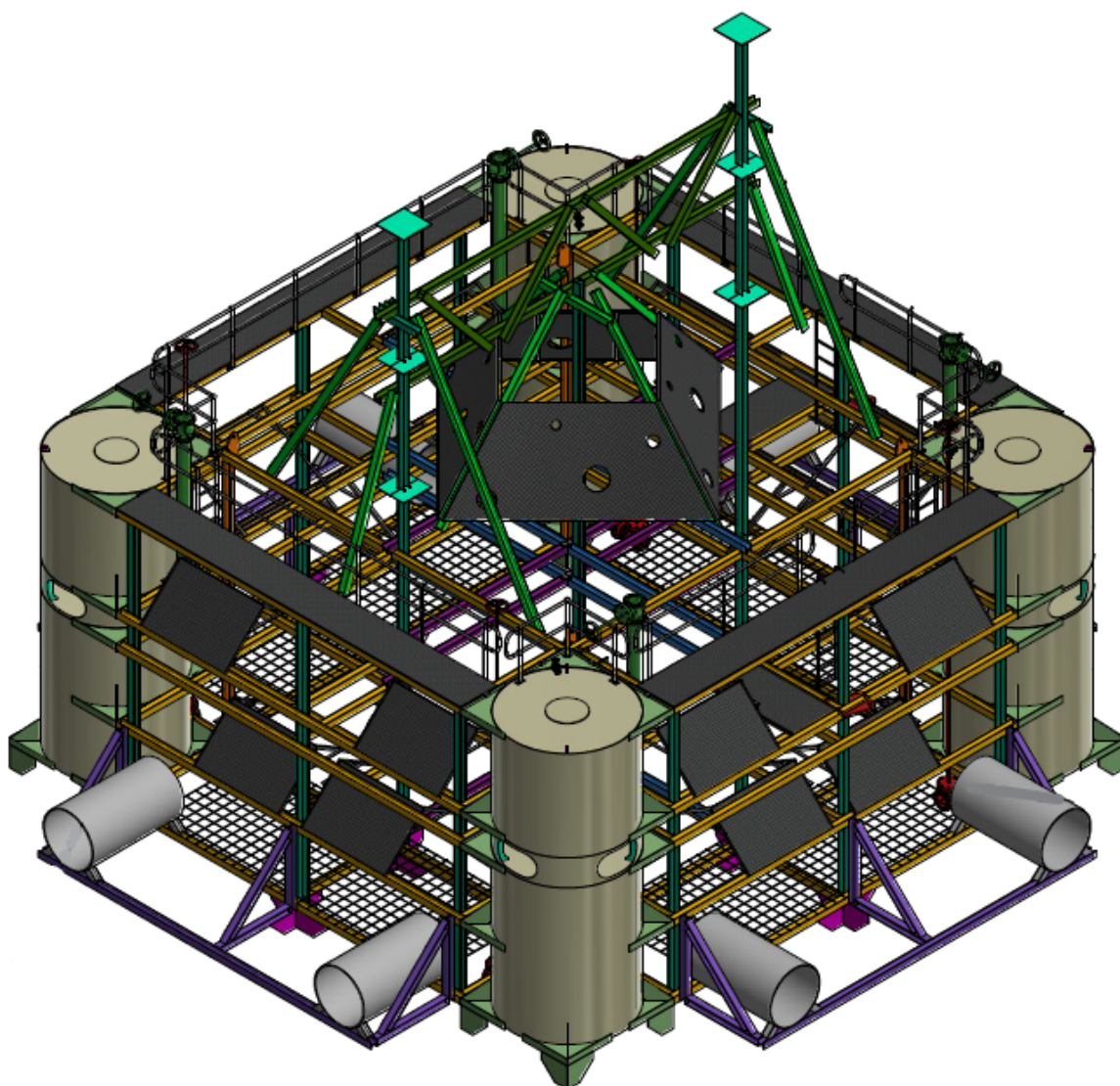


Long Term Management Plan

Coffs offshore artificial reef



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Table of Abbreviations

ABN	Australian Business Number
BRUV	Baited Remote Underwater Video
BRUVS	Baited Remote Underwater Video Survey
DCCEEW	Department of Climate Change Energy Environment and Water
DPIRD	Department of Primary Industries and Regional Development
EAC	East Australian Current
GPS	Global Positioning System
GST	Goods and Services Tax
LAT	Lowest Astronomical Tide
LTMP	Long Term Management Plan
NSW	New South Wales
OAR	Offshore Artificial Reef
ORRCA	Organisation for the Resc <u>ue</u> and Research of Cetaceans
RFT	Recreational Fishing Trust
ROV	Remotely Operated Vehicles
WGS84	World Geodetic System 1984

Introduction

The NSW Department of Primary Industries and Regional Development (DPIRD) is seeking to expand the success of its fisheries enhancement program with the placement of an offshore artificial reef (OAR) off the Coffs coast, within New South Wales (NSW) State waters. Two new, purpose-built steel artificial reef structures are proposed.

