

Industry Guideline for the Collection and Submission of Marine Mammal Observer Data from Marine Seismic Surveys

australian petroleum production & exploration association limited

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1. Part One: Overview

This guideline provides titleholders, operators, and Marine Mammal Observers (MMOs) with guidance on how to consistently record and submit whale sighting and related marine seismic survey data to the Australian government. The aim of the guideline is to improve the quality of MMO data recorded and submitted from seismic surveys in Australian waters. This will assist proponents to meet their reporting requirements and provide more robust data about the interactions between marine seismic operations and whales. In addition, MMO data provides an important source of information about whales, that in turn may benefit proponents' mitigation and operational planning for future surveys.

This guideline consists of:

- Part 1: Overview
- Part 2: Titleholder, operator and MMO responsibilities
- Part 3: Data use and importance
- Part 4: Data collection and submission
- Part 5: Glossary
- Appendix 1: MMO data survey checklist
- Appendix 2: Example MMO dataset

This guideline does not cover:

- Environment Plan compliance advice
- Directing mitigation actions on the seismic survey vessel
- Advice regarding MMO observation processes such as search pattern and area.

1.1 EPBC Act Policy Statement 2.1 Reporting Requirements

Marine seismic surveys in Australian waters are required to meet the requirements outlined in [EPBC Act Policy Statement 2.1 – Interactions between offshore seismic exploration and whales](#) (DEWHA 2008). Section A.4 of the policy (hereafter referred to as PS2.1) requires a report on the conduct of the survey, and any whale interactions, to be submitted to the Department, currently the Department of Agriculture, Water and the Environment, within two months of survey completion:

“The report should, at a minimum, contain:

- the location, date and start time of the survey;
- name, qualifications and experience of any Marine Mammal Observers (or research scientists) involved in the survey;
- the location, times and reasons when observations were hampered by poor visibility or high winds;
- the location and time of any start-up delays, power downs or stop work procedures instigated as a result of whale sightings;
- the location, time and distance of any whale sighting including species where possible; and
- the date and time of survey completion.”

To assist in meeting these reporting requirements, the Department subsequently developed the [Cetacean Sightings Application](#) (CSA) software. The CSA provides a consistent and robust method for recording and submitting MMO data and is available on request from sightingsdata@aad.gov.au.

As well as the reporting requirements outlined in PS2.1, additional reporting may be required by Commonwealth or State regulators under the survey Environment Plan.

2. Part 2: Proponent, Operator and MMO Responsibilities

Marine seismic surveys in Australia are primarily undertaken via an exploration permit, special prospecting authority or scientific investigation consent. The company who holds the permit or authority is the titleholder. The operator is the company who undertakes the survey. In some cases, the titleholder may also be the operator.

As per PS2.1, ultimate responsibility for meeting the reporting requirements of PS2.1 lies with the titleholder: “It is the responsibility of the proponent to maintain a record of procedures employed during operations. Such records should be auditable and account for aspects of the operation that relate to legislative approvals and regulations.” In order to meet these requirements, the titleholder, operator and MMO all have responsibilities for recording and reporting MMO data as follows.

Note that PS2.1 uses proponent which is the equivalent of titleholder under petroleum legislation.

2.1 Titleholder (Proponent)

The titleholder (proponent) is responsible for ensuring:

- Appropriately qualified and trained MMOs are contracted for the survey.
- An appropriate number of MMOs are contracted to allow for quality observations and recording and reporting requirements to be met. This should consider fatigue management to ensure the combined observation hours and post observation reporting do not exceed the acceptable daily work hours.
- The MMO is provided with a responsible person on the vessel who monitors and manages fatigue, overseas data and reporting requirements and
- Roles associated with the implementation of marine mammal controls (MMOs, titleholder and operator) understand and can apply the marine mammal controls detailed in the EP prior to the survey commencing. This includes chain of command for actions and decisions.
- The CSA XML file and a PDF of the “All data” report generated from the CSA is submitted to the Department.

