTNERSHIP, GHHP INCORPORATES GOVERNMENT, INDUSTRY, RESEARCH GROUPS AND COMMUNITY WITH THE SHARED GOALS OF;

INDEPENDENTLY MONITORING and Reporting on the continuing health of the harbour - environmentally, socially, economically and culturally.

IDENTIFYING OPPORTUNITIES, based on rigorous science and strong stakeholder engagement, to assist in future decisions and improve where necessary.

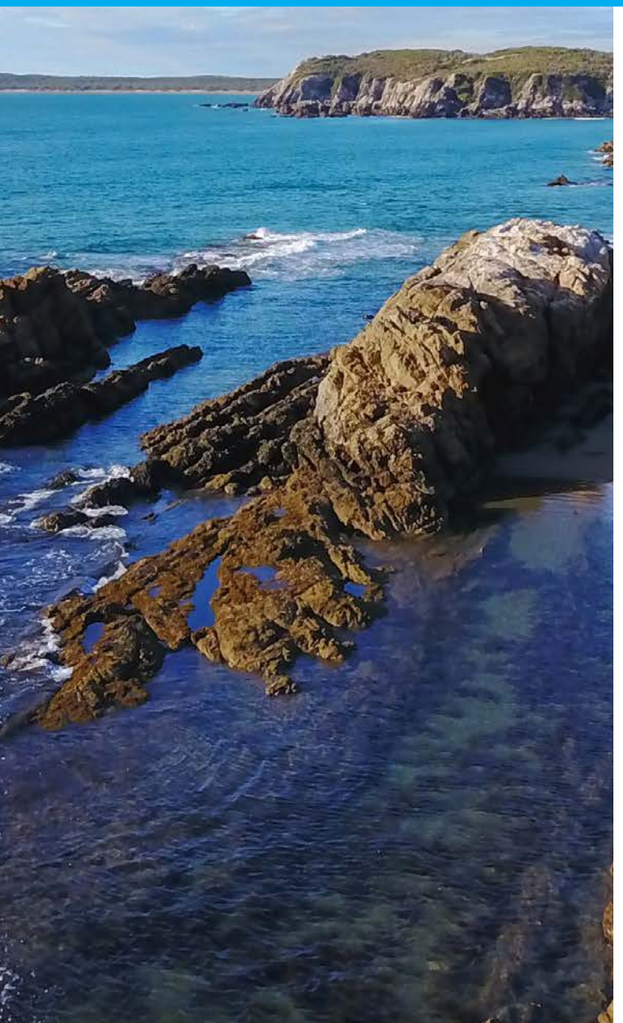
RELEASING an annual report card to communicate our findings to our partners and the wider Gladstone community.



supporting

TRADITIONAL OWNER-LED MONITORING ON SEA COUNTRY

OFFICE OF THE GREAT BARRIER REEF & WORLD HERITAGE & GIDARJIL DEVELOPMENT CORPORATION



The challenges facing the Great Barrier Reef are huge and demand the collective effort of government, industry, community, Landcare and Natural Resource Management groups and Traditional Owners. Traditional Owners in particular have a special and enduring connection to Great Barrier Reef Sea Country that includes a connection with the Reef's evolution into what it is today.

The Australian and Queensland governments' Reef 2050 Long-Term Sustainability Plan (Reef 2050 Plan) includes broad objectives to increase the role of Traditional Owners in developing and implementing management responses and having a greater say in management decision-making in relation to the Reef. This includes an objective to 'increase Traditional Owner-led co-designed and co-delivered water quality projects and programs'.

Established in 2000, Gidarjil Development Corporation Ltd (Gidarjil) oversees the Port Curtis Coral Coast Traditional Use Marine Resources Agreement (PCCC TUMRA), which addresses native title claims and aspirations for Sea Country management by the Gooreng Gooreng, Gurang, Byellee and Taribelang people. Gidarjil has been part of the Queensland Government's Land and Sea Ranger Program since 2009 and through this, has been involved in a range of marine surveys monitoring seagrass, coral, water quality and marine fauna.

Since 2020, the Queensland Government's Queensland Reef Water Quality Program has funded Gidarjil to carry out inshore coral and water quality monitoring in the southern Great Barrier Reef. This project builds upon work carried out for the Great Barrier Reef Foundation aimed at increasing Traditional Owner-led co-designed and co-delivered water quality projects, increasing the skills and capacity of Traditional Owners to manage their sea Country, and filling eReefs model[1] data gaps for the southern Great Barrier Reef.

Another focus has been to train Gidarjil Land and Sea Rangers in monitoring methods used as part of the Great Barrier Reef Marine Park Authority's Marine Monitoring Program and the Australian Institute of Marine Science's Long-Term Monitoring Program, with the data collected supporting eReefs and ultimately, the Reef Water Quality Report Card.

To date, the Gidarjil monitoring project has undertaken ten water quality and three coral surveys covering a total of fifteen monitoring sites. Several of the sites are located in the Rodd's Bay region of Gladstone Harbor while others are in neighbouring Butchulla sea Country.

The Butchulla people granted permission for Gidarjil to access these sites and Butchulla Land and Sea Rangers have worked together with their Gidarjil counterparts to carry out sampling at those locations. This has provided the Butchulla Land and Sea Rangers with additional skills and experience and fostered a closer working relationship between the Gidarjil PCCC and Butchulla Traditional Owner groups.

According to Saranne Giudice, the Gidarjil project manager, "PCCC and Butchulla Elders share a strong and enduring connection to sea country. Coral reefs in PCCC and Butchulla sea country are part of a of a spiritual seascape where connection is vitally important. Coral spawning events are recognised in seasonal calendars and the stories of the Elders". This project allows PCCC and Butchulla traditional owners to continue that connection through working on country.