The chosen design is proven at other OAR sites in NSW and was developed by naval architects, coastal engineers and biologists to create high quality marine habitat and resist sliding and overturning forces during 1/100 year storm event conditions. Each structure has a footprint of 15.6 x 15.6 m and a height of 12 m and will weigh a minimum of 48 tonne. The OAR structures will be placed ~500 m apart. The structures will be placed perpendicular to the East Australian Current (EAC).

The Coffs OAR proposal is not considered to have any significant impact on any social, cultural or environmental matters.

NSW DPIRD is committed to the implementation of this LTMP to monitor and appropriately mitigate any unintended impacts.

The purpose of the LTMP

The purpose of the long term management plan (LTMP) is to ensure that the offshore artificial reef (OAR) structures remain viable over the long-term and do not become an environmental or safety hazard. This LTMP focuses on monitoring to identify potential problems before they occur so that effective and achievable management measures can be implemented.

The key elements of the reef

There are no repurposed materials used in the Coffs OAR design. The Coffs OAR project utilises an engineered, purpose-built design and placement methods which have been proven over six successful deployments off the Eurobodalla, Forster and Terrigal coasts. All six structures have exceeded expectations in their ecological development and withstood significant storm events since deployment. The design incorporates the following features:

- Two new, purpose-built steel artificial reef structures.
- Each structure will have a footprint of 15.6 x 15.6 m and a height of 12 m and will weigh a minimum of 48 tonne.
- Large structural beams will provide complexity and structural integrity.
- Proven design, developed by naval architects, coastal engineers and biologists to create high quality marine habitat and resist sliding and overturning forces during 1/100 year storm event conditions.
- The OAR structures will be placed ~500 m apart. The structures will be placed perpendicular to the East Australian Current (EAC). Large structural beams will provide complexity and structural integrity.
- Large permeable base allowing for benthic foraging and minimise soft sediment disturbance during deployment.
- Tall profile (bait towers) to attract bait and pelagic fish.
- Open skeletal base structure ideal for sand substrate environment.
- Structural complexity of steel beams and plates for the enhancement of variety of habitat types.

