Australian Government
Department of Climate Change, Energy, the Environment and Water
Australian Antarctic Division

AUSTRALIAN ANTARCTIC PROGRAM

RSV *Nuyina*
Environmental Monitoring Plan 2024-2029

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1 Introduction

A key objective of the Australian Antarctic Program (AAP) is to protect the unique environmental values of Antarctica and the Southern Ocean and to ensure that environmental monitoring and management are foremost in planning and operations within the organisation. The Australian Antarctic Division's (AAD) Environmental Policy outlines a commitment to continual improvement in environmental performance, and forms the foundation of the AAD's Environmental Management System (EMS) in compliance with the international standard ISO 14001. Environmental monitoring and reporting are key components of the EMS, serving to verify predicted environmental impacts of project activities, assess the efficacy of mitigation actions, and trigger management responses if thresholds are exceeded.

The AAD's environmental monitoring activities form part of an integrated monitoring system that collects, records and reports on performance data collected from a wide range of applications, networks and programs. Environmental monitoring activities undertaken by the AAD include data collection in relation to the main risks and key environmental indicators identified in the AAD Environmental Aspects and Impacts Register.

The environmental monitoring activities described in this plan relate specifically to the operation of RSV Nuyina and its science systems as described in *Initial Environmental Evaluation – RSV Nuyina Operations and Science Systems (2024-2029)* (the IEE). These monitoring activities will complement, and be integrated into, a comprehensive whole-of-program environmental monitoring, audit and response plan to improve our understanding of the potential and actual impacts associated with current and future activities of the Australian Antarctic Program (AAP).

1.1 Purpose and objectives

The purpose of this monitoring plan is to outline the key environmental monitoring requirements identified through the environmental impact assessment process for the operation of RSV Nuyina and its scientific systems. These requirements are based on Conditions 8 to 10 of the *Notice of Determination and Authorisation for RSV Nuyina Operations and Science Systems (2024- 2029) (Reference number 24/2453)* (the authorisation). The plan details the monitoring activities, methods, timing, data management, rep-orting and review requirements, and identifies the roles and responsibilities of project personnel to ensure that the outcomes of the monitoring are successfully achieved.

The objectives of the monitoring plan are to:

- ensure ongoing compliance with the Antarctic Treaty (Environment Protection) Act 1980
- ensure impacts are avoided or limited and are consistent with the environmental principles of the Madrid Protocol
- establish the accuracy of the conclusion of the IEE, i.e. that the impacts of operating RSV Nuyina and its science systems are likely to remain minor and transitory
- inform any changes needed to practices described in the IEE and associated

management systems to comply with impact thresholds

- ensure that the impacts of the operations of RSV Nuyina are not in conflict with the broader community's expectations in relation to Antarctica's protection, and
- inform the mitigation of any unforeseen but potentially significant impacts attached to continuing shipping operations and operating the ship's science systems at the levels described in the IEE.

1.2 Project background

RSV Nuyina is the AAP's dedicated research and supply vessel. It is the main lifeline to Australia's Antarctic and sub-Antarctic research stations (Casey, Davis, Mawson and Macquarie Island) and Australia's central platform for Southern Ocean scientific research. During the summer months, the vessel transports supplies (primarily dry cargo, fuel and water), equipment and expeditioners (personnel) from Hobart to the stations and returns waste, equipment, scientific samples, and expeditioners back to Australia. The ship is Australia's only icebreaking scientific research platform, supporting numerous scientific sample and data collection systems and providing associated services and workspaces for analysis and support.

Detailed descriptions of RSV *Nuyina* and its activities are provided in the IEE, with following activities being within scope of the authorisation:

- operation of RSV Nuyina in waters south of 60°S
- resupply activities at Casey, Davis and Mawson stations
- small watercraft usage in support of operational or science activities
- small moorings or location monitoring that are fully retrieved and connected to the vessel while in Direct Positioning
- uncontaminated seawater flow through onboard systems
- regular weather observations and weather reporting
- remote piloted aircraft (RPA) to observe sea ice conditions
- biological acoustic activities
- sea ice, iceberg and wildlife observation and reporting
- use of in hull camera systems
- atmospheric and sea ice monitoring via instrumentation attached to the vessel superstructure
- ADCP (in hull/drop keel) for water column current measurement
- expendable probes, e.g. XBT required to truth multibeam
- multibeam bathymetry, and
- lowering of personnel to the ice over the side of the vessel.