According to Des Purcell, a Taribelang Bunda Traditional Owner and skipper of Gidarjil's research vessels, "Being involved in this project has not only enabled Traditional Owners to spend time on their sea country and visit these areas, it has also allowed them to play a part in the collection of research data to address a scientific knowledge gap while also incorporating Traditional Ecological Knowledge. As Traditional Owners, it gives us tremendous pride that we are fulfilling our cultural responsibilities to look after land and sea country, as well as educating the wider Australian community about the importance of good water quality and caring for and maintaining these special sites".

[1] eReefs is a collaboration between Australian and Queensland Government agencies that produces powerful visualisation, communication and reporting tools for the Reef akin to that provided by the Bureau of Meteorology for weather. These support greater understanding and better management of the Reef.

LEFT: *Gidarjil research vessel, the Miiba Gundal (turtle canoe), which is used to undertake marine water quality monitoring.* ***RIGHT:*** *Taylah Currie and Beth Newson using a Van Dorn sampler to take water samples.*

local schools

TAKE THE NEXT LEAP TO PREVENT STORMWATER POLLUTION

GLADSTONE REGIONAL COUNCIL

From May 2021 to June 2022, Gladstone Regional Council facilitated the Litter Education and Awareness Program (LEAP) to give local students the opportunity to learn about stormwater pollution, environmental conservation, and litter source reduction.

Run in collaboration with 10 local Reef Guardian Schools, Cleanwater Group and Tangaroa Blue, the program involved installing litter capture devices around participating schools, analysing the contents captured over the 12-month period and educating students about stormwater pollution and ways to prevent it.

Gladstone Region Councillor and GHHP Management Committee Member Darryl Branthwaite says the program allowed students a unique opportunity to learn about litter management first-hand.

"WE INSTALLED DRAIN BUDDIES AT ALL OF THE PARTICIPATING SCHOOLS, WHICH IS A HEAVY-DUTY MESH BASKET THAT CAPTURES ANY LITTER OR DEBRIS THAT WOULD NORMALLY WASH DOWN THE DRAIN," EXPLAINS CR BRANTHWAITE.

"They essentially strain the pollutants and debris from the stormwater and allowed the students to physically see what was entering the drains around their school and learn about the impact this has on our waterways."

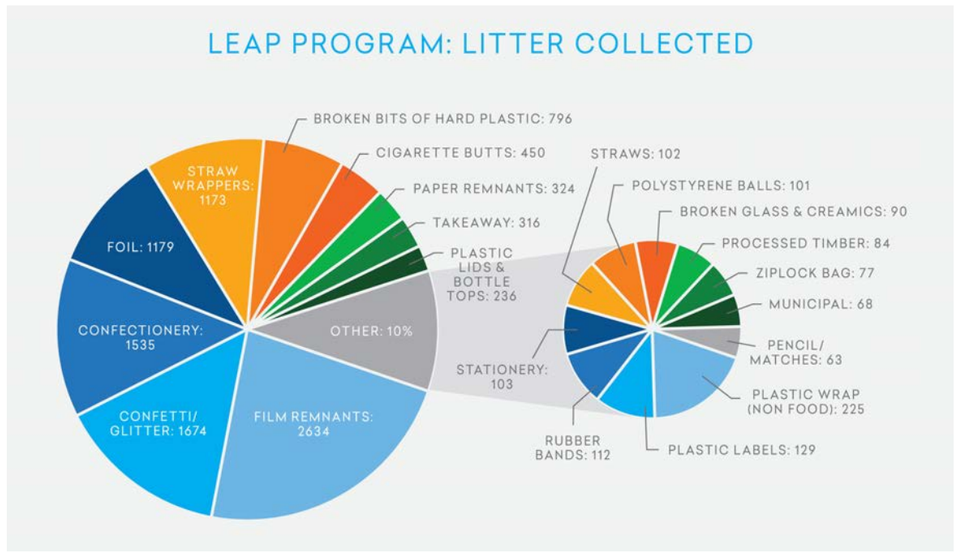
In Term 4 of 2021 and Term 2 of 2022, litter sorting and educational events were held at each participating school to give the students a chance to see the captured litter, discuss why it came to be there and ways they can help address the issue.

The following schools participated in the program:

- Toolooa State High School
- Chanel College
- Kin Kora State School
- Clinton State School
- Gladstone State High School
- Gladstone West State School
- St John's Catholic Primary School
- Boyne Island State School
- Tannum Sands State School
- Agnes Water State School

WHAT'S REALLY ENTERING OUR WATERWAYS

A total of 12,315 pieces of litter were captured during the 12-month program before being hand-counted and categorised by school students into the various litter categories.



***TOP:** Students from Boyne Island State School take part in the LEAP program. **BOTTOM:** Litter Collection results data collected over the program's 12 month period.*

The resultant data will be uploaded to the Australian Marine Debris Database and made available to researchers and litter reduction organisations to support ongoing litter monitoring and reduction campaigns.

'Film remnants'[1] were found to be the most common type of litter found with 2634 individual pieces counted. This was followed by confetti/glitter, confectionary wrappers, foil and plastic straw wrappers.

[1] 'Film remnants' are pieces of soft plastic that cannot be identified within other more specific litter categories (such as confectionery, takeaway etc.), due to their size or lack of markings. Many of the film remnant pieces were small corner-pieces of plastic, created when opening a package/consumable.

waterway

PLANT RESTORATION & SMARTER ROAD DESIGNS TO BENEFIT REEF

GLADSTONE REGIONAL COUNCIL

In an effort to the improve water quality of Gladstone's Great Barrier Reef catchment area, Gladstone Regional Council has launched two separate conservation initiatives: a pilot vegetation restoration project at Tigalee Creek and the Local Government Association of Queensland's (LGAQ) Cleaner Road Runoff Project.

