

Busseton Jetty Inc.
Environmental Management and Monitoring Plan –
Undersea Sculptures

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Environmental Management and Monitoring Plan – Undersea Sculptures

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	Position	Name	Signature	Date
Prepared by:	Environmental Manager	Sophie Teede	<i>S. Teede</i>	8 Nov 2019
Reviewed and Approved by:	CEO	Lisa Shreeve	<i>L. Shreeve</i>	8 Nov 2019

CHANGES

Version		Date	Author
1.	Amended Figure 4.	11/06/20	S. Teede
2.	Incorporated O2 Marine peer review comments	31/12/20	S. Teede
3.	Incorporated DBCA review comments for Cetacean/Pinniped/Turtle interaction procedures	01/12/21	S. Teede
4.	Reviewed entire document. Incorporated O2 Marine peer review comments, added detailed information on sculptures, layout	31.03.23	S. Teede

Sophie Teede is the Environmental Manager at Busselton Jetty and has obtained a Bachelor of Science (Hons) from Murdoch University. Her Honours thesis titled “Colonisation in a South West Australian Artificial Reef: a rehabilitation study” investigated the potential to use soft corals and sponges in a marine restoration program. This research was awarded First Place in the IOC- UNESCO (Perth) student awards. Sophie is also a member of the Commonwealth Marine Parks South West Network Advisory Committee, Australian Marine Science Association and Malacological Society of Australia.

Introduction

Background

Built-in 1865, the 1.841-kilometre Busselton Jetty is the longest wooden-piled Jetty in the Southern Hemisphere, and one of the most highly awarded tourism attractions in the State in Western Australia. In 2019, Busselton Jetty Incorporated (BJI). has won gold in the Major Tourism Attraction and Ecotourism categories at the WA Tourism awards, and the Sir David Brand Award, the highest award for tourism in WA, recognising excellence in the tourism industry.

BJI was formed in 1987, as a community based, not-for-profit organisation to save and restore Busselton Jetty after extensive damage from a prior tropical cyclone and lack of maintenance once port operations ceased. BJI has overseen rejuvenation of the Jetty and its evolution as a tourist attraction - operating the Underwater Observatory (1 of 6 in the world), the solar-powered Jetty Train, the Interpretive Centre/Museum, mermaid tours, sunset tours, virtual reality, underwater helmet walks, diving and underwater dining. BJ Inc. has specific goal of maintaining and enhancing the Busselton Jetty and its immediate marine environment and all profits are directed toward achieving this goal.

25% of BJI's revenue is contributed back to the City of Busselton into the preservation and maintenance of the Jetty, in 2021/22, \$727,173 was contributed to the Jetty Maintenance Fund . The annual cost to maintain the Jetty is \$1.1 million. In addition to the 25% of BJI annual revenue goes to the ongoing maintenance and preservation of the Jetty, an additional contribution of 3% profit is made to the Busselton Jetty Environment Foundation towards marine conservation and environmental imperatives.

Today with over 700 members and 45 staff, BJI is responsible for running the commercial operations on the Jetty under a 42-year licence agreement with the City of Busselton. The City of Busselton has been appointed land reserve managers of Reserve 46715 by Department of Transport and operates Busselton Jetty as a private jetty under a State Management Order. Busselton Jetty has been listed on the Heritage Council of WA's Register of Heritage Places, Database Number 423 since November 2003.

The marine ecosystem beneath the Busselton Jetty structure is anecdotally known as one of Australia's greatest artificial reefs, where colonisation and succession of marine invertebrates has taken place on the jetty piles. The oldest parts of the jetty structure remaining today are over 50 years old. The jetty piles are predominantly made of mixed hardwood; however, some newer parts of the structure have been constructed using steel piles. Over 300 marine species are found beneath the jetty in a surface area of approximately 23,000 m².

Outline of Environmental Management and Monitoring Plan (EMMP)

This EMMP for the BJI Undersea Objects Project aims to consolidate the mitigation and management measures that BJI are committed to implementing to minimise any potential impacts on the environment, during the construction, installation and long-term operation of the Busselton Jetty. It is expected that as the project progresses, additional details will be incorporated into the EMMP as further subject matter experience is provided to the organisation.

Project Description

BJI have been undertaking work on the Undersea Sculpture Reef since 2019, completing background research and proceeding with permits and approvals required for the installation of objects on the seabed of Reserve 47615. The Sculpture Reef will contain a maximum of 13 objects placed on the seabed around the northern end of Busselton Jetty to be installed in April 2023. This installation is being guided by BJI's Sea Dumping Permit conditions as issued by the Australian Government's Department of Climate Change, Energy, Environment and Water (DoAWE 2021). The project is in response to customer survey results for the suggestion for building reef structures, including 'artistic' elements at the end of the Jetty to enhance both the visitor experience and the marine structural habitat of the Busselton Jetty. BJI's Undersea Sculpture Reef will incorporate a mix of themed objects including:

1. Artistic elements (Figure 1); and
2. Australia's maritime heritage (Figure 2)



Figure 1. Artistic Elements – example from <http://seasirensdesign.com>

BJI's Undersea Sculpture Reef will provide a variety of additional underwater habitats for sessile and mobile marine life adding to the habitat provided by the existing jetty structure and historical debris on the seabed. The Undersea Sculpture Reef will also provide interesting viewing opportunities for divers and snorkellers by providing themed and artistic installations beneath the northern end of Busselton Jetty.

BJI's Undersea Sculpture Reef Project Goals are to:

- 1) Manage the installation of undersea objects beneath Busselton Jetty in such a manner to minimise any risks or impacts to existing jetty structure or user groups, such as divers, swimmers, or recreation vessels.

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- 2) Minimise identified impacts to existing ecological sustainability and marine biodiversity, whilst improving the existing anthropogenic habitat to support increased diversity and abundance of species while improving the knowledge base of the environmental role of artificial structures in the marine environment.
- 3) Enhance visitor connection to the marine environment by providing a unique facilitation through object installation and point of contact in the Underwater Observatory to achieve a personal nature-based experience.