2.2 Operator

The operator is responsible for:

- Providing the MMO with appropriate facilities to record and report data accurately.
- Providing the MMO with relevant information about how the survey will be undertaken and details of survey operations such as number of arrays, source volume, shot point interval, duration of soft starts, operations records.
- Ensuring all recording requirements are complete at the end of the survey.

2.3 MMO

The MMO is responsible for:

- Accurately recording whale sightings and survey data.
- Using the CSA to record data (or an equivalent method that exactly follows the CSA XML schema).
- Provide daily data to Operator.
- Quality assurance and quality control of the data on a daily basis and prior to submission to the proponent.
- Exporting the CSA XML file and generating an “All data” PDF report in the CSA and providing both files to the proponent.
- Titleholders may also require the MMO to produce a separate report summarising MMO observations and actions for the survey. The MMO summary report is not a substitute for the CSA export files and should be produced in addition to the latter.

3. Part Three: Data use and importance

MMOs record valuable data about whale observations and the controls implemented to avoid impacts to whales during marine seismic surveys. Collectively, these data form an important resource for managers and regulators, industry operatives and scientists to answer questions about whales and their interactions with seismic operations in Australian waters.

3.1 Why record MMO data?

In addition to fulfilling the regulatory requirement to record MMO data, these data can be used to inform:

- management and regulation:
 - i. impact evaluations for survey approvals,
 - ii. assessment of the effectiveness of controls,
 - iii. compliance records to show a survey was conducted according to approval conditions.
- survey planning:
 - i. to inform survey design, including:
 - a) expected species, timing and mitigation measures to avoid impacts, and
 - b) expected downtime as a result of shutdowns and delays for whales.
- biological information:
 - i. to contribute to the body of knowledge about whale biology and ecology.

3.1.1 Some questions that might be asked of the data include analyses of:

- Distribution and timing of species presence and seasonality.
- Group characteristics and behaviour by location and season.

- Relationships between seismic source output (e.g. source volume and status) and sightings.
- Effectiveness of controls implemented in relation to location, season, source output and species.
- Sightability in relation to weather and distance.

3.1.2 Types of data required

In order to provide meaningful data for analyses, MMOs must record more than just whale sightings data. Without associated data on observer effort, weather conditions and survey operations, analysis and interpretation of sightings data becomes limited. In particular, changes in source status, observation hours, observation distance and weather changes must be recorded consistently to provide context and standardisation of sighting data (or lack thereof). As an example, if effort and weather are recorded consistently throughout a survey, a lack of whale sightings constitutes an important finding. But without a consistent record of effort and weather, any insights about the lack of whale sightings are lost.

3.2 MMO standards and quality of data

To ensure recorded and reported MMO data is consistent and of a high quality, it is important that MMOs are appropriately qualified and trained for surveys in Australian waters. As per PS2.1:

“MMOs should be trained and experienced in whale identification and behaviour, distance estimation, and be capable of making accurate identifications and observations of whales in Australian waters. The MMOs should assist other observers (e.g. trained crew) and be available to provide advice, should whales be encountered.”

Training in the use of the CSA is also recommended. In addition, MMOs need to have a good understanding of marine seismic survey operations and mitigation actions, as well as being mindful of operations underway throughout observation periods, in order to provide high quality data.

In addition to using qualified and trained MMOs, fatigue also needs to be managed appropriately to ensure MMOs have enough time to undertake quality observations, as well as time to fulfill recording and reporting requirements.

4. Part Four: Data collection and submission

To collect consistent, high-quality data, MMOs must adhere to standardised formats, protocols and software. It is essential that MMO data is collected according to the Department's requirements and avoid software, spreadsheets or formats from other jurisdictions (e.g. JNCC, NZ Code of Conduct).

MMO data should be recorded using the [Cetacean Sightings Application](#) wherever possible. If this is not possible then data must be recorded and exported exactly as per the CSA [XML schema](#) provided by the Department. The schema is available through the link on the [CSA web page](#) and outlines the order, fields and values that the XML must conform with to enable import to the National Marine Mammal Database.

