



Eden-1

Decommissioning Management Plan 2026

Disaster Bay, NSW

DOCUMENT DETAILS

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Project Definition	Kelp Aquaculture Farm

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1.0 DECOMMISSIONING MANAGEMENT PLAN

Eden-1 Kelp Aquaculture Farm

Auskelp Pty Ltd | 2026

- **Location:** Offshore in Disaster Bay
- **Key Activities:** Planning and decommissioning for offshore longline infrastructure (and associated onshore repurposing or disposal)
- **Vessel Base:** Snug Cove, Port of Eden & Edrom (Pentarch) Industrial Area
- **Vehicle Base:** Industrial area Edrom (logistics depot, maintenance and disposal facility)

1.1 Purpose and Objectives

This Decommissioning Management Plan (DMP) outlines the procedures, environmental safeguards, waste management protocols, and monitoring requirements that will be implemented upon cessation of aquaculture operations at the Eden-1 Kelp Aquaculture Farm. The plan ensures that infrastructure removal is undertaken safely, efficiently, and in compliance with statutory requirements, while maintaining environmental integrity and navigational safety.

This Decommissioning Management Plan is provided to guide Auskelp operational personnel and contractors in establishing a clear, auditable framework for the eventual removal of infrastructure should decommissioning be required. It reinforces that all installation activities undertaken under the Construction and Deployment Management Plan have been designed with future removal in mind, and that deployment practices must preserve this removability.

Operational staff are required to maintain accurate records and ensure that installation methods, tensioning systems, anchor placement, and component connections are executed and documented in a manner that facilitates safe and efficient retrieval at the end of the lease life or in the event of early cessation. Particular care must be taken to avoid practices that could hinder recovery, such as unnecessary burial of hardware, over-tensioning that may deform fittings, use of unapproved modifications, or loss of component traceability. Routine inspections, maintenance, and incident reporting must also consider long-term recoverability, ensuring that infrastructure remains identifiable, accessible, and structurally suitable for removal. This disciplined approach minimises seabed disturbance during retrieval, reduces operational risk, and ensures the lease area can be returned to its pre-existing condition in accordance with regulatory requirements and best-practice offshore aquaculture standards.

The objectives of the DMP are to:

- return the lease area to a safe and environmentally stable condition
- remove infrastructure that may pose navigational or environmental hazards
- minimise seabed disturbance during removal activities
- ensure waste is responsibly recovered, reused, or disposed of
- comply with NSW Fisheries lease conditions and bond requirements
- align with FAO and UNEP sustainable seaweed aquaculture decommissioning principles
- provide transparency and accountability through monitoring and reporting

1.2 Design of Infrastructure

The Eden-1 infrastructure has been designed and deployed to enable efficient removal and minimise post-removal environmental disturbance. The use of removable screw anchors, tensioned rope systems, and a no-chain rig design ensures infrastructure can be retrieved without seabed dragging, excavation, or sediment disruption. Installation torque records and as-built GPS coordinates for anchors, longlines and boundary

markers will be maintained to facilitate accurate retrieval and verification of complete removal. Deployment procedures prohibit dredging, seabed levelling, or permanent seabed alteration, ensuring that no rehabilitation earthworks are required at the end of operations.

The Construction and Deployment Management Plan (CDMP) incorporates a design philosophy that prioritises removability and minimises seabed disturbance. Infrastructure is secured using removable screw anchors installed by rotational torque rather than impact driving, avoiding percussive methods and limiting seabed disruption. The longline system is designed without chains, eliminating seabed drag and reducing corrosion, noise and contact with the substrate. Site selection targets unconsolidated sandy sediments and avoids sensitive habitats, ensuring only minor, localised disturbance at anchor points. Collectively, these measures support efficient infrastructure removal at the end of operations, minimise the residual seabed footprint, and enable rapid natural recovery of the site following decommissioning.