UNDERSEA SCULPTURE DETAILS

One sculpture object was previously commissioned by Shorewater Marine for deployment and has been in storage since 2020 at Port Geographe Marina. A replica of the SS Pericles – a 4mx3m steel shell in the shape of the Steam Ship Pericles which was wrecked in the Capes region in 1910 (Figure 2. Text Box). The vessel ‘hull’ will contain a granite ballast to provide additional anchorage to the object.

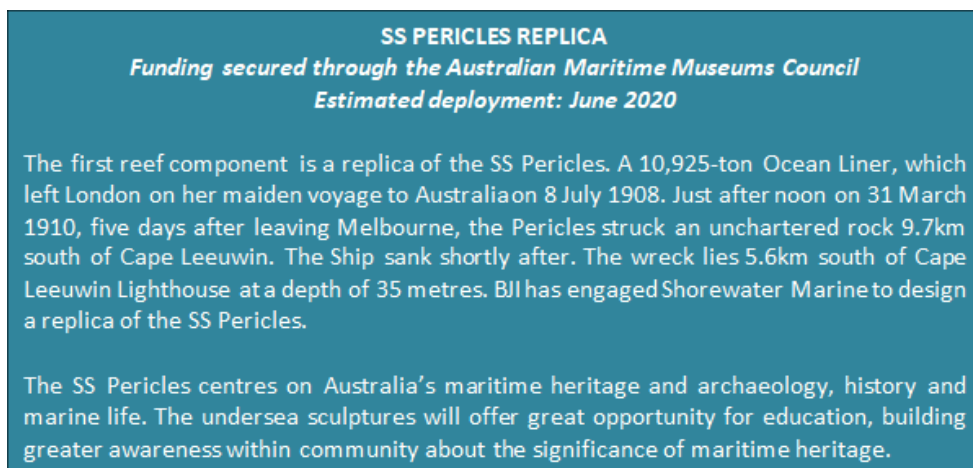


Figure 2. Text box. Historical description of the SS Pericles and BJI’s commissioning of a replica.

Objects 2-13 were designed as part of a competitive Expression of Interest (EOI) selection process, with artists submitting their concept designs to BJI. Concept designs were assessed by a panel which included BJI’s CEO, BJI’s Environment Manager, BJI Board Member and City of Busselton Cultural Officer. Concept designs were required to meet the following criteria;

- 1) Minimum object size and weight (estimated to be minimum 1.5m² and 1 tonne).
- 2) A design life of 30 years.
- 3) Stabilisation features, such as a scour skirt or internal ballast, to prevent sliding of the object across the seabed during periods of sustained high wave action, or embedment into to sediment.
- 4) Specifications on materials ensuring material stability and integrity of objects.
- 5) Vertical relief, interstitial space, and surface rugosity.

Busselton Jetty Undersea Object Installation

Design and Materials

Following the 2 stage EOI process, 12 additional sculptures were selected to progress to detailed design and construction for deployment at the DCCEE approved sea dumping site. Successful artists all showed experience in designing large outdoor art pieces within the specified materials range and some artists had further experience in designing sculptures specifically as artificial reef objects. Final sculpture designs include interpretations of marine life such as a Fish, Stingray and Octopus, as well as marine heritage objects including a Lighthouse and Postmaster. Materials to be used in sculpture fabrication are marine grade concrete, steel, ceramic and bronze. These materials are suitably inert in the marine environment (GSMFC 2019) and currently exist at the site in other artificial structures. Sculpture details and materials are detailed in Appendix A. Each sculpture has an individually designed independent anchorage system enabling sculptures to remain structurally separate from the jetty structure and also each other. Further, a separate cathodic protection system to isolate conductivity between the undersea sculptures from the jetty structure while providing corrosion protection to the sculptures has been designed for installation as part of the project. To prevent increased corrosion rates of both the steel jetty piles and undersea sculptures due to presence of dissimilar metals, mild steel has been chosen as the material over marine grade stainless steel.

Any variation to approved design specifications must be reported to the Department of Environment and Energy prior to commissioning and deployment.

Wave parameters for a 1/100 average recurrence interval at the seaward end of the jetty have been previously calculated by GHD (GHD 2009) and are shown in Table 1. Anchor design for each sculpture has been designed for the object to remain stable under modelled wave conditions with 200-year average recurrence interval by Westpeak Engineering and are shown in Table 2. This modelling includes a 0.47m allowance for sea level rise (Attachment A/).

Table 1. Average wave parameters for Busselton Jetty, showing maximum wave height and wave period calculated by GHD.

GHD Average Wave Parameters for Busselton Jetty 1/100 ARI							
	1	5	10	20	50	100	200
H _{max} (m)	3.88	4.50	4.50	4.65	4.81	4.96	6.10
Period (sec)	12.6	13.5	13.7	13.9	14.6	14.8	14.8

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Table 2. 1/200 ARI wave maximum wave height and wave period calculated by Westpeak Engineering with a 0.47m allowance for sea level rise.

Westpeak Average Wave Parameters for Busselton Jetty 1/200 ARI							
	1	5	10	20	50	100	200
H _{max} (m)	-	-	-	-	-	-	6.70
Period (sec)	-	-	-	-	-	-	15.6

Collaboration and Subject Matter Experts (SME's)

BJI's unique organisation structure and geographical location has meant the organisation has needed seek professional marine advice and services to deliver world class marine tourism products. Services have been sought and relationships built with Westpeak Engineering, O2 Marine consultancy, Shorewater Marine Commercial Diving, SMC Marine and Subcon Blue Solutions. BJI has the capability to ensure the suitability of object selection and installation with extensive site surveys and wave loading assessments that will be incorporated into the design of individual objects. Additionally, several of the successful artists have experience in creating and deploying sculptures in the marine environment and this prior experience and expertise has been utilised during project development. It is a requirement of BJI's contractor engagement that contractors operate under a HSEQ policy framework with waste management plan, which will be the standard expected in this project.