TIGALEE CREEK RIPARIAN VEGETATION RESTORATION

With native plants known to have a direct positive impact upon the health, water quality and ecosystem of waterways, the Tigalee Creek vegetation restoration project aims to restore riparian vegetation along a section of the local creek and in turn, reduce sediment and other pollutants.

Led by Council's Parks, Biosecurity and Environment and Conservation teams, the project involves a combination of weed control, reduced mowing along creek banks and planting of an additional 650 native plants with the help of Conservation Volunteers Australia.

Council Conservation Officer, Emily Fehlhaber explains that benefits of regenerating native vegetation are far-reaching, helping not only to improve the water quality of the creek itself but also the Great Barrier Reef catchment.

"By reducing the amount of sediment and pollutants that enter the waterway, we're improving the water quality that enters Gladstone Harbour and ultimately the Great Barrier Reef catchment, preventing pollutants from adversely impacting coral health and the reef's marine ecosystem," she says.

"Native trees and plants also play an important role in preventing erosion and providing habitat and corridors for wildlife that live in the area."

Council will now monitor the area throughout the project to ensure additional controls won't be required. The project results will be finalised in March 2023 and, if successful, will be a guide for future revegetation projects throughout the region.

NEW ROAD DESIGNS SET TO RESULT IN CLEANER RUN OFF

According to the 2017 Scientific Consensus Statement published by the Queensland Government, fine sediments are one of the three greatest water quality risks to the Great Barrier Reef, reducing available light to seagrass beds and inshore coral reefs.

With an estimated average of 25mm of silt washing off the top of the 38,000km of unsealed roads in the Reef catchment area, the LGAQ has launched the Cleaner Road Runoff Project, which aims to develop better road design practices to protect the Great Barrier Reef.

Gladstone Regional Council is one of five local councils participating in the project by conducting research to better understand the loss of fine sediments from unsealed roads during rain events and its impact on water quality.

"The project aims to understand the factors that drive erosion by trialling various drainage designs and then measuring the amount of sediment that is lost over the two-year project period," explains Cr Darryl Branthwaite, GHHP Management Committee Member.

"We've established seven sediment monitoring sites in the test area along Raglan Station Road and each site has a different combination of roadside drainage and surface treatment.

"Sediment samples from each will then be captured and analysed after major rainfall events."
The results from this project will not only benefit the Reef, but also help improve best practices for road designs and identify materials that will help prolong the life of the road, reducing ongoing maintenance and rehabilitation costs.

The Cleaner Road Runoff Project is funded by the partnership between the Australian Government's Reef Trust, the Great Barrier Reef Foundation and LGAQ with support from Griffith University, Institute of Public Works Engineering Australasia, Queensland (IPWEAQ), Department of Environment and Science, Office of the Great Barrier Reef and World Heritage, Bundaberg Regional Council, Whitsunday Regional Council, Isaac Regional Council, Cassowary Coast Regional Council and Gladstone Regional Council.

watch

LEARN MORE ABOUT THE TIGALEE CREEK PROJECT

TOP: *A monitoring station on Raglan Station Road.* ***RIGHT:*** *Tigalee Creek vegetation restoration.*

living SEAWALLS

GLADSTONE PORTS CORPORATION

In a busy multi-commodity port such as Gladstone, seawalls are essential for protecting cargo ships, marine and port infrastructure, recreational boats and fishing vessels, and coastal community infrastructure from the elements.

Gladstone Ports Corporation (GPC) and researchers from CQUniversity are now investigating the viability of incorporating nature into port infrastructure, through the creation of "living seawalls" in an effort to support marine habitats, biodiversity and ecosystem health.

Sponsored by GPC and CQUniversity, PhD candidate and Ecological Engineering scholarship recipient, Rory Mulloy, is one of two researchers driving the trial project that is set to commence by the end of 2022.

Rory said the aim of the project was to find a way for marine construction projects to have a positive impact on local habitats.

"The aim of this project was to essentially to come up with a solution that allowed coastal development in a port to have a beneficial and sustainable outcome. That's why we investigated the viability of creating new, intertidal sediment habitats and installing these structures adjacent to land reclamation areas."

Initially, the research focused on finding the most suitable structure for the physical barrier, called: "groynes". The groynes are designed to reduce tidal flow, which will allow natural sediments to accumulate around the seawall to create new habitats.

"Numerical modelling was used to identify the most viable and sustainable solution for the marine environment," Rory said.

"We discovered that regularly spaced projections constructed out of rock and placed perpendicular to the shore would be the most suitable for slowing the flow of sea water in the area – which will allow sediment to accumulate and new habitats to establish.

"We then used this information to design the "living seawall" concept and then we selected the initial trial areas for the project."

Co-researcher Rodrigo Zilleruelo, who is a PhD candidate and Environmental Economics scholarship recipient, said the trial project would provide socio-economic value to the Gladstone community, via the collection and assessment of survey data about the value of the ecosystem services that the new habitats would provide.

"Using ecological economics to assess how the community values different seawall project options – and the services that seawalls generate – provides crucial insight into the economic value of this sustainable alternative and allows various options to be evaluated," Rodrigo said.

> "THE AIM OF THIS PROJECT WAS TO ESSENTIALLY COME UP WITH A SOLUTION THAT ALLOWED COASTAL DEVELOPMENT IN A PORT TO HAVE A BENEFICIAL AND SUSTAINABLE OUTCOME.

"The ultimate goal is to provide information that can aide policy development or review that maximise benefits to our community."