1.2 Regulatory and Policy Framework

Under the Fisheries Management Act 1994 (NSW), aquaculture permit holders operating under Class A permits and Class 2 leases are required to enter into an Aquaculture Lease Security Arrangement (Bond). This bond provides financial assurance that:

- infrastructure will be removed if operations cease
- the lease area will be returned to a safe condition
- the site will not present ongoing environmental or navigational risks

If a permit holder fails to complete decommissioning works, Fisheries NSW may draw on the bond to undertake removal and remediation. The Project also aligns with:

- NSW Marine Waters Aquaculture Strategy (MWAS) principles for environmental stewardship
- FAO & UNEP (2021) Guidelines for Sustainable Seaweed Aquaculture, including infrastructure removal and habitat recovery
- international kelp farming research demonstrating rapid ecological recovery following decommissioning

1.3 Triggers for Decommissioning

Decommissioning may occur under the following circumstances:

- lease expiry or surrender
- cessation of commercial operations
- regulatory directive
- force majeure or catastrophic infrastructure loss
- unacceptable environmental impact requiring removal

1.4 Infrastructure to be Removed

Decommissioning will involve removal of:

- backbone longlines
- droppers and cultivation lines
- floats and surface buoys
- mooring lines and shackles
- navigation markers
- shore-based staging equipment (if installed)

1.5 Anchoring Systems

Accurate as-built records and geospatial data form a critical component of lifecycle infrastructure management and decommissioning efficiency. Deployment documentation includes precise GPS coordinates for all anchor locations, boundary markers, and longline alignments, together with infrastructure layout logs and installation verification records. Maintaining this spatial record enables efficient and targeted retrieval of infrastructure at the end of operations, minimises unnecessary seabed search and disturbance during removal activities, and provides an auditable basis to confirm that all equipment has been fully recovered from the lease area.

The farm's screw anchors are installed below the seabed and provide high holding capacity with minimal seabed disturbance. According to the NSW DPIRD Fisheries screw anchor risk assessment completed for the Jervis Bay mussel farm, removal or retention may be considered on a case-by-case basis, as removal may cause greater disturbance than leaving anchors buried in situ. Discussions with NSW DPIE Fisheries will assess this at the time of farm removal to assess the most appropriate action.

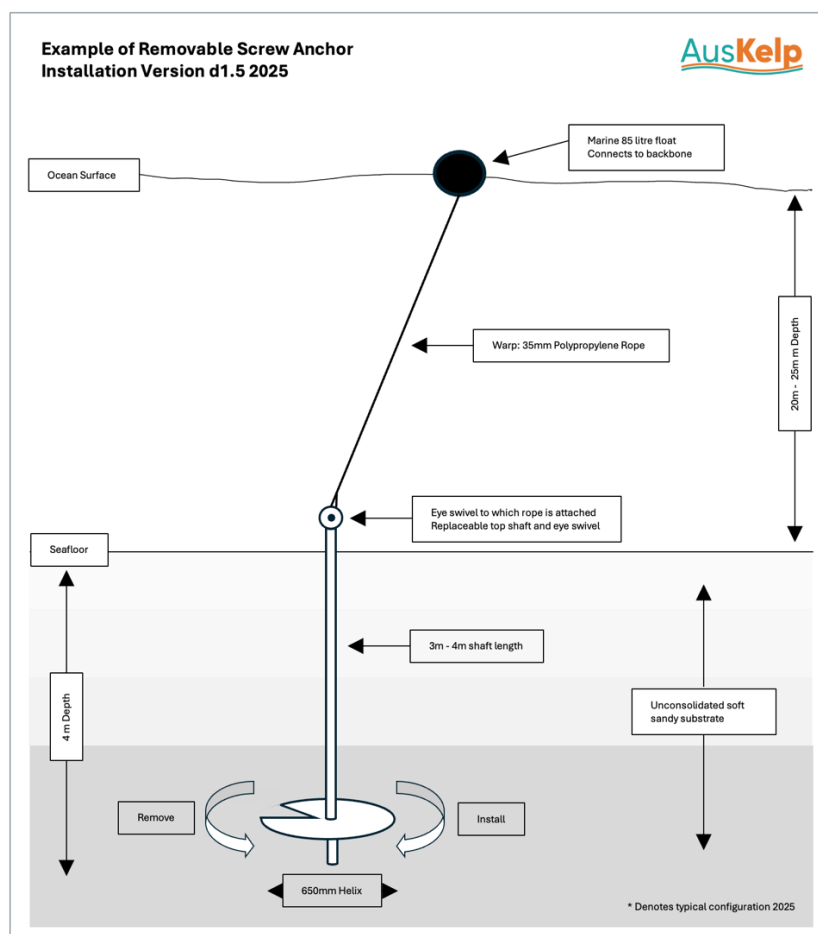


Figure 1. Auskelp Screw Removable Screw Anchor design (Credit: Auskelp 2025).