Upon completion of a survey, all information entered into the CSA should be exported as an XML file and emailed to sightingsdata@aad.gov.au. A PDF report of “All data” should also be generated using the Reports section of the CSA and emailed along with the XML file. An emailed confirmation will be sent upon receipt of each submission.



Appendix 1 provides a checklist that can be used by a MMO to ensure all components of recording MMO data are completed.

Appendix 2 provides an example of recorded survey data.

4.1 Data collection using the Cetacean Sightings Application

A summary and points of clarification for records required in the CSA is provided as follows:

- Observers
 - An observer is anyone who has responsibility for marine mammal/fauna observations. Observers also have responsibility for recording and reporting marine mammal sightings. This includes dedicated MMOs as well as vessel or seismic crew. The details for each Observer should be recorded including their level of training. Notes should also be included if the Observer was not acting in a dedicated capacity (e.g. vessel crew if they had other duties while observing).
- Survey information
 - The specific details of the survey should be recorded, including clear delineation if multiple surveys are conducted during the same voyage. Use the 'Additional notes' field if required.
- Survey operations
 - Records must be entered at the start time for all changes in source status throughout the survey, including source testing, soft starts, full power, shut downs, power downs, delays and restarts. Survey operations data should also include when the vessel enters and leaves the operational area and when gear is deployed and retrieved.
 - Changes in operational status must be recorded using accurate times as the record may be used to assess compliance.
 - Recording shut downs: If a survey operation is at full power acquiring data and requires a shut down due to a whale sighting, the shut down should be recorded as:
 - A row capturing the act of shutting down the source as a single event (i.e. *Source status* as "Shut down" with 1 minute as the default)
 - One or more rows with *Source status* as "no source" to cover the period until the source is started up again or status changes in some other way.
 - Any further details can be added in the *Notes* column (e.g. abandoned lines, how long the animal is inside the relevant mitigation zone).
 - The shut down itself is captured by *Source status* as "Shut down" and *Reason activity interrupted* as "Shut down". The next row is recorded as "No Source" and *Reason activity interrupted* as "Shut down".
 - Adhering to the above protocol provides a consistent method for recording shut downs and allow for easier analysis of the data.

- Observer effort
 - Observer effort must be recorded throughout the day, not just summarised as the total hours observed per day. Observers are required to maintain continuous observations during key periods, such as soft starts, and not be distracted by other tasks. All changes in Observer effort should be recorded, including MMOs going on or off effort and changes in weather conditions. Key observation times, such as pre-shooting, soft start and full power observations must also be recorded. These provide a record of compliance with observer requirements.
- Weather conditions
 - Weather conditions and changes are important to record as they provide a measure of whale detection probability.
 - Typically observations are less effective when weather conditions are above wind 20 knots and sea state 4+.
- Cetacean sightings
 - All sightings of whales and dolphins should be recorded regardless of survey operation status, including while in transit to and from the survey area or between surveys. Ideally the first, closest and last sighting for each animal or group should be recorded, as well as whenever mitigation actions (e.g. shut down or power down) are required or animals enter or leave a mitigation zone.
 - Species must be recorded to the lowest confirmed taxon. It is better to record a 'certain' sighting of an 'Unidentified Bryde's/Fin/Sei type' than to guess and be wrong about the species.
 - For mixed species groups, each species identified are to be recorded separately for the same location.
 - It should be noted that the CSA has some limitations with regards to recording of species when there is uncertainty in the lowest confirmed taxon. For example, there is no option to record a 'bottlenose dolphin' unless further detail is known, only 'Bottlenose dolphin – Common' or 'Bottlenose dolphin – Indo-Pacific'. In these instances, the MMO should provide a description in the *Notes* field.
 - MMOs are encouraged to make use of the *Notes* field to provide more detail about cetacean sightings as needed. Supplementary information may include species identification notes (e.g. size, colour, anatomical descriptions, confidence level or similar species), behaviours, group dynamics, presence of other species or any other information the MMO deems relevant.
 - Bearings must be recorded relative to the bow of the vessel (with the bow as '0' degrees) for both cetacean sightings and the bearing to the source.
- Non-cetacean sightings
 - Sightings of non-cetacean species should be recorded but not at the expense of core MMO duties or cetacean sightings. Non-cetacean sightings data can provide useful information about large numbers of animals in an area, important habitat or unusual sightings but these data have limited utility for answering broader questions due to their opportunistic nature and lack of robustness.