Construction of the living seawalls will commence in November 2022, before initial trials commence at the end of 2022 to establish new mangrove, seagrass and oyster habitats at a site located at Fisherman's Landing.

PAGE 10: *Researcher Rory Mulloy inspects mangroves.* ***PAGE 10, RIGHT:*** *Researchers conduct a field expedition via kayak to inspect the existing man-made seawall structures.*

seagrass monitoring PARTNERSHIP REACHES 20-YEAR MILESTONE

GLADSTONE PORTS CORPORATION

For the past two decades, Gladstone Ports Corporation (GPC) has worked closely with marine researchers to undertake a long-term, annual seagrass monitoring program throughout Gladstone Harbour.

Funded by GPC, the monitoring program forms part of GPC's commitment to the Port of Gladstone Long Term Maintenance Dredging Management Plan (LMDMP). The LMDMP is a requirement of the Australian Government which, in conjunction with the Queensland Government, regulates maintenance dredging operations that keep the harbour's channels and berths at navigable depths for international shipping.

This year, the monitoring program reached a major 20 year milestone, having been running since 2002.

Dr Megan Ellis, GPC's Environment Specialist, said researchers from James Cook University's (JCU) TropWATER research centre had worked in partnership with GPC to monitor and report upon the health of seagrass meadows during the peak growing season each year, which runs from October to November.

"The data we collect, analyse and utilise in our marine monitoring programs supports all marine animals in the harbour, and helps GPC to sustainably manage port operations," Dr Ellis said.

> "THE MONITORING PROVIDES AMBIENT DATA FOR GPC TO ASSESS THE HEALTH OF SEAGRASS MEADOWS AND MEASURE ANY POTENTIAL IMPACTS ON THE MARINE ENVIRONMENT.

The partnership between the university and GPC is an important part of the broader work that GPC does throughout Gladstone Harbour.

"The monitoring program is a baseline, ambient program to assess the health of the seagrass meadows, which in turn informs sustainable port management," Dr Ellis said.

"As part of the program, seagrass meadows are assessed for changes in three metrics: biomass, area and species composition."

JCU Associate Professor of Marine Biology & Principal Research Scientist, Dr Michael Rasheed, who has worked on the program since its inception, said seagrasses were considered significant receptors of the health of marine ecosystems.

"Seagrasses are flowering marine plants that produce flowers under water. The flowers pollenate under water and also produce a fruit, which contains seeds," Dr Rasheed said.

"Seagrasses are so important to the health of the harbour and a key food source for green turtles. They're also the only food source for dugong. That's why their presence in the harbour supports biodiversity, fisheries resources, and threatened species."

"All seagrasses need light to survive and grow. However, they are vulnerable to reductions in sunlight, sedimentation and eutrophication, and can be affected by sediments, nutrient levels, temperature changes, storms and land-based flooding events."

Michael and his team of researchers have identified six species of seagrasses growing throughout the harbour, with each species requiring different growing conditions.

"When we started the program, we did a detailed survey of where the seagrasses were located and the different types of seagrasses that were in the harbour, and then designed a monitoring program to understand how healthy the seagrasses were and to be able to report on that annually," Dr Rasheed said.

From 2009 to 2011, the study also looked at light requirements for seagrasses in Gladstone Harbour.

"We found out what the right levels of light were for each species and provided this information to GPC," Dr Rasheed said. "Now, GPC use this data routinely to continuously monitor their port operations and channel dredging programs to ensure that light requirements for seagrasses are met."

GPC CEO Craig Haymes said GPC's investment in the annual monitoring program and involvement in the Gladstone Healthy Harbour Partnership (GHHP) were a priority for GPC, as custodians of the Port of Gladstone.

"Our long-term focus on the monitoring program shows that GPC regards the health of Gladstone Harbour as a priority," Mr Haymes said. "GPC provides the data from the seagrass monitoring program to GHHP for publishing in its annual Gladstone Harbour Report Card."

Mr Haymes said partnerships between science and industry were critically important to GPC's port operations.

"Working together, we can come up with solutions that help GPC to operate in a sustainable way that protects the marine environment, while delivering benefits to the community."

watch
THE RESEARCH BEING UNDERTAKEN FIRST-HAND

PAGE 12, LEFT: *Researchers from JCU's TropWATER undertake monitoring via helicopter.* ***RIGHT:*** *Local seagrass meadow.*

five-year

QAL ENVIRONMENTAL IMPROVEMENT STRATEGY WRAPS UP

QUEENSLAND ALUMINA LIMITED

Producing over 3.7 million tonnes of alumina each year, Queensland Alumina Limited (QAL), is the world's 4th largest alumina refinery and has been an integral part of the Gladstone community for over 55 years. In a bid to continuously improve their environmental stewardship and minimise their overall footprint, QAL committed to a $460M 5-Year Environment Strategy (5-YES) that will significantly reduce the environmental risk profile.

Commencing in 2018, the strategy consists of 60 individual capital improvement projects that demonstrate the refinery's commitment to reducing the risk of a process incident impacting the surrounding environments across six key focus areas: air quality, odour, noise reduction, land management, water management and culture.

The works have seen more than 80 additional contractors per month being employed on site and tens of thousands of hours invested into researching and developing new technologies and processes over the past four years. While some projects such as replacing the alumina conveyor with a sealed air slide to eliminate airborne alumina dust during transfer have involved replacing existing equipment for more environmentally friendly solutions, others have required tailored innovation. In many instances, project engineers have had to develop processes that completely redefined the way the refinery operates or implemented technologies that had not previously been used in a refinery setting.

With the overall project due to be complete towards the end of 2023, a brief overview of some of the key 5-YES achievements across each focus area is provided below.