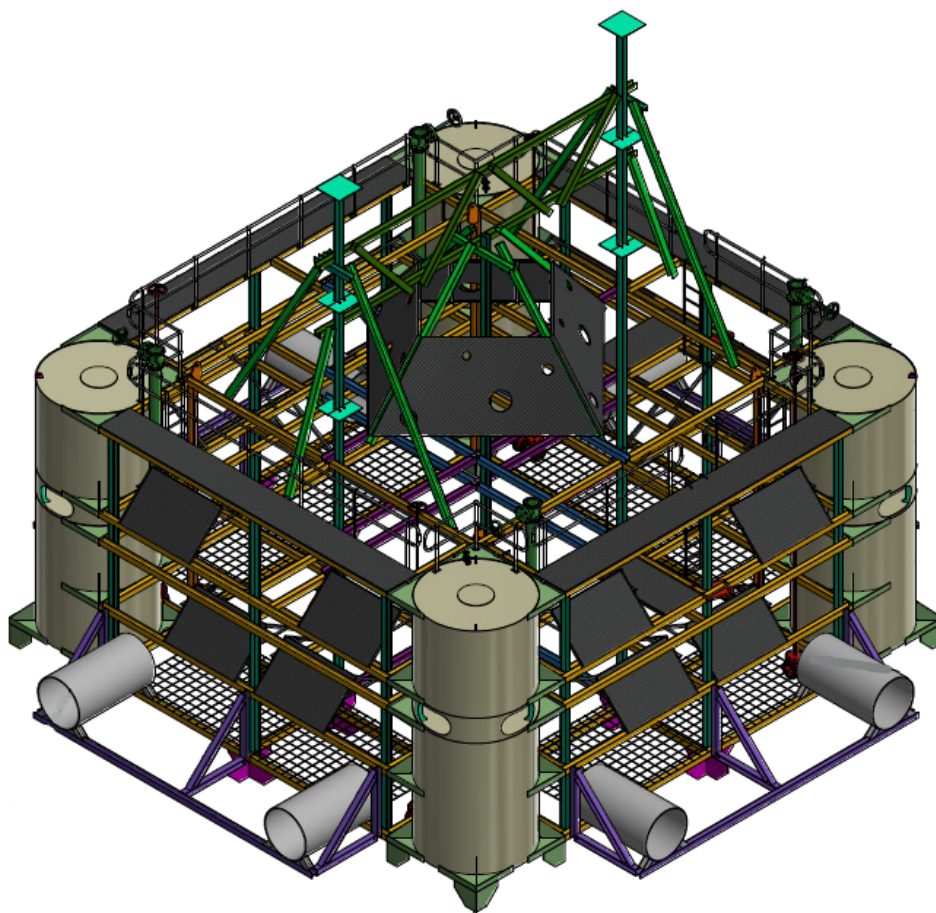


Figure 1 Isometric schematic of OAR design

The location of the reef including proximity to protected areas

The location of the reef has been chosen for its isolation from all social cultural and environmental matters in the Coffs region. The nearest protected area to the placement site is the Solitary Islands Marine Park is located 10 km to the north of the placement site. The two Coffs OAR structures will be located in NSW State waters, approximately 2.5 km southeast of Sawtell at a depth of 26-28 m.

Module	Latitude	Longitude	Depth
Coffs West	-30.3916°	153.1158°	26 m
Coffs East	-30.3908°	153.1210°	28 m

The main potential impacts relevant to the long-term monitoring and management of the reef impacts

The main potential impacts subject to long-term monitoring and management include recreational fishing related debris, physical impacts to undiscovered marine heritage sites/items and establishment of marine pests. These matters have been carefully considered and adequately addressed during the risk assessment phase and will be monitored in accordance with this LTMP to ensure effective and achievable management measures can be implemented.

Procedures that will be undertaken to monitor compliance with the permit

NSW Department of Primary Industries and Regional Development (DPIRD) is committed to the implementation of an approved monitoring plan and reporting to ensure compliance with any permit conditions.

Procedures that will be undertaken to monitor the performance of the reef

OAR monitoring requires a time frame that is consistent with the rate of recruitment to the artificial reef system and the ecological factors that drive this process.

Previous work associated with both estuarine and offshore artificial reef systems has indicated that fish communities remain dynamic over the first 18 months period post deployment.

Monitoring frequency for NSW OARs has been developed in consultation with DCCEEW over the past 13 years. In recent years the following frequency has been adopted and considered commensurate with the scope scale and risk of the NSW OAR program:

- annually for the first five years,
- a minimum of every five years over the remaining design life of the OAR,
- at the end of planned life (i.e. a final inspection), intended to inform decommissioning options.

The responsibility for all monitoring lies with NSW DPIRD.

Baited remote underwater video surveys (BRUVS) and remotely operated vehicles (ROV) will be the primary methods used to monitor the performance of the reef.

The end-of-life decommissioning plan.

This LTMP also outlines the end-of-life decommissioning options. While it is anticipated that the OAR structures will remain in perpetuity, this outcome is subject to the monitoring program and an end-of-life assessment. Decommissioning options have been prepared for end of planned service life or as a contingency during the operational life of the OAR should unforeseen and unacceptable impacts be realised.

Whether the structures are removed intact or dismantled at the end of the life of the Sea Dumping Permit would depend on the outcome of environmental and structural assessments.

Goals and objectives

Demonstrate how the reef will be fit for the intended purpose

The objective of the Coffs offshore artificial reef is:

- 1) increasing or concentrating populations of marine plants and animals
- 2) for the purpose of being used in human recreational activities

Extensive research and development and consultation with marine experts has led to the production of fit-for-purpose OARs deployed along the NSW coastline. Eleven purpose-built OARs have been installed and monitored since 2011. Data and lessons learned during this time have provided great insight into the effectiveness of these structures. The Coffs purpose-built steel structure design provides high quality complex habitat in an area previously unproductive for recreational fishing. A complex steel structure provides niche environments for both predator and prey of sessile, benthic and pelagic species. A number of these species are recreationally targeted by anglers and have established populations on OARs of comparable design at 11 other locations along the NSW

coastline. The existing 11 offshore artificial reefs in NSW demonstrate the Coffs OAR will deliver beneficial social and environmental outcomes with negligible risk of impacts to social, cultural and environmental values of the region. For example, over the first two years post placement, 36 species of fish have been observed on the Eurobodalla (formerly Batemans) OAR as well as a benthic community comprised of algae, sponges, crustaceans, cnidarians and ascidians.