Corrosion risk to embedded screw anchors is reduced by design because the steel helix and shaft are installed below the seabed in sediments where dissolved oxygen is rapidly depleted. Oxygen availability (i.e., sediment aeration) is a primary driver of corrosion in soils/sediments, with higher oxygen typically occurring near the surface and in disturbed materials. In marine sediments, oxygen is commonly consumed within the upper centimetres of the seabed, so anchor elements installed below this zone are not continuously exposed to oxygenated seawater, reducing the corrosion driving potential relative to fully exposed infrastructure.

Reference: California Department of Transportation (Caltrans) 2018, Corrosion Guidelines, Division of Engineering Services, Sacramento, CA. Available at: <https://dot.ca.gov/-/media/dot-media/programs/engineering/documents/mets/corrosion-guidelines-a11y.pdf>

Eden-1 factors:

- screw anchors are typically buried several metres below the seabed
- leaving anchors in situ may present lower environmental risk than removal
- removal creates localised sediment disturbance and turbidity
- anchors left buried pose negligible navigational risk

Removal will therefore occur unless:

- removal poses greater environmental harm
- anchors remain deeply buried and stable
- regulatory authorities approve in-situ retention

NOTE: Any anchors left in situ will be recorded, mapped, and managed in accordance with NSW Fisheries DPIE or Crown Lands regulatory approvals.

1.6 Decommissioning Process

1.6.1 Pre-Decommissioning Planning

Prior to removal works:

- Notify NSW DPI Fisheries and relevant authorities
- Conduct infrastructure inventory and condition assessment
- Confirm anchor locations via GPS and ROV survey
- Identify any entangled debris or marine growth requiring management
- Develop safety and vessel operations plan

1.6.2 Removal of Surface and Suspended Infrastructure

Procedure

1. Remove kelp biomass and cultivation lines.
2. Recover droppers and longlines sequentially.
3. Retrieve floats, buoys, and surface markers.
4. Recover mooring lines and connectors.

Environmental Controls

Operational and design controls are implemented to minimise seabed disturbance and eliminate the need for post-removal rehabilitation. The project does not involve dredging, excavation, or seabed levelling, and the longline system avoids chain contact with the seabed. As a regenerative aquaculture activity, kelp cultivation requires no feed inputs, fertilisers, or additives, thereby preventing nutrient enrichment or organic accumulation. Hydrodynamic corridors are maintained to preserve natural water flow and sediment transport processes. Collectively, these measures ensure that sediment chemistry and benthic habitat structure remain unaltered and that natural recovery processes can occur rapidly following infrastructure removal.

- removal conducted in calm sea conditions where possible
- recover any incidental debris immediately

1.6.3 Mooring and Anchor Management

Preferred approach:

- disconnect mooring lines from screw anchors with diver present
- assess anchor burial depth and stability

- remove anchors where environmentally appropriate using screw anchor drill (reverse)

Anchor removal method

- reverse torque extraction (unscrewing)
- minimal sediment disturbance (minimal expected cavity)
- hole naturally infills through sediment transport

NOTE: Observations in similar environments show such cavities become indistinguishable within hours.

Where anchors remain in situ:

- anchor heads remain buried below seabed surface
- GPS coordinates recorded
- documented and reported to relevant government agencies
- removal undertaken if future impacts identified

1.7 Waste Management and Disposal

Waste segregation, material recovery, and incident logging protocols further support lifecycle accountability and minimise the risk of residual marine debris. These design and operational measures, combined with the Project's location over unconsolidated sandy substrate in a high-energy, well-flushed environment, ensure that decommissioning can be completed efficiently and that the site will return to its pre-existing condition through natural processes.

Decommissioning may generate:

- synthetic rope and polypropylene lines
- floats and plastic components
- metal shackles and fittings
- worn mooring components
- biofouling residues

Waste Management Hierarchy

- Reuse
- serviceable lines and hardware reused

Recycle

- HDPE floats
- polypropylene rope
- steel fittings or synthetic thimbles

Disposal

- non-recyclable materials and chaffed or damaged ropes disposed at licensed waste facilities

Biofouling Material

- returned to marine environment where appropriate, as it represents natural marine biomass

NOTE: No hazardous waste is expected.