AIR QUALITY

A total of $40M was invested across nine separate projects. Two of QAL's four caustic storage tanks were upgraded. A new oxalate vent tank system was installed to reduce alkali emissions on-site and an extensive network of alkali monitoring stations have been set up around the refinery and surrounding areas. Reducing dust emissions is equally paramount when it comes to improving air quality. In addition to the new $4.5M air slide alumina conveyor, a new conveyor washing station has also been built to remove residual bauxite dust from the conveyor after it is unloaded onto the bauxite stockpile, alongside other coal dust suppression projects.

ODOUR

Although the odour produced by QAL poses no known threat to human health or the environment, QAL recognises that it is unpleasant for the community members who experience it. As the odour is produced by numerous sources within the refinery, the 5-YES approach was to engineer new solutions that target the sources with the largest impact, such as incinerating odorous gases from the digestion units using a Thermal Oxidiser Odour Destruction unit.

NOISE

QAL have implemented a ‘Buy Quiet’ program, where quieter equipment is selected and installed when replacements are required. Where this isn’t feasible, new noise management strategies have been developed, such as a new tank hydroblasting maintenance strategy where works are only conducted during the day and noise levels are continuously monitored.

WATER

9.5km of old wastewater line was removed with new and improved piping installed to ensure the waste lines remain safe for years to come. This project included replacing the mud line from the refinery, over South Trees Inlet to the Residual Disposal Area, costing a total of $40M.

LAND

The refinery committed to a complete overhaul of its drainage system and bunded catchment areas to prevent liquor contaminating the soil and water beneath the refinery. Half a million dollars was spent on remediating 64.5 meters of drains.

CULTURE

QAL is committed to ensuring all employees and contractors have adequate controls in place to prevent environmental incidents when conducting everyday tasks. The refinery’s environment committee have also implemented several initiatives including supporting Containers for Change, earplug and battery recycling, installing new planter boxes made from recycled materials and switching all photocopy paper to 100% recycled.

PAGE 14: *QAL Specialist - Environment undertake routine environmental inspection.* ***PAGE 15 :*** *5-YES investment commitment by focus area.* ***RIGHT:*** *QAL Superintendent and Specialist - Environment conduct water quality monitoring.*

fisheries habitat

RESTORATION PROGRAM RAMPS UP IN GLADSTONE HARBOUR

FITZROY BASIN ASSOCIATION & CQUNIVERSITY

Healthy oceans and marine life rely on seagrass. Although Gladstone Harbour meadows are currently in a state of recovery after the negative impacts of flooding in 2013, there has been a 50% reduction in seagrass meadow cover along the Capricorn and Curtis Coasts over the last 20 years. Moreover, seagrass meadows across the globe are becoming smaller, more fragmented or disappearing completely.

To address this issue, a partnership collective of Fitzroy Basin Association, CQUniversity, Konomie Island Environmental Education Centre, Woppaburra TUMRA and members of the Central Queensland fishing community are working together to restore seagrass meadows around Curtis and Konomie (North Keppel) Islands.

Seagrass ecosystems provide environmental services such as protection from coastal erosion, support of marine biodiversity, carbon sequestration, sediment and nutrient entrapment, as well as provision of nursery grounds that support commercial and recreational fisheries.

The Fisheries Habitat Restoration Program has had overwhelming support from the Gladstone community, in particular the Gladstone Sports Fishing Club.

> "TO DATE, 132 VOLUNTEERS HAVE CONTRIBUTED 1,141 HOURS (OR 142 DAYS) TOWARDS SEAGRASS TRAINING AND RESTORATION EFFORTS IN GLADSTONE HARBOUR, INCLUDING THE COLLECTION OF OVER 400,000 SEEDS.

This program is a fantastic example of how actions - no matter how small - can make a big difference. Given the right conditions, one seagrass seedling can grow to cover one hectare of the seafloor. Similarly, one empowered community member can make positive changes and actions that ripple out across the region and connected oceans.

To learn more about this ongoing program or other regional on-ground action visit www.fba.org.au

ABOVE: *Local volunteers support the Fisheries Habitat Restoration Program.*

watch

STEM CENTRAL'S QUOIN ISLAND PROGRAM IN ACTION

TOP: *A/Prof Linda Pfeiffer with students from Gladstone West State School.* ***LEFT :*** *'Odin' the turtle being released back into the ocean.* ***MIDDLE RIGHT:*** *The debris collected from the students' beach cleanup.* ***BOTTOM RIGHT:*** *The students tour the Quoin Island Turtle Rehabilitation Centre.*

the local facility

TEACHING THE NEXT GENERATION TO PROTECT THE HARBOUR

AUSTRALIA PACIFIC LNG & CQUNIVERISTY

When it comes to environmental education, it's vital that the next generation are given the opportunity to access hands-on learning experiences so they can foster a love for looking after our local waterways from a young age.

This is exactly what the team at local STEM education facility, STEM Central, are aiming to do in partnership with industry stakeholders and local environmental organisations. Sponsored by Australia Pacific LNG and operating out of a purpose-built facility at CQUnivesity in Gladstone, STEM Central facilitates a range of Science, Technology, Engineering and Maths (STEM) programs for children of all ages and backgrounds. Environmental education is a key component of these programs with the team recently running their annual full-day excursion to Quoin Island for Year 3 and 4 students from the Buraligim Weiber program at Gladstone West State School.

After a short ferry ride to the island, the students visited the Quoin Island Turtle Rehabilitation Centre where they received a guided tour of the centre, learnt about how the turtles are rehabilitated and had the special experience of watching a turtle be released back into the ocean. The students then also received a demonstration from the Native Bee Club where they were able to view the beehives and gain an understanding of the unique role native bees play in pollinating native plants, many of which can't be pollinated by introduced bee species.