The spatial arrangement of the two structures will enable fishers to spread out so that multiple fishers can access the site simultaneously.

User guidelines and a code of conduct have been established to provide guidance to OAR users on a range of issues including, OAR etiquette and responsible fishing.

Investment in artificial reefs generates a positive net return for NSW, providing high quality fishing opportunities, generating new research activity and encouraging increased recreational activity that delivers flow on economic and social impacts for communities. The NSW Government has identified that investment in artificial reefs generates a positive net return for NSW.

How the objectives of the reef will be measured

The Coffs OAR objectives will be measured by the results of BRUV and ROV surveys along with recreational fisher satisfaction which will be measured through contact with local fishing clubs and charter operators in the region. Echosounder, livescope, sidescan, downscan and multibeam technology will also be used to measure objectives during conditions not suitable for visual surveys.

The BRUVS will consist of two camera frames dropped adjacent to the reef structures for a minimum soak time of 20 mins.

Fisher satisfaction and field surveys will provide evidence that objectives have been met by showing species not identified within the baseline study are establishing within the new habitat provided by the OAR structures.

Key issues or reporting areas identified during the investigation and planning phase.

Marine debris (for example, fishing line or other anthropogenic inputs)

Introduced and pest marine species

Historical, cultural, heritage-listed and scientific sites including underwater cultural heritage

Stability and structural integrity

Not meeting objective: Increase or concentration of populations of marine plants and animals over the baseline BRUV footage.

Not meeting objective: OAR being used for the purpose 'human recreational activities'

Long term monitoring and adaptive management

Objectives

The objective of the Coffs offshore artificial reef is:

- 1) increasing or concentrating populations of marine plants and animals
- 2) for the purpose of being used in human recreational activities.

The NSW DPIRD proven track record in OARs represents a minimal risk to environmental, social and cultural aspects of the placement site. The environmental benefits of engineered, purpose built,

complex steel structures are well documented in Australian scientific literature. A recent study by Woolley (2024) provides the most contemporary summary of the success of OARs in NSW citing a broad range of supporting literature. Woolley (2024) provides a summary of community development on six OARs in NSW.

The Long-term monitoring and adaptive management table below has been prepared with respect to the scope, scale and risk the Coffs OAR proposal represents. The table is focused on impacts identified within the impact assessment section from the sea dumping permit application. Impact areas considered include all physical and chemical, social and cultural, and biological impacts from the risk assessment. Positive impacts resulting from objectives being met will also be monitored.

Responsibility for all activities associated with the Long Term Management Plan lie with the NSW Department of Primary Industries and Regional Development.

Those with a risk rating of 'Low' or higher which may require monitoring, triggers and mitigation strategies are provided in the table below for long term monitoring.

Table 1 Long term monitoring commitments

<i>Reporting area</i>	<i>Impacting pathway</i>	<i>Objective</i>	<i>Monitoring method</i>	<i>Monitoring frequency</i>	<i>Data type</i>	<i>Trigger values</i>	<i>Mitigative actions</i>
Marine debris (for example, fishing line or other anthropogenic inputs).	General marine pollution, risk of direct impacts to wildlife.	Reduce likelihood of marine debris impacts on marine species and environment.	BRUVS (opportunistic) and ROV (primary). Visual inspection of the surface while on site.	Annually for the first 5 years. Post 5 year review to determine if a change to 5 yearly monitoring is sufficient.	Quantitative (BRUVS and ROV survey).	Identification of recoverable marine debris that represents a risk to the environment during routine annual ROV surveys.	Anthropogenic debris will be removed from the OAR. Education (via website, Fisheries newsletter 'Newscast' and social media) <u>Code of conduct</u> on website.
Introduced and pest marine species.	Introduced competition to native species.	Reduce spread and impact of marine pests.	BRUVS and ROV.	Annually for the first 5 years. Post 5 year review to determine if a change to 5 yearly monitoring is sufficient.	Quantitative (BRUVS and ROV survey).	Identification of a marine pest.	No ballast water exchange during deployment. Report and work through <u>strategy</u> in consultation with DPIRD Biosecurity branch to manage or eliminate risk. Follow NSW Biosecurity – <u>Aquatic fieldwork hygiene procedures</u>
Historical, cultural, heritage-listed and scientific sites including underwater	Physical impacts to unexpected finds during OAR	Reduce likelihood of physical impacts to cultural items.	BRUVS and ROV.	Annually for the first 5 years. Post 5 year review to determine if a change	Quantitative (ROV survey).	Identification of any unexpected items.	Follow unexpected finds procedure (appendix A) Notifications of suspected underwater cultural heritage discoveries in Australian waters will be submitted to the Minister of the