BJI's Environmental Manager/Marine Scientist has been the main source of local and site-specific biodiversity information in consultation with University of Western Australia, Murdoch University, RecfishWest and O2 Marine who have staff with specialised knowledge in artificial structures. A research trip to the Museum of Underwater Art in Townsville was undertaken and knowledge sharing with Reef Ecologic is in place.

Undersea Object Location

Undersea objects will be deployed onto the seabed, beneath Sections 7, 9 and 10 of Busselton Jetty in an area approximately 200m x 20m at the northern end of the jetty (see Figure 3). The centre point of this location is approximately 1.8km offshore in a northerly direction from the Busselton townsite at 33°37'47" S and 115°20'18" E. This area is within the Ngari Capes Marine Park; however, the Busselton Jetty Sanctuary Zone does not include the Jetty Management Reserve 47615. Crown Reserve 47615 is inclusive of the waters and seafloor under and around the jetty to a distance of 20 metres from the surveyed centre line of the jetty. BJI has a close working relationship with the State park managers, Department of Biodiversity, Conservation and Attractions and Department of Primary Industry and Regional Development (Fisheries) and will work closely with these departments to ensure values of the marine park remain intact. The Department of Transport will be notified of the object installation for inclusion on navigational maps. It is notable that this section of Busselton Jetty currently has a seasonal closure for boating in the summertime for marine safety of swimmers and divers. The sculptures will rest at a maximum depth of 8 metres, with an overwater clearance of 5m at low tide. The seabed beneath Busselton Jetty consists of coarse sand,

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littered with jetty rubble and sections of an old lighthouse. Much of the unstable debris was cleared during a recent structural refurbishment which was completed in 2011. Seabed areas adjacent to Busselton Jetty's land reserve consist of dense *Posidonia* and *Amphibolis* seagrass beds with irregular limestone outcrops and so installation of objects will remain on sand areas within the existing land reserve (Figure 4). Within the permitted area (DoAWE 2020), sculptures will be situated towards the predominant wave. at an angle of 330° (Figure 5/Appendix B)

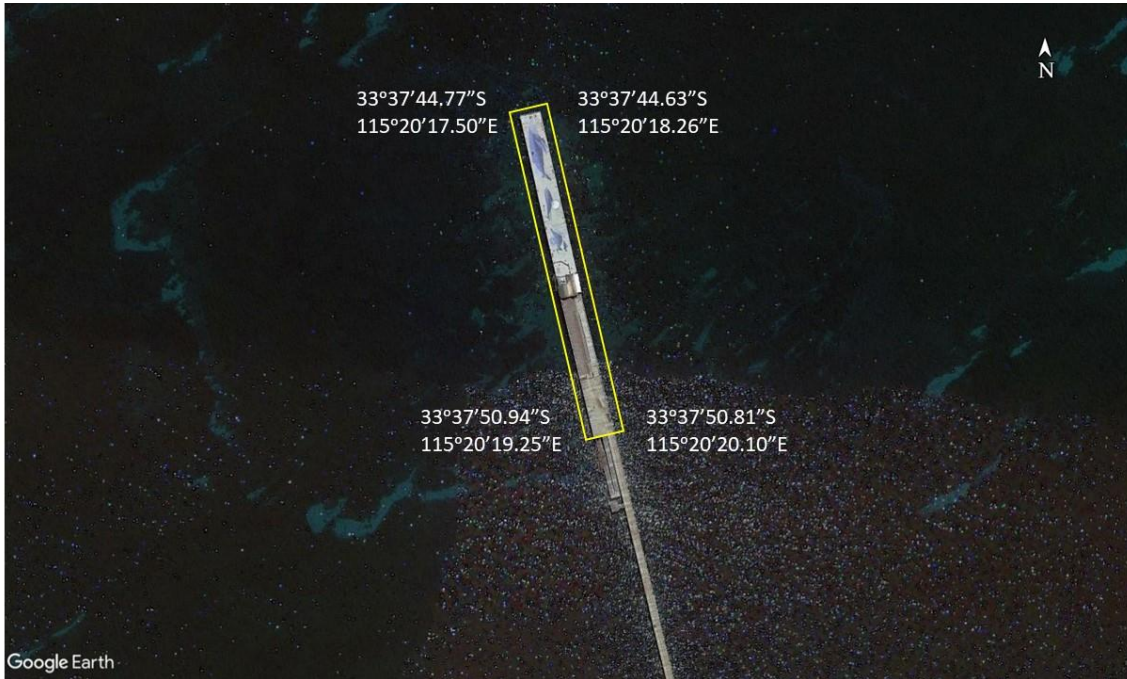


Figure 3. Site of Busselton Jetty and module location (Map from Google Earth 2017)