2 Monitoring plan scope

This environmental monitoring plan covers the operation of RSV Nuyina and its science systems while the vessel is south of 60°S. This includes both summer resupply voyages and science campaigns that can occur at any time of the year.

The scope of the monitoring activities includes reporting and data collection:

- in relation to the main impacts and key environmental indicators identified in the IEE
- that will enable change in environmental indicators to be assessed over both short and long term
- to assess the activity's compliance with authorisation conditions, and
- that complements and integrates with data collection and analysis related to the monitoring of AAP impacts more broadly.

As required in Conditions 8 to 10 of the authorisation, the monitoring plan includes:

- details of the purpose/s, milestones and impact thresholds for monitoring key environmental indicators
- details of the potential impacts to be monitored, including (but not limited to) disturbance/destruction of flora and fauna, spillage of fuel and other contaminants, light and noise, impacts from science systems, and changes to the nearshore marine environment from anchorage/s and watercraft use associated with the RSV Nuyina near stations
- details of any baseline monitoring to address identified uncertainties and data gaps, including in relation to nearshore marine environments
- details of responsibilities, including in relation to personnel on voyages, and dedicated resourcing, to ensure full implementation
- methodologies consistent with the Antarctic Treaty system guidance and best practice
- actions to measure and respond to environmental change, including that which is relevant and attributable to Nuyina's operational activities, over both short and longer time intervals
- relevant data gathered during the 2024-25 season, and from previous RSV Nuyina environmental monitoring activities, as appropriate.

3 Related monitoring, reporting and supporting studies

The following sections describe other environmental monitoring and reporting systems and programs, and how they integrate with this monitoring program.

3.1 Whole-of-program environmental monitoring

The AAD has committed to the design of a comprehensive whole-of-program environmental

monitoring, audit and response plan that will improve our understanding of the potential and actual impacts associated with current and future activities of the AAP. The monitoring, audit and response plan is being developed to ensure alignment with authorisation conditions contained with the *Notice of Determination and Authorisation for All Stations Operations Activities*, dated 6 October 2024. The knowledge gaps and opportunities for improvement identified in the *Initial Environmental Evaluation for All Stations Operations* will assist in the Plan's development.

Monitoring results are expected to continually inform the AAD's development of a program-wide Environmental Impact Minimisation Strategy to deliver improved environmental outcomes from program activities. The development of the Impact Minimisation Strategy will commence in 2025 and is a commitment made in the Australian Antarctic Strategy and 20 Year Action Plan. The development of the Strategy will be led by the AAD's Environmental Stewardship Program and will require collaboration with multiple work areas across the AAD. The environmental monitoring associated with RSV Nuyina's operations will be integrated into the AAD-wide environmental monitoring program.

3.2 Incident management and reporting

The AAD's environmental incident and hazard reporting system is a key component of the AAD's EMS. The system provides the capacity to monitor and track activities or incidents that either directly or indirectly have the potential (near misses and improvements) to impact the environment. This reporting system forms part of a monitoring framework that identifies, prioritises and responds to environmental impacts or risks in real-time. The integration of this reporting system into AAD quarterly and annual reporting allows for the analysis of incidents and trends to identify and monitor environmental impacts and response actions. AAD's environmental incident reporting system provides an evidence-based approach for the development and delivery of continual improvements to the AAD's EMS and Antarctic operations.

Any incidents related to the monitoring indicators covered under the current plan will be included in the data analysis and reporting for RSV Nuyina as per Section 8. Such incidents may relate to:

- impacts on wildlife (Section 6.1)
- inadvertent release of fuel, oil, oily water, sewage or waste (Section 6.2), and/or
- introduction of non-native species through cargo and scientific operations or as a result of biofouling (Section 6.3).