Reporting area	Impacting pathway	Objective	Monitoring method	Monitoring frequency	Data type	Trigger values	Mitigative actions
cultural heritage	deployment or operation.			to 5 yearly monitoring is sufficient.			Environment within 21 days in accordance with section 40 of the Underwater Cultural Heritage Act 2018 both via email to UnderwaterHeritage@dcceew.gov.au, heritagemailbox@environment.nsw.gov.au online via the Australasian Underwater Cultural Heritage Database (AUCHD).
Safety, stability and structural integrity	Surrounding oceanographic forces impacting on the OAR structure.	Structures are upright, stable, safe and within the deployment area.	ROV and GPS georeferenced sonar systems.	Annually for the first 5 years. Post 5 year review to determine if a change to 5 yearly monitoring is sufficient.	Quantitative (ROV and GPS georeferenced sonar systems).	Structure has moved outside assessed area. Structure has >45 degree lean. Structure presents a safety risk to the environment or users	New environmental assessment to be undertaken at new location and relocated if risks/impacts are unacceptable at new location. Assessment and review by a naval architect/structural engineer. Structure's lean to be remediated to a stable condition as determined by naval architect/structural engineer. Modifications, repair and decommissioning commitments
Positive effects / impacts	Increasing or concentrating marine plants or animals	OAR objectives Confirm an increase or concentration of populations of marine plants and animals over the baseline	BRUVS and ROV.	Annually for the first 5 years. Post 5 year review to determine if a change to 5 yearly monitoring is sufficient.	Quantitative (BRUVS and ROV survey).	Community development remains consistent with baseline monitoring outcomes.	Reconsider which aspects of design are restricting expected community development. Modify reef to provide habitat for community development.

Reporting area	Imacting pathway	Objective	Monitoring method	Monitoring frequency	Data type	Trigger values	Mitigative actions
		BRUV footage.					
Positive effects / impacts	Enhancing recreational fishing opportunities.	OAR objectives Confirm the OAR is being used for the purpose human recreational activities	User group feedback	Annually for the first 5 years. Post 5 year review to determine if a change to 5 yearly monitoring is sufficient.	Quantitative and quantitative.	No fisher reports indicating recreational fisher satisfaction.	Survey recreational fishers on OAR use to determine the reason for poor uptake of the additional fishing opportunity. If fishers are unaware of its location DPIRD will promote the location via social media and Newscast newsletter. If fishers are not catching fish, DPIRD will promote fishing tactics and BRUV footage via social media and Newscast newsletter. If fish community is not developing as expected DPIRD will reconsider which aspects of design are restricting expected community development and modify reef to provide habitat for improved community development.

Financial assessment

\$1.35M (exc. GST) has been secured from the NSW Recreational Fishing Trust (RFT) and Marine Estate Management Strategy (MEMS) to complete placement of the Coffs OAR. Fishing in NSW waters requires (by law) the payment of a fee. Funds raised by the NSW Recreational Fishing Licence Fee are placed into the RFT which supports a broad range of projects designed to improve recreational fishing in NSW waters. The artificial reefs program is one of the most popular programs supported with funding from the RFT. During 2023/24 alone, 406,135 licences were sold and \$19.4M provided from the RFT to support projects that directly benefit recreational fishing (NSW DPIRD 2024). The NSW DPIRD Fisheries Enhancement team has four dedicated staff to deliver new reef projects and facilitate ongoing management and monitoring of previously installed artificial reefs. The program is also well supported by a range of suitably qualified DPIRD Fisheries research scientists, technical staff and managers. DPIRD Fisheries is experienced in the implementation of fisheries enhancement projects from inception through to completion and long term monitoring. The Fisheries Enhancement team has proven experience in managing multidisciplinary teams of contractors and consultants to deliver complex offshore projects. DPIRD Fisheries has a large fleet of vessels, monitoring equipment and staff strategically placed around NSW to support ongoing management and monitoring of projects.