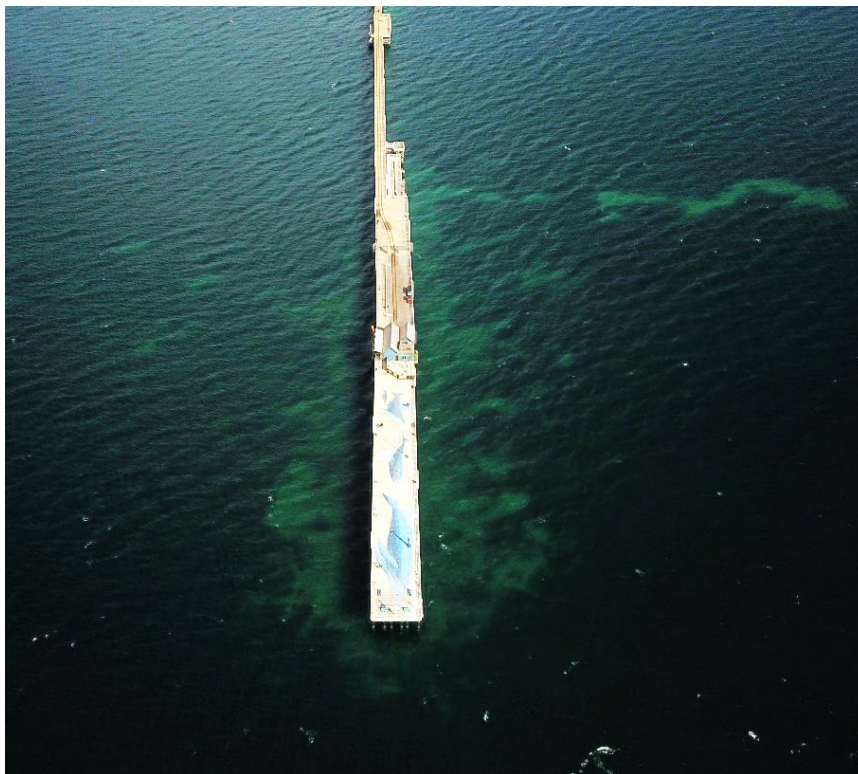


Figure 4. Seagrass meadows adjacent to the Busselton Jetty reserve. Image by BJI

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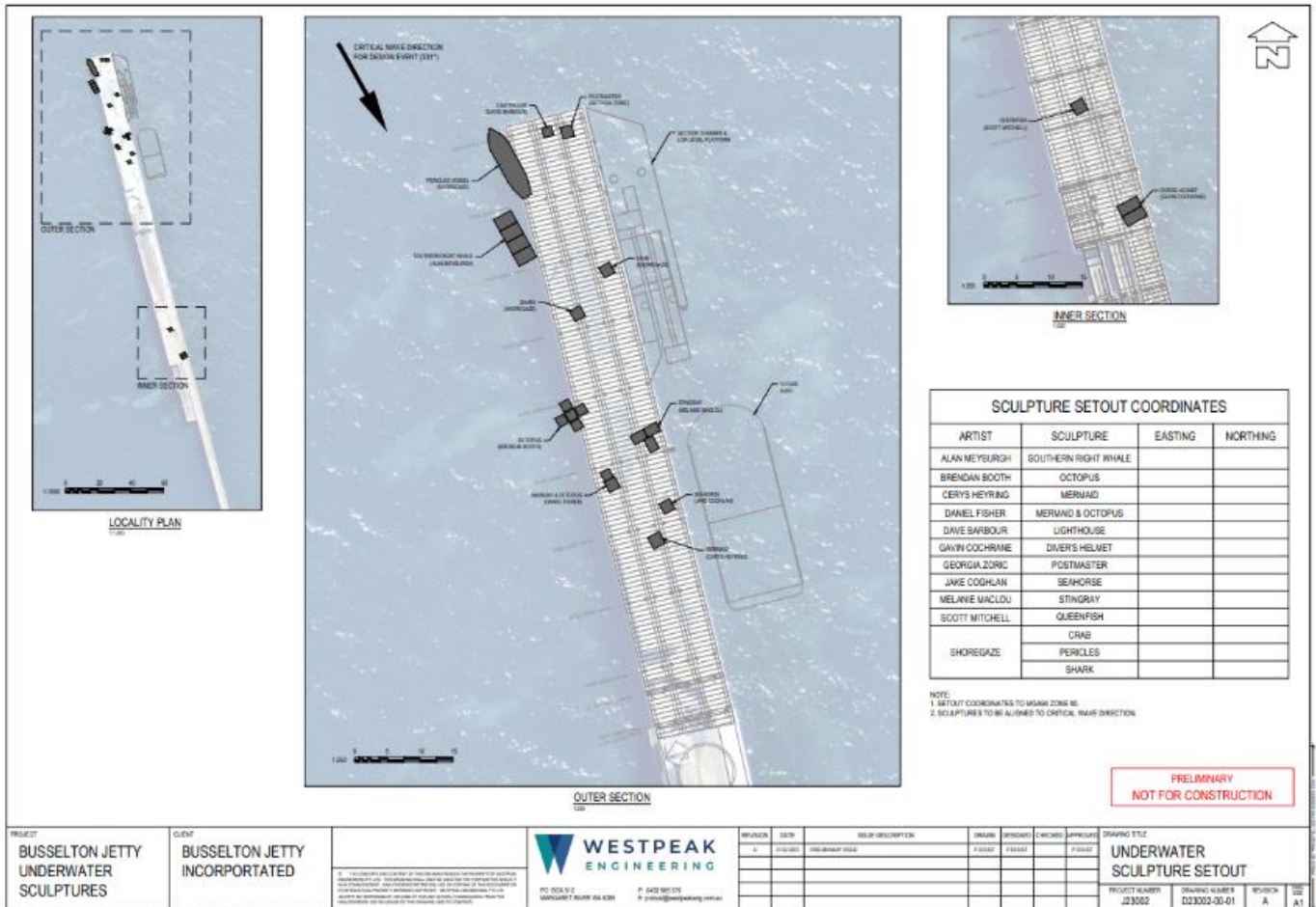


Figure 5. Underwater Sculpture Reef layout, showing proximity to Jetty structure and Underwater Observatory, all objects are placed at 330° facing towards significant wave direction. Full sized map is shown in Appendix B.

Logistics

Construction of Undersea Sculptures project will take place at various dedicated workshop and yard locations, depending on the agreement with the chosen contractor or commissioned artist. These workshops are all located between Perth and Margaret River in Southwest Australia. Each sculpture will be transported by road to a secure laydown area in Busselton at the Port Geographe Marina prior to deployment (Figure 5). Port Geographe Marina is easily accessible from a number of established road routes and has sufficient services to facilitate marine transport and construction. Transport from the laydown area to the deployment site at the end of the jetty will be through one of 2 methods, 1) Small crane barge or 2) Floatation with lift bags. Both transport and deployment methods will be undertaken by the chosen installation contractors and these methods will allow for accurate deployment of individual objects beneath the jetty structure. The deployment route from Port Geographe Marina to Busselton Jetty is shown in Figure 7. It is expected that object deployments will take place during April-May 2023

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During days of object installation an exclusion zone no less than 50m will be in place. Due to the size limitations of the proposed area, GPS coordinates alone will not be sufficient for the accurate placement of objects beneath the jetty structure and contractors, in collaboration with BJI, will need to engage site surveys and local mapping to ensure accurate placement of objects within the permitted area.