3.3 State of the Environment and Department monitoring and reporting

Various AAP environmental performance indicators such as energy use, greenhouse gas emissions, water consumption and waste returned to Australia are monitored on an annual basis to support reporting requirements for the *Department of Climate Change, Energy, the Environment and Water Annual Report* and the 5-yearly *State of the Environment (SoE) Report*.

Indicators relevant to shipping operations are primarily associated with fuel usage and greenhouse gas emissions, which are relevant to impacts related to the emission of diesel engine exhaust to the environment (Section 6.2).

RSV Nuyina fuel usage and greenhouse gas emissions data that are collated by the AAD for these reports will be included in the data analysis and reporting for RSV Nuyina as per Section 10. Fuel usage and greenhouse gas emissions calculations will be reviewed against calculations done by the ship's operator, Serco, as part of the RSV Nuyina's Ship Energy Efficiency Management Plan.

3.4 AAP science projects and Special Research Initiatives

There are a number of current and proposed AAP science projects and Special Research Initiatives (SRIs) that may produce data that would support the objectives of the RSV Nuyina Environmental Monitoring Plan. Examples include: i) an SRI study that aims to inform on-ground management of non-native species in Antarctica by quantifying the efficacy of current biosecurity practices, identifying taxa most likely to survive transport, and determining the drivers of establishment (Section 6.3), ii) an AAP study to investigate the usefulness of eDNA methodologies in identifying transport pathways for non-native species to Antarctica (Section 6.3), and iii) a proposed study under the Biodiversity of Each Antarctica, Underwater and Terrestrial (BEAUT) program to investigate the biodiversity of nearshore marine waters around Australia's Antarctic stations (Section 6.1).

The AAD Science Branch and SRIs will be engaged on an ongoing basis to identify potential synergies and efficiencies in data collection, and identify how data from relevant AAP and SRI projects could be incorporated into the monitoring program.

4 Consultation

In developing the initial environmental monitoring program, input was sought from the AAD Environmental Management Unit (EMU) and relevant subject matter experts within the Science Branch to:

- identify suitable monitoring objectives, indicators, triggers and high-level monitoring methodologies
- provide advice on incorporating data from relevant Australian Antarctic science projects, and
- maximise alignment with broader AAP environmental monitoring activities.

The AAD's Operations and Logistics Branch and Assets and Technology Branch were engaged for advice on:

- RSV Nuyina's technical specifications
- details of RSV Nuyina's operational and science system commissioning activities, and
- international environmental compliance obligations specific to RSV Nuyina's

certifications.

5 Approach and implementation

5.1 Roles and responsibilities

The following personnel are responsible for implementing the environmental monitoring program:

- **All personnel (including subcontractors)** – responsible for:
  - reporting any environmental compliance issues to the Voyage Leader
- **AAD Voyage Leader** – responsible for:
  - ensuring all underway monitoring activities are completed for each voyage either directly or via delegation
  - ensuring logs of all underway monitoring activities are completed for each voyage
  - logging environmental incident information within the AAD's incident management system, and
  - the coordination of any incident responses
- **AAD Voyage Management Team** – responsible for:
  - overseeing underway monitoring activities:
    - monitoring compliance with light management guidelines
    - recording bird strikes on the ship
    - scheduling wildlife spotters
  - the implementation of safeguard and mitigation measures during operational activities, including operation of science systems, and
  - implementing management measures and rectifying any compliance issues related to these activities
- **Assistant Director, Assurance and Compliance (Maritime Assets Management)** – responsible for:
  - developing a resourcing plan for implementation of monitoring activities and submitting relevant documents as part of the annual Season Planning processes
  - ensuring that AAD Voyage Management, Voyage Leader/s and any sub-contractors are executing the required monitoring activities and reporting according to the requirements in this environmental monitoring plan
  - reporting estimated greenhouse gas emissions from shipping operations
  - ensuring the self-noise trials and biofouling inspections are completed on schedule, and
  - drafting the annual Report of Activities