Modifications, repairs and decommissioning

If routine monitoring identifies that modifications or repairs required to maintain safety to the environment and users of the area the following procedure will be followed:

- Notification to recreational fishers via Newscast and social media that the area is unsafe for use
- Notification that the area should be avoided until further notice to the following stakeholders:
 - DCCEEW: seadumping@dcceew.gov.au
 - AMSA: AMSAConnect@amsa.gov.au
 - JRCC: rccaus@amsa.gov.au
 - NSW Maritime: NavigationAdviceNorth@rms.nsw.gov.au,
NavigationAdviceSouth@rms.nsw.gov.au
 - NSW Marine Rescue: contact@marinerescuensw.com.au (to issue a Marine Notice)
 - Australian Hydrographic Office: datacentre@hydro.gov.au (to issue a Notice To Mariners)
 - Shipping Australia: admin@shippingaustralia.com.au
 - Commercial Fishers in NSW
- Engage a contractor to undertake the required works to make safe for the environment and users of the area
- Engage the above stakeholders to reopen the area for use.

If routine monitoring identifies matters which cannot be resolved to maintain safety to the environment or users of the area, decommissioning will be initiated (refer to decommissioning section below).

Emergency and incidence response

If at any time during the deployment or operation of the reef an environmental risk/incident occurs, DPIRD will immediately implement measures to mitigate the risk or the impact. The situation will be reported in writing within 24 hours to DCCEEW (and any other relevant Government agency or authority), with a full report detailing:

- the incident that occurred and/or 'non-compliance' detected,
- the mitigation measures taken (i.e. notice to mariners, marine notice, exclusion zones), and
- the success of these measures in addressing the environmental incident that occurred and/or 'non-compliance' detected and any additional measures that are proposed to be taken.

Emergency contacts:

- DPIRD Fisheries Manager (Fisheries Enhancement)
- Ph: 0457 664 062 (during office hrs), 1300 550 474 (24 hrs)
- Email: fisheries.enhancement@dpird.nsw.gov.au
- Other relevant emergency contacts include:
 - ORRCA Whale and Dolphin Rescue – Ph: (02) 9415 3333
 - Fisheries Watch - for reporting illegal fishing – Ph: 1800 043 536
 - For ALL other emergencies (NSW Police, Maritime, Fire, Ambulance) – Ph: 000

Decommissioning

Provided no impacts have been identified (including to the environment, navigation or the safety of users) and the OARs continue to meet objectives, it is proposed that the Coffs OAR structures would be left in place for perpetuity.

DPIRD would survey and assess the reef and submit a report outlining whether they wish to leave the OAR in place, partly remove the OAR, or remove the whole OAR. The report will be submitted during the second last year of the permit, that is, reporting during year 28 for a 30-year permit.

Whether the structures are removed intact or dismantled at the end of the life of the Sea Dumping Permit would depend on the outcome of structural and environmental assessment inspections. If the OAR structures continue to meet their objectives while not presenting any significant impact to the environment the structures would remain in-situ on the seabed and be allowed to gradually break down over time.

Where OAR removal is required, provided the structures are verified to be structurally sound for removal, structures would be recovered and transported to an appropriate harbour to be cleaned, dismantled and disposed of at an appropriate land-based facility.

If it is not feasible for the structures to be recovered to the surface intact, then the method of removal of the structures would be subject to a government tender process to ensure the most contemporary methods for removal were employed at the time. Structures would then be transported to a waterside facility where the pieces would be cleaned and disposed of at an appropriate land-based facility.

During the life of the OAR, the need for modifications or repairs (e.g. if the structure becomes unsafe or unstable) would be assessed on a case-by-case basis from the structural integrity monitoring. DPIRD would approach industry professionals to determine the most appropriate methods and course of action to undertake any works required.

These considerations also provide a contingency for decommissioning at any stage during the operational life of the reef if required.

Reporting

Within 21 working days from completion of the reef installation, DPIRD will provide a report to DCCEEW that:

- details the date and time of the placement of the Coffs OAR,
- confirms placement occurred within the approved site boundaries (WGS84),
- confirms the depth of water (safe vessel clearance) over the reef at (LAT), and
- proof of written notification to the Australian Hydrographic Office and NSW Maritime.

Within 14 days of each annual monitoring inspection, DPIRD will provide a report to DCCEEW that:

- confirms presence, absence of marine debris,
- confirms presence or absence of any identified marine pests,
- confirmation that the OAR structures are still upright, stable and located within the deployment area,
- confirmation that an increase in species from the baseline data has been achieved, and confirmation that recreational fishers are using the reef.