Figure 6. Location of the laydown area at Port Geographe, which will be used as a laydown area for object delivery prior to deployment (Google Maps 2023).

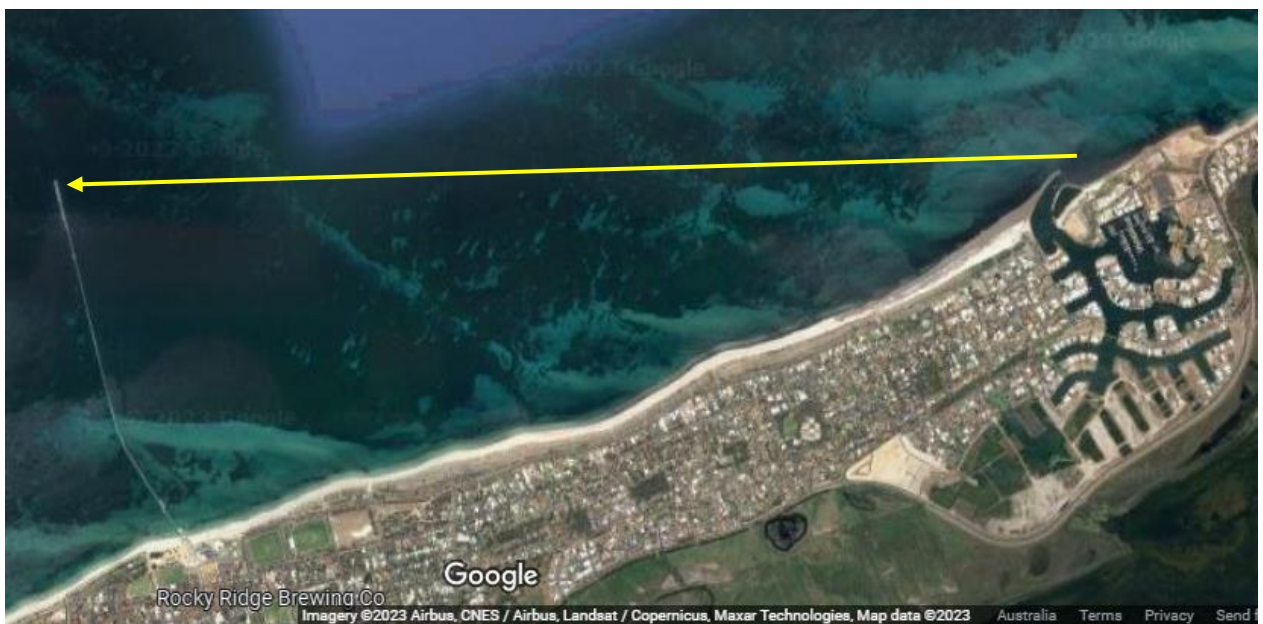


Figure 7. Marine traffic route from Port Geographe Marine to Busselton Jetty for undersea sculpture transportation (Google Maps 2023).

Cetacean/Pinnipeds/Turtle interaction procedures

In line with the EPBC Act and existing regulations, if at any time during deployment and operations activities, a close observation occurs involving Cetaceans, Pinnipeds or Turtles work will cease immediately until the animal/s have moved on from the work area.

- Any incident involving these species must be immediately reported to the Department of the Agriculture Water and Environment in writing;
- Adherence to the Environment Protection and Biodiversity Conservation Regulations when towing or operating any other vessels (below)

1. The regulation applies: (a) to a person who is operating a vessel that is not a prohibited vessel; and (b) in relation to cetaceans other than calves. Note Regulation 8.06 contains special provisions for calves.

2. Within the caution zone (caution zone, for a cetacean, means an area around the cetacean with a radius of: (a) for a dolphin — 150 metres; and (b) for a whale — 300 metres.) for a protected marine species to which the regulation applies, the person must:

- Operate the vessel at a constant speed of less than 6 knots and minimise noise;
- Make sure the vessel does not drift or approach closer to the cetacean than: (i) for a dolphin — 50 metres; or (ii) for a whale — 100 metres;
- If the cetacean shows signs of being disturbed, immediately withdraw the vessel from the caution zone at a constant speed of less than 6 knots;
- If there is more than 1 person on the vessel, post a lookout for cetaceans;
- subject to paragraph (b), approach the cetacean only: (i) from the rear, no closer than 30 degrees to its observed direction of travel; or (ii) by positioning the vessel ahead of the cetacean at more than 30 degrees from its observed direction of travel;
- Make sure the vessel does not restrict the path of the cetacean;
- Make sure the vessel is not used to pursue the cetacean.

For Pinnipeds and Turtles, the interaction procedure will be implemented as for dolphins.

Management and Environmental Monitoring

Scope

The proximity of the proposed underwater sculptures to the shore and ease of access to the water from the jetty provides a unique opportunity for monitoring the condition and environmental impact of the object installation.

An intensive 2-3 year monitoring plan will be implemented, which will include photo and video monitoring of the reefs to determine invertebrate and fish colonisation to the objects. Objects which are installed at a later time, as they are obtained by BJI, will all initially undergo this initial intensive monitoring following deployment. Environmental monitoring of the undersea objects will become an extension of BJI's existing marine environment

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monitoring programs. Annual condition inspections of the objects will also be undertaken to assess their stability, settlement and structural condition. Condition inspections will also occur following periods of sustained high seas and winds in excess of 100km/hr, which is expected to occur in the winter period. This monitoring schedule is in line with City of Busselton damage assessments carried out following a severe winter storm. The condition monitoring will continue until either the objects naturally degrade, are removed from the water, or determined to be structurally stable for a longer amount of time.

While BJI will drive the monitoring program, community involvement will be crucial to the program's success. University and Adventure Dive Clubs, Jetty Crew Divers and interested locals will all be able to participate in the monitoring program at different stages. And due to its ongoing nature, participants will be able to have a long involvement in the project should they wish.

The data collected during the monitoring programs duration will be a valuable addition to the available knowledge of Western Australia's marine life and the position of 'artificial reefs' in the marine environment. Currently, there are many knowledge gaps in this emerging area of science.