- **Wildlife spotters** – responsible for:
    - acquisition of wildlife interaction data while the ship is travelling within 5 nm of areas of high ecological value (e.g. ASPAs, ASMAs) and during operation of multibeam bathymetry survey equipment
- **Watchkeeper** – responsible for:
    - recording any observable wildlife strikes/deaths while the ship is underway, and
    - reporting any wildlife strikes/deaths to the Voyage Management Team
- **Environmental Lead** – responsible for:
    - coordinating the collection and analysis of benthic marine/nearshore data[1]
    - coordinating the development of any standalone environmental monitoring reports relevant to RSV Nuyina, and
    - drafting sections relating to environmental monitoring in the annual Report of Activities
- **Environmental Manager** – responsible for:
    - reviewing the environmental monitoring reports, and approving the submission of the reports to the Director, Antarctic and Environmental Regulation (AER) and Branch Head, Policy and Strategy
- **Director, Maritime Assets Management** – responsible for:
    - identifying and agreeing to resourcing requirements (staff, equipment, berths, etc.) for implementation of this monitoring plan and requesting approval for the required resources within the Season Planning prioritisation process
    - maintaining awareness of any environmental incidents, and
    - signing off on environmental monitoring reports relevant to RSV Nuyina operations prior to submission.

5.2 Resourcing

Personnel and equipment will be resourced according to the resourcing plan developed by the Assistant Director, Assurance and Compliance, in consultation with the Director, Maritime Assets, with berths allocated during the annual Season Planning process.

To assist with prioritising the monitoring required under this plan, EMU have included components of this monitoring program in the project application for Project 5231. This project incorporates comprehensive environmental monitoring, audit and assurance activities for the AAP. It includes a range of monitoring activities needed to meet impact assessment and quality assurance requirements, including existing obligations associated with legislative authorisations and approvals. Monitoring activities associated with the RSV Nuyina Monitoring Plan are

[1] Analysis of data is overseen by the relevant subject matter experts in Science Branch. Depending on priorities and resources, data analysis may be contracted out to external consultants.

proposed for voyages to Casey, Davis and/or Mawson stations in each of the next 4 field seasons, noting that projects in support of IEE authorisation and compliance are considered Tier 2 projects (i.e., secondary focus projects) in the 2025-26 field season.

Resourcing of the marine benthic/nearshore baseline surveys (see Section 7) will be determined in consultation with the BEAUT program lead.

5.3 Environmental training

All crew and passengers aboard RSV Nuyina receive mandatory environmental training and awareness presentations, as described in the RSV Nuyina Environmental Management Plan 2024-2029. In addition, all persons involved with implementing the RSV Nuyina Environmental Monitoring Plan 2024-2029 will be provided with training tailored to the role of the individual and their level of involvement in implementing the monitoring plan.

Specific training to be completed by personnel includes:

- pre-departure briefings led by EMU covering the Environmental Management Plan, IEE, and obligations under the ATEP authorisation, and
- training relevant to collection of monitoring data, including deployment and use of the various monitoring equipment, delivered by EMU or by relevant subject matter experts (for specialised monitoring equipment).

5.4 Methodologies

Detailed monitoring methodologies, including equipment selection, deployment, and sample collection will be developed in consultation with the Science Branch and Operations and Logistics Branch (Maritime Assets and Maritime Science Delivery sections) prior to the commencement of each summer field season and once season planning details have been finalised.

6 Summary of impacts

The following sections list the main impacts and key environmental indicators identified in the IEE upon which the monitoring activities are based. In general, these relate to potential impacts where residual risk is rated as greater than ‘low’. In addition, the environmental authorisation requires that monitoring activities be undertaken for several other potential impacts – these are also listed in the sections below.

6.1 Flora and fauna

The primary potential impacts to flora and fauna described in the IEE or authorisation include:

F1 Impacts on wildlife through collisions, disturbance from the ship whilst underway, noise and light

F2 Impacts on benthic/nearshore marine communities from anchors/cables and operation

of small vessels (noting that surveys of the anchorage areas around Casey and Mawson stations were identified as a key knowledge gap in the IEE).

6.2 Pollution

Primary pollution impacts described in the IEE or authorisation include:

- P1 Inadvertent release of fuel, oil, oily water, sewage or waste
- P2 Emission of diesel engine exhaust to the environment
- P3 Noise
- P4 Light

6.3 Biosecurity

Biosecurity impacts considered in the IEE or authorisation include:

- B1 Introduction of non-native species or pathogens (e.g. Highly Pathogenic Avian Influenza [HPAI]) to the Antarctic continent through cargo, equipment and/or personal items.
- B3 Introduction of non-native species to Southern Ocean waters as a result of biofouling of ship or scientific equipment, or through exchange of ballast water.