The students ended their day by participating in a beach clean-up in partnership with the Tangaroa Blue Foundation, an Australian-wide not-for-profit organisation dedicated to the removal and prevention of marine debris in our waterways. The collected debris was used as an opportunity to educate the students about marine litter and the adverse effects this debris has on our waterways and sea creatures.

Australia Pacific LNG STEM Central Lead, Associate Professor Linda Pfeiffer, says the importance of these environmental education programs cannot be understated.

"The kids that we have coming through our STEM Central programs are the next generation of people who will be responsible for making sure our waterways, habitats and reefs are preserved for years to come," Linda explains. "That's why it's really important that the students of Gladstone are made aware of all the programs and initiatives that are out there to protect the health of the harbour and the little things that they can do like putting rubbish in bins or collecting any litter they see lying around to start making an impact now."

"The sooner they understand just how important it is and develop a passion for wanting to care for our environment, the better off our future will be."

staff volunteer TO HELP RESTORE SEAGRASS MEADOWS

SHELL QGC

Seagrass meadows are one of the most important habitats in the Great Barrier Reef, providing food, shelter and nurseries for many marine animals that call the Gladstone region home, including turtles and dugongs. Yet with the reef's seagrass meadows becoming increasingly under threat, including those located around Curtis Island, Shell QGC's business staff volunteered to lend a hand to a vital Seagrass Restoration Citizen Science project run by CQUniversity's Coastal Marine Ecosystems Research Centre (CMERC).

21 staff attended the Seed Collection Day, helping to collect seagrass flowers and seeds for use in ongoing habitat restoration research programs. Project lead, CMERC's Associate Professor Emma Jackson, says that the collection day gave staff the opportunity to learn about the value of seagrass habitats first-hand.

"The citizen science projects are all about encouraging community members to take an active role in protecting the health of our coastal waterways and promoting the value of these habitats to the local community, so it was fantastic to see the team from Shell play a role in that," A/Prof Jackson explains.

> "IT'S CURRENTLY PEAK COLLECTION SEASON AND WE RELY ON ORGANISATIONS LIKE SHELL AND OTHER MEMBERS OF THE COMMUNITY TO VOLUNTEER THEIR TIME TO COLLECT FLOWERS AT THE DIFFERENT COLLECTION EVENTS WE RUN DURING THE YEAR.

CMERC's seagrass flowering collection events are proudly supported by the Queensland Government—Queensland Citizen Science Grants. The seeds collected are utilized in research and restoration trials to develop techniques for large scale seed-based restoration of seagrass. Seed based restoration helps to maintain genetic diversity and minimize impact on donor meadows.

For Shell staff members, the day began with a tour of CMERC's Gladstone-based facility, which is the only coastal and marine research facility based in Central Queensland and features world-class research equipment and laboratories. Here, staff learned about the seagrass restoration project and the importance of seagrass in maintaining the reef's biodiversity before travelling to the south end of Curtis Island to get their hands dirty. The team assisted A/Prof Jackson in collecting the flower seeds from the seagrass meadows and making seed balls ready for dispersal, collecting approximately 20,000 flowers.

The collected flowers are then brought back to CMERC where the seeds are and used in CMERC's ongoing restoration trials and research on seed storage, germination, viability and seedling survival.

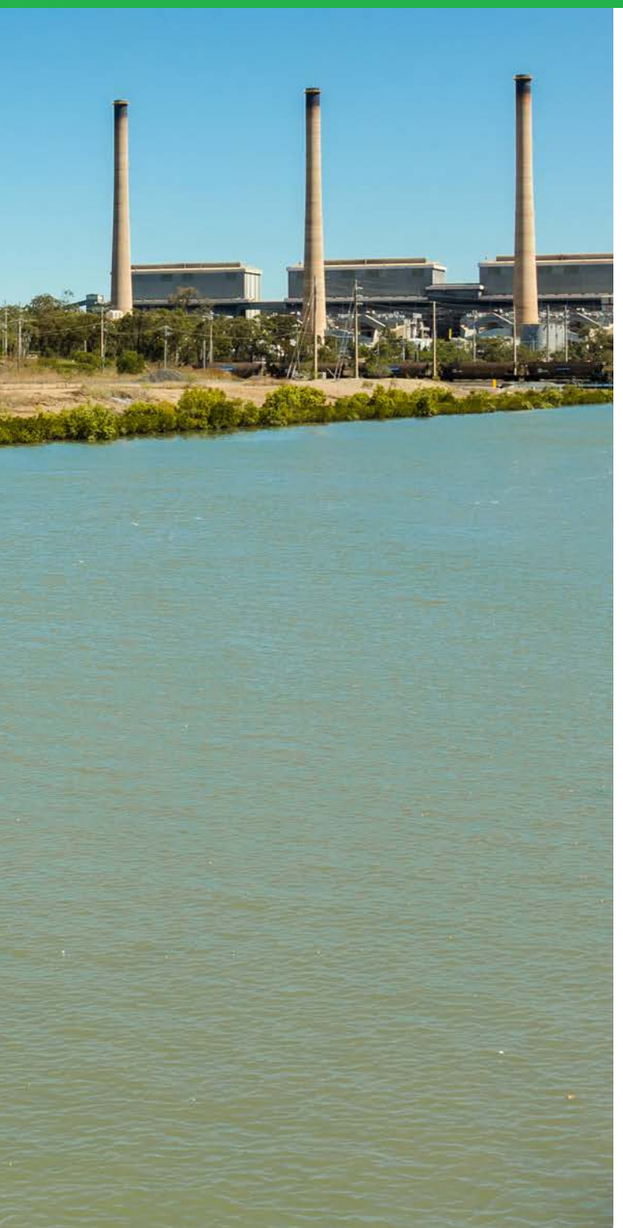
Krishna Venkatesan, Shell QGC's Asset Manager Midstream hopes that their involvement in the collection day is just the start of their ongoing involvement with CMERC.