Performance Measures

The overall effectiveness and success of the undersea objects at Busselton Jetty can be assessed by measuring visitor user satisfaction, ongoing structural integrity and positioning of objects and the net potential environmental benefits vs impacts (i.e. what are the extent of any impacts vs the benefits of new habitat and ecosystem creation). If the project proposal was shown to not meet objectives and/or to have significant negative environmental impacts, then the appropriate action to be taken would be to cease the installation of any further objects at Busselton Jetty, and in conjunction with DoEE explore removal of deployed objects if it was considered to alleviate further environmental harm.

This project will be considered successful based on three measurable objectives which ultimately seek to address the success of the proposal in meeting the identified Project Goals:

Project Goal #1:

Appropriately design and manage the installation of undersea objects beneath Busselton Jetty in such a manner to minimise any risks or impacts to existing jetty structure or user groups, such as divers, swimmers or recreation vessels.

Performance Measure #1

Structural integrity and stability: each individual object remain intact, in original position and structurally sound throughout its life (30 years);

Project Goal #2:

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Minimise identified impacts to existing ecological sustainability and marine biodiversity, whilst improving the existing anthropogenic habitat to support increased diversity and abundance of species while improving the knowledge base of the environmental role of artificial structures in the marine environment.

Performance Measure #2

Fish and benthic community development residing and colonising the objects: public viewing of marine life which has colonised the objects will connect people with the marine environment. It is expected that community development on and immediately nearby will be very similar to the existing marine community which has colonised the Busselton Jetty structure.

Project Goal #3:

Enhance visitor connection to the marine environment by providing a unique facilitation through object installation and point of contact in the Underwater Observatory to achieve a personal nature-based experience.

Performance Measure #3

Community and visitor experience: the deployment of the undersea objects will result in public satisfaction reflected by increased marine education and knowledge, higher visitation rates and ongoing positive feedback.

Monitoring Objectives

As per the above Performance Measures for the success of BJI's undersea object deployment, monitoring objectives are based upon the categories of physical, social and biological are set out below in Table 2. Monitoring methodologies for each monitoring objective is set out in Table 3. As this monitoring program will become an extension of BJI's existing marine monitoring program, funding for the extended monitoring objectives will be provided for through the organisation's Environment Fund.

Table 2. Monitoring objectives are identified below against three categories

Monitoring Category	Monitoring Objectives
Physical	<ul style="list-style-type: none">• Asses deployed object stability & structural integrity
Social	<ul style="list-style-type: none">• Assess the effectiveness of the object deployment in terms of popularity with and feedback from visiting tourists and local community
Biological	<ul style="list-style-type: none">• Record the colonisation of deployed objects & overall community development• Assess and investigate movements and occurrence of threatened/protected & migratory species within the reef management area• Measure for invasive species settlement

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Table 3. Monitoring objectives and corresponding methodologies and timeframes.

Monitoring Category	Monitoring Objectives	Timeframe
Asses deployed object stability & structural integrity	<ul style="list-style-type: none"> • Visual inspection by divers conducted minimum of 4 times/year; these surveys will allow a thorough assessment of each object to document stability and integrity, investigate seabed characteristics including any scouring or deposition, monitor any obstructions 	Incorporated as regular annual inspection program set annually and following severe storm events.
Assess the effectiveness of the object deployment in terms of popularity with and feedback from visiting tourists and local community	<ul style="list-style-type: none"> • Visitor surveys to be amended to include questions on undersea objects to assess user engagement. Conduct local information sessions on project and short-term monitoring results to engage local community response. 	At next annual review of Visitor Surveys following object deployment. Public forum sessions to be held after Year 1 monitoring complete. Analysis of visitation data
<ul style="list-style-type: none"> • Record the colonisation of deployed objects & overall community development • Assess and investigate movements and occurrence of threatened/protected & migratory species within the reef management area • Measure for invasive species settlement 	<ul style="list-style-type: none"> • Implement site monitoring focussed on changes in species cover of benthic species and overall biodiversity. Include photo log monitoring of representative colonies at fixed locations • Report all sightings of threatened species to DBCA • Monitor for the colonisation of marine pests, and make image data available to SME's (Fisheries Biosecurity unit) 	Quarterly surveys every 12 months for 2/3 consecutive years and then monitoring timeframes will be reviewed.

Monitoring of Marine Community Development (including Invasive Species)

The marine environment beneath Busselton Jetty is characterised by the processes of colonisation and succession of marine invertebrates which has taken place on the jetty piles. Beneath the jetty, there are both structural and non-structural piles, which have been preserved to conserve the marine life which has colonised them. Over 300 different marine species have been recorded beneath Busselton Jetty. The invertebrate community is complex and consists of many species of sponges, hydroids, bryozoans, corals, flat worms, polychaetes, molluscs, crustaceans, echinoderms and ascidians. Consequently, the diversity of fishes utilising this habitat includes both residential reef and migratory pelagic species. The proposed undersea objects will provide additional structure on the seabed for propagules and larvae from the existing mature colonising organisms to colonise the bare habitat.

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Divers will undertake quarterly photographic monitoring to measure the settlement of organisms onto the undersea objects (Figure 7.), and record data on the fish assemblages observed in the immediate vicinity of the individual objects.

Monitoring for invasive species impacts will form a part of the community development monitoring. Using the same diver photography methods, any suspected colonies of identified marine pests will be photographed, location noted, and data sent to DPIRD's Biosecurity (Fisheries) team for formal identification and advice on actions to take. New larval settlement onto the undersea objects can potentially also include settlement of non-indigenous invasive species. Non-indigenous invasive species are by their nature opportunistic and can take extreme advantage of favourable conditions to colonise a new area of habitat quickly. Of note is the invasive ascidian, *Didemnum perlucidum*, a benthic form which favours warm conditions and will quickly overgrow and smother organisms, eventually becoming the dominant organism in the ecosystem. Although only recently observed in West Australia, it has spread quickly from the Hillary's Marina, through the Swan River and down to the Port Geographe Marina, so it is not unlikely that this pest could be transferred to the Busselton Jetty ecosystem. The European fan worm (*Sabella spallanzanii*) has already been observed in the Busselton Jetty ecosystem although in low numbers. Both species are likely to have been introduced to Geographe Bay via shipping/boating activity.