7 Monitoring summary

The table overleaf provides details of monitoring activities to evaluate the potential impacts and address the knowledge gaps listed in Section 6.

#	Objective	Indicator	Trigger	Management response/s	Method	Location	Monitoring frequency	Reporting	Implementation (I) & Reporting (R) Leads	Reporting frequency
Flora and fauna										
F1a	Record strike/death of wildlife due to collision with ship whilst underway	Wildlife strike	Wildlife strike	• Reduce speed, alter course, or cease operation of ship when appropriate and safe	Visual lookout for wildlife maintained by Watchkeeper	South of 60°S	While ship is underway	• Incident report • Report of Activities	I: Watchkeeper R: Voyage Leader	Event / Annual
F1b	Assess the number of wildlife interactions (collisions or behaviour change) with the ship whilst underway near high value ecological areas and during operation of multibeam bathymetry survey equipment	Physical impact of ship with wildlife and/or detected wildlife behaviour change	Wildlife strike / wildlife visibly distressed or panicked	• Reduce speed, alter course, or cease operation of ship when appropriate and safe • Increase lookout capability in high risk areas	• Wildlife behaviour observations using wildlife spotters on the bridge or from wildlife observation stations on the Compass Deck • See *AAD Standard Operating Procedure for RSV Nuyina Cetacean Monitoring for Acoustic Survey* (D24/32666).	• In areas of high environmental value e.g. in close proximity (5nm) to ASPAs or ASMAs • Any location south of 60°S where multibeam equipment is operated	• While ship is underway within 5nm of ASPA/ASMAs • During multibeam bathymetry surveys	• Incident report • Report of Activities	I: Wildlife spotter/s R: Voyage Leader	Event / Annual
F1c	Assess the number of bird strikes on the ship	Bird strike or presence of bird on vessel	Deceased or injured bird	• Review of light management on vessel • Reduce external lighting not used for navigation or safety of personnel	Visual checks for birds on ship	External locations onboard RSV *Nuyina*	Daily	• Incident report • Report of Activities	I: Vessel Crew and Voyage Management Team R: Voyage Leader	Event / Annual
F2[1]	Verify the magnitude of impacts on benthic marine and nearshore communities from anchors and small vessel operations	Distribution, abundance and/or community composition of benthic communities	Significant deviation of indicator from reference communities	• Investigate options to reduce anchorage footprint • Update procedures and other mitigation measures	Benthic surveys using ROV and/or grab/core samples	Within and outside anchorage areas and/or landing areas at Antarctic stations	Initial baseline/case study	• Report of Activities • Standalone report	I: EMU R: EMU	Event
Pollution										
P1	Monitor surface water quality in the event of a major spill of fuel, oil, oily water, sewage or waste	Concentrations of contaminants attributable to human sources and measurable using standard analytical techniques	Detectable persistent concentrations of contaminants	• Investigate incident • Review engineering and administrative controls and develop recommendations • Implement endorsed recommendations	Collection of snow/water from impacted and non-impacted areas. Analytical analyses for contaminants of concern.	Within and outside spill impact area	Event	• Incident report • Report of Activities	I: Voyage Leader/Vessel Crew R: Voyage Leader	Event/Annual
P2	Calculate estimated greenhouse gas (GHG) emissions from shipping operations	Estimated GHG emissions	Exceedance of expected GHG emissions[2]	• Investigate cause of fuel exceedance • Review measures to reduce fuel usage and emissions to the air as a result of fuel consumption, as outlined in *Shipboard Energy Efficiency Management Plan* (SEEMP) (Serco 2021) • Implement endorsed recommendations	Ship-specific method for collecting, aggregating and reporting data on annual fuel oil consumption, distance travelled, hours underway and other data required by Regulation 22A for MARPOL Annex VI (Serco 2021)[3]	RSV *Nuyina* engines, turbines, boilers and incinerators	• Monthly reporting of operating hours/fuel consumption • Annual calculations of GHG	Report of Activities	I/R: Assistant Director, Assurance and Compliance (Maritime Assets Management)	Annual
P3	Monitor compliance with light management guidelines for RSV Nuyina	Lighting during hours of darkness (defined as number of external lights or lights visible from external locations on ship exceeding minimum required for safety or navigational purposes)	Non-conformance with ship's light management guidelines	• Reduce external lighting not used for navigation or safety of personnel	• Real time observations of external locations using security video footage (CCTV) • Assessment of lights visible from external locations during regular rounds of ship	• Locations of existing webcams • External locations onboard RSV Nuyina walked during regular rounds	Daily	Report of Activities	I: Voyage Leader / Vessel Crew R: Voyage Leader	Annual