1.8 Environmental Protection Measures

Seabed Disturbance

Disturbance is expected to be minimal and localised due to:

- sandy unconsolidated substrate
- high-energy hydrodynamic environment
- absence of organic enrichment

NOTE: Natural sediment transport will restore seabed structure.

1.9 Water Quality

Temporary minimal turbidity will occur during anchor removal due to sandy substrate and will be:

- highly localised
- short duration
- rapidly dispersed due to strong flushing

NOTE: No nutrient release or contamination is expected due to absence of industrial contaminants.

2.0 Biodiversity and Habitat Recovery

Studies of kelp systems in Scandinavia and Europe have documented minimal benthic disturbance and rapid ecosystem recovery following removal of cultivation infrastructure (Visch et al., 2020; Hancke et al., 2021; Carranza et al., 2024).

Monitoring and incident logging procedures provide ongoing environmental oversight and support adaptive management throughout deployment and operations. Monitoring activities include marine fauna observation logs during installation and maintenance tasks, routine waste and debris inspections, maintenance of an incident and near-miss register, and recording of relevant environmental observations. This monitoring framework enables early detection of anomalies, supports compliance reporting, and provides baseline and operational data that assist in verifying environmental conditions and recovery outcomes following decommissioning.

Eden-1 Kelp Aquaculture:

- produces no organic waste accumulation
- does not alter sediment chemistry
- allows rapid benthic recovery post removal

NOTE: Detached kelp fragments contribute to natural detrital pathways and nutrient cycling.

2.1 Schedule

Decommissioning duration for standard i-hectare farm rigs will be as follows, but timeframes may be affected by weather events and winds in excess of 20 kmph.

Indicative timeframe (1 hectare Rig removal)

- 11 x longlines
- 220 floats
- 22 Screw anchors
- 4 Cardinal Markers
- 3 x vessel trips per hectare removal

Phase	Expected Duration
Planning and approvals	2 – 4 weeks
Longline removal leaving screw anchor rises (only)	8 hours
Anchor removal	2 hours per anchor – total 44 hours
Waste transport, repurpose or disposal	2 days per hectare
Navigation marker removal	1 day
Post removal inspection	1 day

2.2 Monitoring and Verification

Post-Removal Inspection

- visual survey of lease area
- ROV or diver inspection if required
- confirm removal of debris
- confirm anchor status

Follow-Up Monitoring

If anchors remain in situ:

- periodic ROV inspection (if required)
- verify burial depth and stability

NOTE: Monitoring will be adaptive and proportionate to risk.

2.3 Reporting

A Decommissioning Completion Report will be provided to NSW DPI Fisheries and relevant authorities including:

- infrastructure removal summary
- anchor status and locations
- waste disposal documentation
- environmental observations
- photographic and GPS records

2.4 Environmental Recovery Expectations

Based on international kelp aquaculture studies and regional aquaculture monitoring:

- benthic conditions recover rapidly
- no long-term sediment enrichment occurs
- ecological conditions return to baseline

2.5 Version Control and Iterative Management

This Decommissioning Management Plan is intended to function as a living document that will be refined over time to incorporate operational experience, technological improvements, and regulatory guidance.

Learnings from installation, maintenance, storm-response events, and any partial retrieval activities will be systematically reviewed and used to improve future decommissioning procedures, equipment selection, and

recovery methods. Version control will be maintained to document revisions, ensuring that updates are traceable and that current procedures reflect best practice and site-specific knowledge. Through this iterative process, Auskelp will continually improve the efficiency, safety, and environmental performance of any future decommissioning works, ensuring that the lease area can be restored effectively while minimising disturbance and operational risk.

This document has been prepared using the best available information, operational knowledge, and regulatory guidance current as of February 2026. It reflects site conditions, engineering design parameters, environmental data, and industry best practice understood at the time of writing. While every effort has been made to ensure accuracy and completeness, offshore environments and regulatory frameworks are dynamic, and operational experience may identify opportunities for refinement. Accordingly, the procedures and recommendations contained herein should be read in conjunction with current permit conditions, applicable legislation, manufacturer specifications, and any subsequent technical updates. Auskelp reserves the right to revise this document as new information becomes available to ensure ongoing compliance, safety, and environmental stewardship.

2.6 Review and Continuous Improvement

This CDMP will be reviewed when consent conditions, guidance or regulator requirements change, or when processes do not meet the minimum expected standards.

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