"We're always proud to partner with local community that help to protect and preserve the local environment and the work that CMERC is doing to help restore seagrass habitats is vital to the health of the Gladstone Harbour."

ALL: *Shell QGC's business staff collect seagrass flowers on Curtis Island to assist CMERC's ongoing seagrass research and restoration trials.*

responsibly MANAGING ASH WASTE

GLASTONE POWER STATION (NRG)



Although it's common knowledge that ash is by-product of the combustion of coal, what is perhaps lesser known is the efforts that Gladstone Power Station (GPS) goes to recycle as much of this ash as possible for community benefit.

Gladstone Power Station's Fuel and Ash Superintendent, Mark Fleming, explains that the station has environmental management systems in place to manage and recycle the two types of ash waste that the power station generates.

"The ash comes along pipelines to us in both a dry and a wet product, both of which end up being recycled and reused for different purposes," says Mark. "The dry product, the fly ash, is collected into a big silo area on-site where it's then transferred into trucks and actually ends up being used to make concrete by Cement Australia."

"The process for treating the wet product, the ash placement water, is a lot more involved but essentially it gets pumped into bunds where the ash settles out and is eventually used for reclaimed land."

Monitoring the quality of any water runoff and the quality of water in the nearby creeks and rivers is also a major priority.

"All of the water run-off from the area is tested and monitored daily along with any ground water runoff and storm water. We go to great length to ensure that any water that goes back into the Calliope River is pure and has been sufficiently filtered," Mark explains.

GPS'S ASH PLACEMENT WATER MANAGEMENT PROCESS

STEP ONE:
The Ash Slurry is pumped along the ash lines into a man-made detention pond called a bund.

STEP TWO:
Here, the ash settles out and the water is purified before the bund is dewatered and the purified water is pumped back into the Calliope River. The system not only separates out the ash but also acts as a set of lungs that filter out any unwanted solids from the water itself. This quality of the water is tested and monitored consistently by the GPS team.

STEP THREE:
The remaining ash solids are transferred into trucks and used for local land reclamation. "We ensure the finished product is suitable for revegetation so that when we've placed the ash, we can give it back to the community as place that can be utilised to benefit the growing town of Gladstone," says Mark.

"WE ENSURE THE FINISHED PRODUCT IS SUITABLE FOR REVEGETATION SO THAT WHEN WE'VE PLACED THE ASH, WE CAN GIVE IT BACK TO THE COMMUNITY AS PLACE THAT CAN BE UTILISED TO BENEFIT THE GROWING TOWN OF GLADSTONE.

watch
THE ASH MANAGEMENT PROCESS IN ACTION

LEFT: *The Gladstone Power Station, situated alongside Calliope River.* ***BOTTOM:*** *Gladstone Power Station's Superintendent - Fuel and Ash, Mark Fleming, inspects the water quality of the nearby creeks and rivers.*

funding initiatives WITH LONG-LASTING IMPACT

BOYNE SMELTERS LIMITED | RIO TINTO

Boyne Smelters Limited (BSL) has been a proud community member for more than 40 years, providing financial and in-kind support for programs, events and initiatives that contribute to improving the liveability, sustainable development and promotion of environmental sustainability in the Gladstone region.

BSL General Manager, Lesley Bryce, says that BSL are committed to contributing to a circular economy and funding initiatives that will have a long-lasting environmental impact.

“BSL aluminium is infinitely recyclable and we are here for future generations. I am excited to see what the future has in store for us,” says Lesley.

Below is a snapshot of some of the initiatives undertaken during the 2021-2022 financial year.

ALUMINIUM STEWARDSHIP INITIATIVE (ASI) FOUNDERS AND MEMBERS

Rio Tinto are founders and active members of the Aluminium Stewardship Initiative (ASI), and were the first aluminium producer to have our product ASI-certified as responsible throughout its lifecycle. They continue to actively participate in the review of the ASI standard on biodiversity and ecosystem services, contributing knowledge and experience that they have gained on the ground at operations around the world.

BSL CARING FOR CLOWNFISH PROGRAM

BSL is proud to support the Boyne Island Environmental Education Centre (BIEEC) to deliver the BSL Caring for Clownfish and BSL Bee Sustainable environmental programs.

Since 2019, BSL has sponsored BIEEC’s BSL Caring For Clownfish program to support the clownfish breeding program. The innovative program takes positive environmental stewardship action by addressing the overharvesting of wild Clownfish off reef environments. Through a Clownfish captive breeding activities established at the Centre, students and community are provided a hands on learning opportunity centred around sustainable fishing and reef health, beyond the capacity of the classroom.