#	Objective	Indicator	Trigger	Management response/s	Method	Location	Monitoring frequency	Reporting	Implementation (I) & Reporting (R) Leads	Reporting frequency
P4	Characterise underwater noise from operation of RSV Nuyina	Underwater noise levels	N/A	• N/A	As per Section 6.3 of Serco 2018 (D22/13280)	Storm Bay[4]	As per Serco 2018 (D22/13280)	Report of Activities	I/R: Assistant Director, Assurance and Compliance (Maritime Assets Management)	After each major docking
Biosecurity										
B1	Detect non-native species or pathogens present in RSV Nuyina cargo, equipment, and personal items	Non-native species or pathogen	Detection of non-native species or pathogen	• Remove biosecurity risk • Review operational measures for prevention	AAD cargo and voyage biosecurity procedures including inspections and incident reporting for detection of non-native species or HPAI	• Cargo and Biosecurity Centre (CBC) (and Mac 4 storage facility if applicable) • RSV Nuyina	Event (prior to each voyage)	• Incident report • Report of Activities	I: CBC Staff (pre-departure) / Vessel Crew (rodent traps) / Voyage Leader (biosecurity of cargo holds) R: Voyage Leader	Event/Annual
B2	Monitor biofouling of ship and scientific equipment	Biofouling organisms	Non-conformance with biofouling management plan (DAMEN 2018)	• Remove biofouling organisms (see DAMEN 2018 [D21/129149], DoE & NZMPI 2015) as required through a risk assessment • Review operational measures for cleaning of scientific equipment and prevention of ship biofouling (e.g. flushing systems) • Additional inspections/studies to quantify risk of successful translocation and establishment in Southern Ocean waters	Inspections of scientific equipment and areas of the ship that are susceptible to biofouling (see DAMEN 2018) (D21/129149)	• Hobart wharf – underwater inspection and inspection of scientific equipment • Dry dock inspections	As per DAMEN 2018 (D21/129149) Underwater inspection and inspection of: • scientific equipment = minimum annually • Every dry dock = minimum every 60 months	Report of Activities	I/R: Assistant Director, Assurance and Compliance (Maritime Assets Management)	Annual

Notes:

[1] Detailed objectives, indicators, triggers, methods and resourcing will be developed in consultation with the BEAUT program.

[2] Expected GHG emissions calculated based on expected fuel consumption for operational season and Key Performance Requirement (KPR) for fuel consumption. Annual fuel consumption trial determines whether compliance with KPR is met.

[3] Serco calculations of GHG emissions will be compared to calculations completed annually for Department Annual Report and SoE Report.

[4] Location of noise trial may vary depending on operational requirements.

8 Constraints

The ability to achieve the monitoring components outlined in this report is dependent on available resources, berth availability on ships/stations, operational capacity and logistical constraints that can occur in any season. Risks associated with these constraints will be managed through season planning and budget/corporate planning processes to ensure that monitoring activities are sufficiently prioritised commensurate with their high level of importance as a statutory requirement.

9 Data management

Records (including photographs and ship tracking data) will be maintained to substantiate activities associated with the monitoring plan. Data collected as part of this monitoring plan will be guided by the FAIR principles for scientific data management and stewardship (i.e., Findability, Accessibility, Interoperability and Reusability) and managed according to the AAD Information Assets Policy: Records Management. Data will be stored initially on a dedicated file share, with access restricted to individuals directly involved with the monitoring plan. Data will be published as soon as possible on the Australian Antarctic Data Centre (AADC) once quality assurance and quality control processes have been conducted.