NSW agency reporting:

- Threatened species identified on the OAR will be reported to the NSW Threatened Species Unit
- Marine pest species identified on the OAR will be reported to the Aquatic Biosecurity Unit

Audit and review

Within 21 working days of the 5 year monitoring inspection, DPIRD will provide a report to DCCEEW that includes:

- A summary of DPIRD monitoring events for the 5 year period
- A summary of OAR performance against the objectives for the 5 year period
- Recommendations on the adequacy of the monitoring procedures
- Recommendations for future monitoring procedures including frequency

The LTMP will be made available on DPIRD's artificial reefs webpage
<https://www.dpi.nsw.gov.au/fishing/recreational/resources/artificial-reef>

References

NSW DPIRD (2024). Annual Report 2023/24 NSW Recreational Fishing Trusts. November 2024. 84 pp.
https://www.dpi.nsw.gov.au/_data/assets/pdf_file/0006/1594617/NSW-Recreational-Fishing-Trusts_Annual-Report-2023-24_Digital.pdf

Woolley, S.H. (2024). *Ecological succession of communities on offshore artificial reefs*. University of NSW. Thesis (Hons). 50 pp.

Appendix A – Unexpected Finds Procedure:



Unexpected Finds Procedure Overview

This Unexpected Finds Procedure (Figure 1) has been developed by Mountains Heritage in collaboration with DPIRD – Fisheries to support the identification and management of unexpected cultural heritage items that may be encountered during the installation and ongoing monitoring of artificial reef systems.

The procedure draws on Mountains Heritage expertise as well as planning practices from the NSW DPIRD artificial reef projects and outlines key processes, including:

- Identification of unexpected finds
- Stop-work triggers
- Notification protocols
- Recording guidelines and examples

DPIRD's Artificial Reef project planning stipulates that reef installation areas must not contain known shipwrecks and should present a low likelihood of undocumented or unknown shipwrecks.

Should any unexpected item be discovered during reef deployment or monitoring, the Project Maritime Archaeologist will assess whether the item is part of a shipwreck or another type of underwater cultural heritage site, or whether it is unrelated debris or a scattered deposit.

In the event a shipwreck is identified, further investigation will likely be required to confirm its nature, determine its location, and implement appropriate mitigation measures.

Isolated finds or items suspected to be dumped debris may have arrived at the site through natural coastal processes, however these items will still require assessment by a Maritime Archaeologist to inform appropriate mitigation.

Section 40 of the *Underwater Cultural Heritage Act 2018* (Cth) requires that notification of suspected underwater cultural heritage discoveries in Australian waters must be submitted to the Minister of the Environment within 21 days via: underwaterHeritage@dcceew.gov.au and online via the [Australasian Underwater Cultural Heritage Database](#) (AUCHD).

Notifications will also be provided to Heritage NSW via heritagemailbox@environment.nsw.gov.au

Non-compliance with this procedure may constitute a violation of the *NSW Heritage Act 1977* and/or the *Underwater Cultural Heritage Act 2018* (Cth), with potential penalties applicable under both laws.