- Other notes:
 - Further details about the formats and values required for each field can be found in the CSA Help Menu. All data recorded during a survey should adhere to these formats even if recorded using a method other than the CSA. For example, wind speed should be recorded as per the CSA syntax and format of '0-10 kts', not as '5 knots'.
 - MMOs should make use of the *Notes* field in the CSA whenever there is uncertainty or further clarification is required. This gives context and can help clear up or eliminate questions when interrogating the data.
 - All times should be recorded in UTC using 24 hour format.

4.1.1 Quality control

Before finalising the data for a survey, MMOs should review all data using the “Search and edit data” option in the CSA. This is an important step to ensure quality control of the data. Ideally the data should be reviewed, and corrected if required, throughout a survey, or at the least before any MMO crew change occurs. A final review and edit should also be performed prior to exporting the XML file for the survey. As the CSA uses *required fields and the survey data cannot be exported as an XML file unless all data adheres to the required formats, the MMO should also perform a data validation using the “Reports” function in the CSA prior to attempting to export the data.

4.1.2 Data export and submission

As per the CSA instructions:

“Once the data for a survey has been collected, entered and reviewed to ensure its accuracy and completeness ... create an XML export file. A PDF report of “All data” should also be generated using the Reports section of the CSA.

The XML export file and PDF must be emailed to the proponent.

The proponent is responsible for ensuring the XML export file and PDF to: sightingsdata@aad.gov.au.

If you are unable to fill in all *required fields in the CSA and therefore can't export an XML file for the survey email sightingsdata@aad.gov.au for assistance.

5. Part Five: Glossary

Cetacean	A whale or dolphin
CSA	Cetacean Sightings Application
Dedicated observer	A Marine Mammal Observer or Marine Fauna Observer
Full power	All seismic sources in the array(s) are at full power and data is being acquired
MMO/MFO	Marine Mammal Observer/Marine Fauna Observer
Marine seismic survey	The use of an acoustic source to send sound waves into the seabed and measuring their reflection to map subsurface geological characteristics.
Operator	The company conducting the survey
Pre-shooting observations	Visual observations for cetaceans prior to activation of the acoustic source.
PS 2.1	Environment Protection and Biodiversity Conservation Act Policy Statement 2.1 - Interaction between offshore seismic exploration and whales
Shut down	The acoustic source is completely stopped. If the array is completely shut-down or reduced to low power (eg. for operational reasons during line turns), observations for whales should continue.
Soft start	A sequential ramp-up of the acoustic source is considered to be industry best practice and is known as a 'soft start'. The slow increase in acoustic energy may alert whales in the area to the presence of the seismic array and enable animals to move and avoid (or stand off) at distances where injury is unlikely.
Source status	The status level of the acoustic source, such as testing, soft start, powered down to minimum, full power, shut down or no source
Titleholder	The company who holds the permit or authority to conduct a seismic survey.
UTC	Coordinated Universal Time. Local times in Australia vary between UTC+8 (AWST) and UTC+11 hours (AEDT).
Whale	For the purposes of seismic survey mitigation actions, EPBC PS2.1 defines 'Whales' as 'baleen whales and larger toothed whales, such as, sperm whales, killer whales, false killer whales, pilot whales and beaked whales'
XML schema	A description of the constraints on structure and content of XML elements. The CSA XML schema describes the constraints on data field headings and content to enable CSA data to be imported to the National Marine Mammal Database.