Monitoring of Object Stability and Structural Condition

Monitoring of the stability and structural condition of the deployed undersea objects will be undertaken to determine each objects stability and structural condition. Visual diver inspections will inspect for material faults, degradation and visible damage. Suitable maintenance, repairs or removal of objects will ensue following the reporting of damage or faults in an object. These surveys will be completed on a quarterly basis, the dates of which will be set as part of the annual monitoring program as well as following a severe storm event where waves are forecast to be above 3 metres. This maintenance schedule will enable determination of the suitability of a type of object to adequately withstand the sea conditions surrounding Busselton Jetty as designed.

The inspection checklist includes:

Date and type of observation conducted, location and description of faults identified including significant scouring or sedimentation; object damage including cracks, splits or breakages and the site location. A list of proposed actions to be undertaken (if any) which may include the contracting of third-party assessment, repairs or maintenance.

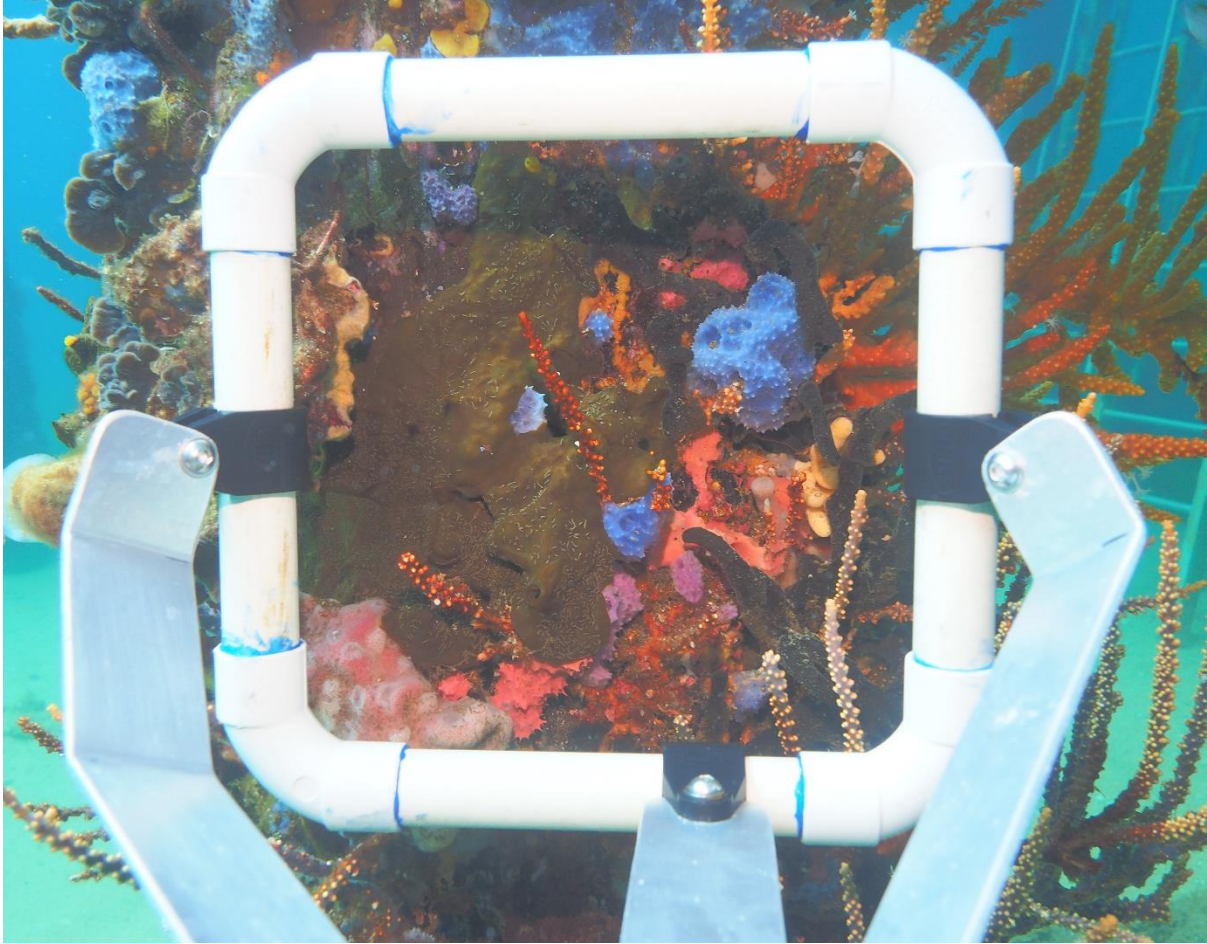


Figure 7. Example of photo quadrat from BJI's existing monitoring programs

Monitoring of Social Impact

Community involvement and acceptance of BJI's initiatives has proven importance in demonstrating project success and fostering community ownership of the asset at Busselton Jetty. BJI's undersea objects project will create opportunities for the community for social inclusion, ownership and to participate in marine research.

As the undersea objects project has arisen as a result of some 2000 visitor surveys, this survey system will be amended to include questions on end user acceptance and engagement with the project. Surveying both direct users and non-users will enable BJI to adapt the project as the deployment of objects evolves towards the maximum 13 objects in order to facilitate better user engagement where surveys indicate it is lacking.

BJI also assesses in detail its visitor numbers and this existing analysis can be extended to collect data on the visitor numbers particular to those viewing the undersea objects. All visitation and survey data is publicly available in BJI's annual report, published in October each year for the Annual General Meeting.

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Community participation in the biological monitoring of marine life colonisation processes will be enabled by participation from university and adventure Dive Clubs, Jetty Crew Divers and interested locals who will all be able to participate in the monitoring program at different stages. And due to its ongoing nature, participants will be able to have a long involvement in the project should they wish.