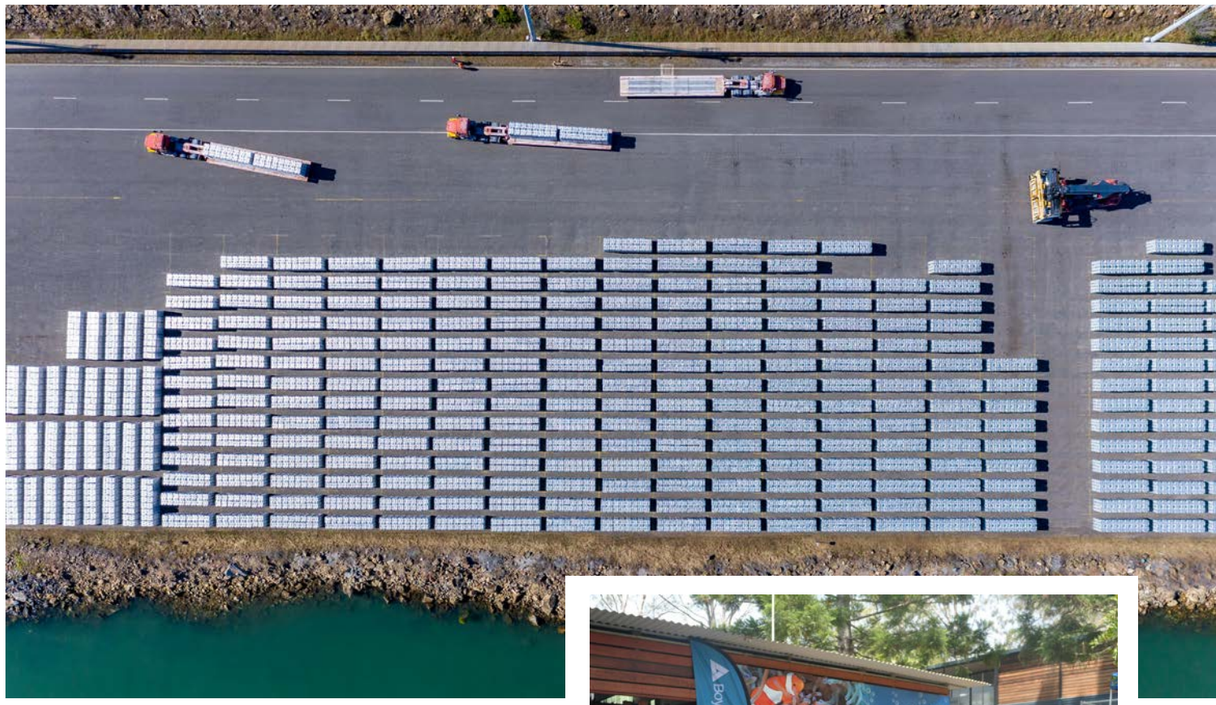
Approximately 2,800 students participate in the program each year through day visits to BIEEC and community events.

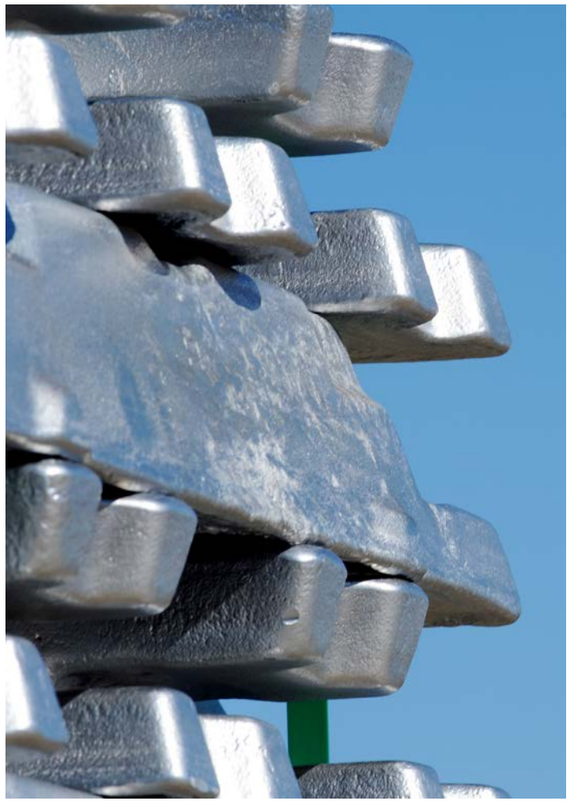
BSL BEE SUSTAINABLE PROGRAM

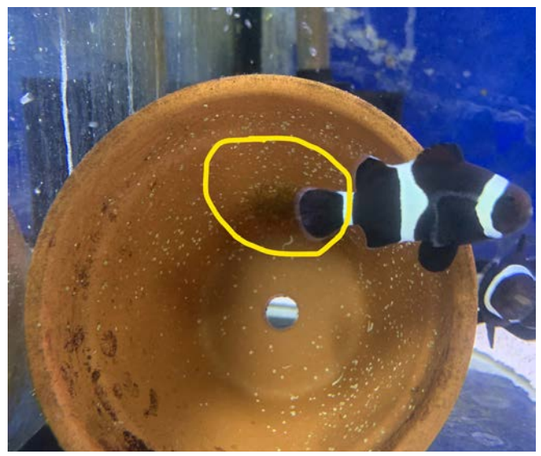
BSL also proudly sponsors BIEEC’s BSL Bee Sustainable program.

The BSL Bee Sustainable program is an educational program structured much like the BSL Caring For Clownfish program and educated students and the community on the role of native bees in pollination and plant health.

Students and the community participate in learning activities to understand the important role of bees in pollination and plant health in our environment.







TOP: *BSL’s aluminium ready to be loaded for export from the Gladstone Wharf.* ***LEFT:*** *BSL’s aluminium product is ASI certified.* ***MIDDLE RIGHT:*** *BSL’s caring for clownfish program educates over 2,800 students a year.*
BOTTOM RIGHT: *A black clownfish lays its eggs as part of the breeding program.*

report CONTRIBUTORS

This annual Stewardship Report was made possible with the assistance of the following partners:

Australian Government

Australian Institute of Marine Science

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Gladstone Area Water Board

Gladstone Ports Corporation — Growth, prosperity, community.

Gladstone Regional Council

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RioTinto

Santos GLNG

SEA-LINK Travel Group

Smit Lamnalco

WICET Wiggins Island Coal Export Terminal

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