Appendix 1: MMO Data Survey Checklist

MMO data survey checklist to check all components of recording MMO data completed.

#	Action	Status
1	<i>Prior to survey</i>	
1.1	Download and install the CSA on the MMO computer from: https://data.marinemammals.gov.au/csa	
1.2	Read the information contained in the CSA help menu – in particular, 'Getting started'	
1.3	Use the CSA to enter observer details under 'Enter new data - 'Observer''	
1.4	Use the CSA to enter survey details under 'Enter new data' - 'Survey'	
2	<i>During survey</i>	
2.1	Record weather at the beginning of the effort period and when conditions change under 'Enter new data' - 'Observer effort'	
2.2	Record effort and changes in effort under 'Enter new data' - 'Observer effort'	
2.3	Record source status at the beginning of the effort period and changes in source status under 'Enter new data' – 'Survey operations'	
2.4	Record all cetacean sightings and resightings of marine mammals whether in transit or during the survey under 'Enter new data' – 'Cetacean sighting'	
3	<i>At completion of survey</i>	
2.1	Review and check the entered data under the 'Search and edit data' tab/Reports - the information box at the bottom of the CSA screen will indicate missing data	
2.2	Compile reports using the 'Reports' tab when required	
2.3	Email the exported XML data file and a pdf of the 'All data' report generated from the Reports section of the CSA to sightingsdata@aad.gov.au	

Appendix 2: Example data set

Example data from a survey – it is noted the time is not recorded in UTC which is preferred. However, the notes are used to detail time is recorded in AWST.

This survey has validated successfully and can be exported

Seismic survey report for MMO Data Example - SurveyId: 1

Lease: WA-XX-L, WA-XX-L	Survey type: 3D	DEWHA referral reference number:
Start date: 07/06/2020	End date: 11/08/2020	
Client: XXX	MMO provider XXX	Seismic contractor XXX
Source powerdown distance (meters): 2000	Shutdown distance: 2000	Source volume: 2860
Number of airguns: 32	SP interval (metres): 13	SP interval (seconds): 6
Total sightings: 51	Total power downs: 0	Total shut downs: 4
Notes All times are in AWST to match all other reporting and recording requirements during the survey. All acoustic source positions are = GDA 94 All sighting positions are = WGS 84 Since this database does not accommodate for Passive Acoustic Monitoring effort and detection records, dummy weather data was inputted to allow for the XML file to be exported at the end of the survey. Note that the following weather data listed below for Effort and Sightings wherein the observer is PASSIVE ACOUSTIC MONITORING OPERATOR, are meant to be Not Applicable (NA). Weather = Other - Enter in notes Cloud Cover = 9 Visibility = Less than 1 km Glare = 0 - no glare Beaufort Sea State = 9 Wind Direction = N - 0 Wind Speed = Greater than 50 kts Swell Direction = Confused Swell Height = Greater than 4 m		

**Observers**

Name: 1 MFO	Function: Dedicated observer
Employer: XXX	Employer's email address: XXX
Seismic experience: More than 1 year	Training: Marine Fauna Observers (MFO) Normal rotation times: Lead MFO = 8-10, 12-15, 18-dark MFO = daylight - 8, 10-12, 15-18 Lead MFO from 6 June 2020 - 11 Aug 2020. Australia Marine Fauna Observer Training and Certification 2009. More details of qualifications found in MFO final report. MFO2 from 6 June 2020 - 11 Aug 2020. New Zealand trained and certified MFO 2013. More details of qualifications found in MFO final report. There was no need to distinguish between the Lead MFO and MFO because: * the PAM equipment was calibrated already it was practised that a PAM detection alone to trigger appropriate mitigation measures for sperm and beaked whales at any time of the day and did not require visual confirmation by the Lead MFO.