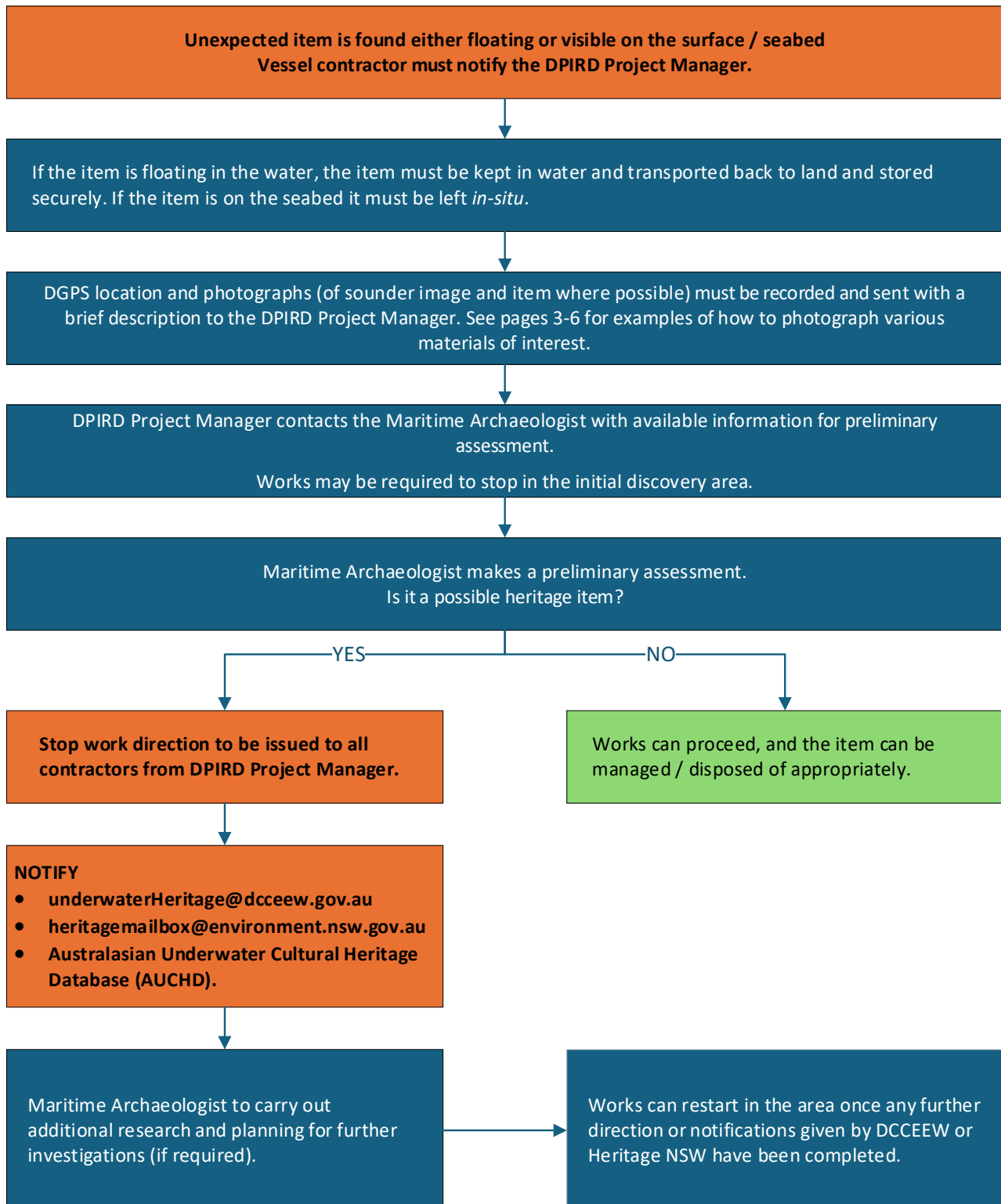


Figure 1 Unexpected finds procedure flowchart



Photograph recording examples and possible material examples

DISCOVERY OF PREVIOUSLY UNIDENTIFIED HERITAGE OBJECTS DURING ACTIVITIES EXAMPLE PHOTOGRAPHIC RECORDING GUIDE



- 1 SCALE IN EVERY PHOTO
Scale can be
 - Tape Measure
 - Photo Scale.
- 2 PHOTOS FROM DIFFERENT ANGLES
Flip the object over, or photograph the sandstone from side.
- 3 CLOSE UP OF DETAILS
Including features, text and marks.
Detailed photos can be taken in the site office at the end of the day.
- 4 PHOTOS MUST BE IN FOCUS
Details need to be clear when zooming in.
- 5 OBJECTS CAN BE CLEANED
Water can be used to gently remove dirt in order to highlight or reveal details.
- 6 OBJECTS MUST BE KEPT SOMEWHERE SAFE
Objects can be put into zip lock bags or blocks can be stacked somewhere safe.





EXAMPLE OF TIMBER ITEMS



Examples of how to photograph unknown timber items.

Scale in every photograph.

The background of each photograph should be kept as clean as possible to see the item clearly.





EXAMPLE OF METAL ITEMS



Examples of how to take detailed photographs of metal items.

Photographs of the whole item should be taken before taking detailed photographs.

Scale should be present in every photograph and located close to the detail being shot.

Different angles of the same detail should be taken.



Multiple small objects can be photographed in one shot. Items should be spaced so each can be clearly seen.

The scale needs to be visible so accurate measurements can be taken from the photos.

Detailed photos should still be taken if objects have writing or other stamped features on them.





EXAMPLES OF GLASS ITEMS



How to photograph a whole bottle.
Scale kept straight on either below or to one side of the bottle.



How to photograph detail present on a glass bottle.
Scale kept straight and close to the detail being photographed.



How to photograph detail around the base of a glass bottle.
Scale is in line and kept straight.



How to photograph the detail on the base of a bottle.
The photo can be taken on an angle to help see the outline of embossing
Scale is level with the section of the bottle to be photographed and kept straight.