The approved monitoring plan, and its future revisions, will also be published on the AADC within one year of its approval.

10 Reporting and review

10.1 Reporting

Several reports will be produced to assess compliance with the authorisation conditions.

Report	Description	Timing	Submitted to
Report of Activities	Report describing all activities undertaken as part of this monitoring plan as per the Report of Activities form	On or before 31 May, annually	Director AER
Incident Report	Relevant for impacts relating to: 1) significant wildlife disturbance; 2) spills of fuel, oil, oily water, sewage or waste; and, 3) biosecurity incidents.	At time of event	AAD's Environmental Incident Reporting system
Marine baseline survey report (case study)	A description of all activities undertaken, and data collected for Activity F2. The purpose of the report is to: 1) describe the baseline data collected on the biodiversity and sediments at anchorage areas/nearshore marine areas, and 2) assess the magnitude of impacts on marine and nearshore areas from anchors and small vessel operations.	Within 1 year of completion of baseline survey	Director AER

10.2 Monitoring plan review

AAD Science Branch subject matter experts in conjunction with the EMU will review data collected under this plan at the end of the operational season. An annual review of data and evaluation of management measures will be undertaken with key stakeholders from Maritime Assets, Maritime Science Delivery, EMU, subject matter experts and AER to assess whether the plan is achieving its objectives and the requirements of any relevant approval conditions, and to identify ongoing and additional monitoring, management and mitigation requirements. Review of the environmental monitoring plan will also be undertaken following significant environmental incidents or when there is a need to improve performance in an area of environmental impact. The review will consider environmental monitoring records, corrective actions and the results of any audits.

9 References

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Serco. 2018. Environmental Management Plan, Draft Version 4 (MGT-1400). Document Reference: ASP-DEF-RSV-PLN-MGT-1400.

Serco. 2021 Ship Energy Efficiency Management Plan. Part 2: Fuel Oil Consumption Data Collection Plan. Version 1.0. Document Reference: ASP-DEF-RSV-PLN-HSE-006

11 Appendix A: Datasheets

F1a/b - Wildlife interaction/strike with vessel (underway or multibeam survey south of 60°S)

This datasheet is used to record: 1) strike/death of wildlife due to collision with ship whilst underway and 2) wildlife interactions (behaviour change) with the ship whilst underway near high value ecological areas and during operation of multibeam bathymetry survey equipment.

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Date	24hr time (local)	Observer(s)	Species	Location of ship	Direction of ship's travel	Strike / Wildlife behaviour response	Action taken	Comments

Behaviour responses: change in posture, vocalisation, diverting course, fleeing

F1b - Wildlife monitoring roster

Dedicated wildlife observers will operate whilst the ship is underway near high value ecological areas and during operation of multibeam bathymetry survey equipment.

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Voyage			
Date / Time zone (UTC+)			
Start time (local)	**End time (local)**	**Port side monitor**	**Starboard side monitor**
1200	0100		
0100	0200		
0200	0300		
0300	0400		
0400	0500		
0500	0600		
0600	0700		
0700	0800		
0800	0900		
0900	1000		
1000	1100		
1100	1200		
1200	1300		
1300	1400		
1400	1500		
1500	1600		
1600	1700		
1700	1800		
1800	1900		
1900	2000		
2000	2100		
2100	2200		
2200	2300		
2300	2400		

F1c Bird strike/bird presence on vessel (south of 60°S)

This datasheet is used to record: 1) observed bird strikes and 2) the presence of bird/s on the vessel (dead or alive)

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Date	24hr time (local)	Observer(s)	Species	Location on ship	Status of bird (uninjured, injured, deceased)	Action Taken	Additional Comments

P3 Light pollution during hours of darkness (south of 60°S)

This datasheet is used to monitor compliance with light management guidelines for RSV Nuyina.

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Date	24hr time (local)	Observer(s)	Number of lights visible	Location of light source on vessel	Location of vessel	Actions taken	Additional comments