Monitoring of Threatened and Protected Species

Several species of national significance are known to occur within the waters of Busselton Jetty. Significant species to note are the Loggerhead Turtle (*Caretta caretta*), Green Turtle (*Chelonia mydas*), Leatherback Turtle (*Dermochelys coriacea*), Weedy Sea Dragon (*Phylloteryx taeniolatus*), Widebody Pipefish (*Stigmatopora nigra*) and Australian Sea lion (*Neophoca cinera*). Geographe Bay is also a known path for migratory cetaceans including Humpback (*Megaptera novaeangliae*), Southern Right (*Eubalaena australis*) and Blue whales (*Balaenoptera musculus*). There are several species of seahorses and pipefish which are possibly found in nearby waters, but these distributions have not been confirmed with actual sightings. Potential impacts to the seagrass meadows could affect the presence of turtle species nearby the jetty and the loss of habitat and reduction in food availability beneath Busselton Jetty could affect local individual of the seahorse and pipefish families.

Monitoring of threatened and protected species during object deployment will primarily take place via visual watch surveys conducted from the vessel on the water in conjunction with subsurface observations from commercial divers.

Protected species monitoring and data collection will be undertaken at the same time as the physical and biological monitoring to maximise opportunity for sighting protected species within the permitted area. Public reports of the above species will also be reported to DBCA, as per BJI's current sightings procedures.

Contingency Measures

Emergency contacts and response

If at any time during the deployment or operation of Busselton Jetty's Undersea Objects an environmental risk/incident occurs, BJI will immediately implement measures to mitigate the risk or the impact. Measures may include but are not limited to decommissioning procedures. The situation will be reported in writing within 24 hours to Department of the Environment and Energy (and any other relevant Government Agency or Authority) detailing:

- i) the environmental incident that occurred and/or 'non-compliance' detected;
- ii) mitigation measures taken, and;

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iii) The success of these measures to address the environmental incident and/or ‘non-compliance’ and any additional measures that are proposed to be taken.

Emergency contacts:

Primary:

Busselton Jetty Environment Manager

Ph: (08) 9754 0900 (office hrs)

Email: uwo@busseltonjetty.com.au

Secondary:

City of Busselton

Ph: (08) 9781 0444 (Switchboard 24 hrs)

Other relevant emergency contacts include:

- i) Wildcare Helpline – (08) 9474 9055
- ii) Fisheries Watch - for reporting illegal fishing – Ph: 1800 815 507
- iii) For ALL other emergencies (WA Police, Fire, & Ambulance) – Ph: 000

Decommissioning of Objects

The operational lifespan of BJI’s Undersea Objects project is expected to be 30 years. This timeframe fits within BJI’s current operational License Agreement with the City of Busselton to operate the tourism businesses at Busselton Jetty. However, it is anticipated that the operational life of the objects would be much longer than this, given appropriate design and engineering during an object’s design phase.

Decommissioning of objects will only be considered if significant negative environmental impacts arise. There must be strong supportive information to suggest that removing an object from the water is the best course of action. It is BJI’s preference that once deployed, objects will remain on the seabed at least for the duration of their life.

Determination of whether an object should be dismantled or removed would be dependent on the stability and condition monitoring of objects as part of the monitoring program prior to removal and will consider the following options;

Option 1 – Objects would remain in-situ on the seabed and be allowed to gradually break-down over time. Monitoring of the objects condition would continue;

Option 2 – If an object is unable to be removed intact, it may be possible to be dismantled or section the object in-situ by commercial divers, with sections either lifted onto a vessel or the jetty for road based transport to be disposed of at an appropriate land-based facility;

Option 3 – If an object is deemed in good condition for removal, a commercial dive team will be mobilised to lift bag the object out of position to be towed to the Scout Road Jetty at the shore for removal using a crane

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The above three options allow for the decommissioning of undersea objects at any stage of the project and its operational life. Should an unacceptable environmental impact be detected then Option 2 and 3 would be the most likely method of decommissioning. The main environmental impact of removing an object would be the loss of attached organisms if it had been submerged for a length of time and would be considered as a failure in project outcomes. A further assessment of environmental impacts of leaving the object in place versus removal would be necessary to determine the most suitable option to progress.

Project Reporting

Project milestones will be communicated to public mostly through social media, newsletter and local print and digital media outlets. Information will also be published in BJI's Annual Report. Final results of the data collected from the monitoring objectives will be available from BJI upon request at the conclusion of the monitoring period. BJI will also provide the DCCEW with a written report following the deployment of objects as per current permit conditions (DoAWE 2021)

Further reports can be provided upon request to relevant authorities.

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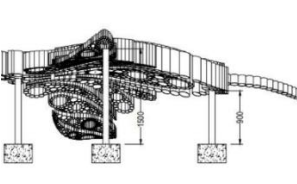



Attachment A: Undersea Sculptures Anchoring Design

Environmental Management and Monitoring Plan – Undersea Sculptures

Appendix A: Underwater Sculpture Details

Sculpture Name	Image	Materials	Dimension (m)	Weight (T)
SS Pericles replica			4x3	3
Queen of the Bay		Welded/ bolted mild steel	3.5x3	2
Divers Helmet		Welded/ bolted mild steel	3x3	2.5
Lighthouse		Welded/ bolted mild steel	1.5x2.8	1.5
Ophelia Octopus		Marine grade concrete	4.5x1.5	13

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Postmaster		Ceramic outer with solid grout fill	1.2x2.8	2
Mermaid		Bronze with mild steel frame tail	2x2	2
SR Whale		Welded/ bolted mild steel	9.5x3	2.5
Stella Stingray		Welded/ bolted mild steel pipework	6x3	3
Mermaid and Octopus	Image not available	Welded/ bolted mild steel	3x2	2
Seahorse		Welded/ bolted mild steel	1x3	1.5
Crab		Welded/ bolted mild steel	2.5x1.5	1.5
Shark		Welded/ bolted mild steel	2.5x1.5	1.5

Appendix B: Underwater Sculpture Reef layout