Name: PAM Operator	Function: Dedicated observer
Employer: XXX	Employer's email address: kerrie.coombe@rpsgroup.com
Seismic experience: More than 1 year	Training: PAM 1 from 6 June 2020 - 11 Aug 2020 working midnight - midday. New Zealand Department of Conservation qualified PAM operator. More details of qualifications found in MFO final report. PAM 2 from 6 June 2020 - 11 Aug 2020 working midday - midnight. JNOC MMO/PAM training, NZ MMO/PAM training, USA PSO training. More details of qualifications found in MFO final report.

Observer effort report for MMO Data Example - SurveyId: 1

Start date	Start time	End date	End time	Observer	Vessel	On or off lease	Effort status	Reason	Were obs hampered	Reason	Weather	Cloud cover	Visibility	Glare	Beaufort sea state	Wind direction	Wind speed	Swell direction	Swell height	Notes
09/06/2020	16:20	09/06/2020	19:00	Officer On Watch	Vessel A	On lease	Pre-shooting observation		No		No phenomena - except clouds	4	3 - 5 km	2 - medium glare	5	S - 180	10 - 20 kts	SW - 225	2 - 4 m	As per Section A.3.6 of the EPBC Act Policy Statement 2.1 at position 21°22.00'S 113°55.7'E. No whales sighted.
10/06/2020	00:00	10/06/2020	02:00	PAM Operator	Vessel B	On lease	Routine observation		Yes	Dark	Other - enter in notes	9	Less than 1 km	0 - no glare	9	N - 0	Greater than 50 kts	Confused	Greater than 4 m	01:27 acoustic source entered operational area
10/06/2020	02:00	10/06/2020	03:16	PAM Operator	Vessel B	On lease	Pre-shooting observation		Yes	Dark	Other - enter in notes	9	Less than 1 km	0 - no glare	9	N - 0	Greater than 50 kts	Confused	Greater than 4 m	
10/06/2020	03:16	10/06/2020	05:09	PAM Operator	Vessel B	On lease	Soft start observation		Yes	Dark	Other - enter in notes	9	Less than 1 km	0 - no glare	9	N - 0	Greater than 50 kts	Confused	Greater than 4 m	acoustic source test
10/06/2020	05:09	10/06/2020	05:58	PAM Operator	Vessel B	On lease	Routine observation		Yes	Dark	Other - enter in notes	9	Less than 1 km	0 - no glare	9	N - 0	Greater than 50 kts	Confused	Greater than 4 m	
10/06/2020	05:58	10/06/2020	06:00	1 MFO & PAM Operator	Vessel B	On lease	Routine observation		Yes	Dark	No phenomena - except clouds	5	Less than 1 km	0 - no glare	3	S - 180	10 - 20 kts	SW - 225	2 - 4 m	
10/06/2020	06:00	10/06/2020	06:09	1 MFO	Vessel B	On lease	Routine observation		Yes	Dark	No phenomena - except clouds	5	1 - 2 km	0 - no glare	3	S - 180	10 - 20 kts	SW - 225	2 - 4 m	
10/06/2020	06:09	10/06/2020	06:19	1 MFO	Vessel B	On lease	Pre-shooting observation		No		No phenomena - except clouds	5	2 - 3 km	0 - no glare	3	S - 180	10 - 20 kts	SW - 225	1 - 2 m	
10/06/2020	06:19	10/06/2020	06:20	1 MFO	Vessel B	On lease	Pre-shooting observation		No		No phenomena - except clouds	5	3 - 5 km	0 - no glare	3	S - 180	10 - 20 kts	SW - 225	1 - 2 m	
10/06/2020	06:20	10/06/2020	07:03	1 MFO & PAM Operator	Vessel B	On lease	Pre-shooting observation		No		No phenomena - except clouds	5	3 - 5 km	1 - low glare	3	S - 180	10 - 20 kts	SW - 225	1 - 2 m	
10/06/2020	07:03	10/06/2020	07:35	1 MFO & PAM Operator	Vessel B	On lease	Soft start observation		No		No phenomena - except clouds	5	Greater than 5 km	3 - bad glare	4	S - 180	20 - 30 kts	SW - 225	1 - 2 m	