

**Looking for Mutjalanydjai (Dolphins) and Galangami (Dugongs) in
Dhimurru Sea Country, Arnhem Land – Development of a standardised
survey methodology for Indigenous Ranger groups to monitor inshore
dolphins and dugongs in northern Australia**

Final Report

Submitted to the Australian Marine Mammal Centre

28 May 2015

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- **Title** – Looking for Mutjalanydjai (Dolphins) and Galangami (Dugongs) in Dhimurru Sea Country, Arnhem Land – Development of a standardised survey methodology for Indigenous Ranger groups to monitor inshore dolphins and dugongs in northern Australia
 - **Project** – 13/25
 - **Chief Investigators** – Dr. Isabel Beasley and Ms. Vanessa Drysdale
 - **Organisation** – James Cook University
 - **Collaborating Institutes** – Dhimurru Aboriginal Corporation

Activity Period – 30 March 2014 – 30 May 2015

Funding Amount – AUD\$58,200 **Amount Remaining** – AUD\$0



Activity Summary

A clear summary of approximately 500 words outlining the work undertaken and any significant findings

Background

Australian snubfin dolphins, *Orcaella heinsohni* (hereafter snubfin dolphins) and Australian humpback dolphins, *Sousa sahulensis* (hereafter humpback dolphins) are collectively known as inshore dolphins, together with inshore bottlenose dolphins, *Tursiops aduncus*. Inshore dolphins occur in small, fragmented populations in northern Australian coastal waters. All species are highly susceptible to human activities, where increasing coastal developments throughout northern Australia have the potential to impact the viability of remaining populations. Although experts have been concerned about the status of inshore dolphin populations for more than 30 years, all species are currently considered data deficient, which precludes their listing under Commonwealth or state legislation. Certain areas in Cape York, Gulf of Carpentaria and Arnhem Land are potentially important habitats for inshore dolphins, but information on their distribution and abundance is virtually non-existent in these regions.

As a result of continued threats and suspected small populations, increasing information on the status of inshore dolphins in north Australian waters is now becoming a national priority, particularly for the little known snubfin dolphin. In a 2013 national meeting to discuss research priorities for inshore dolphins (convened by the Australian Marine Mammal Centre), the remote regions of Cape York, Gulf of Carpentaria and Arnhem Land were identified as key areas where information on potential inshore dolphin hotspots was urgently required.

In 2012, the chief investigator (Isabel Beasley) began a collaborative project with the Yirralka Rangers of East Arnhem Land (funded by Territory NRM) to determine the status of marine mammals in Blue Mud Bay (western Gulf of Carpentaria). Only one marine mammal research project had previously been conducted in the east Arnhem land/western Gulf region, which consisted of aerial surveys in the 1980s (Freeland and Bayliss 1989). This area was therefore identified as a critical area for further study. While conducting this project, opportunistic surveys were conducted in Melville Bay in collaboration with Dhimurru Rangers, where it was discovered that Melville Bay was a potential hotspot for inshore dolphin occurrence (Beasley et al. 2012).

Dhimurru Rangers expressed significant interest to begin independent ranger surveys, which led to the successful proposal to AMMC in 2013 with the following aims and objectives:

Project Aims and Objectives

Project Aims:

1. collaborate with Dhimurru Rangers to develop a cost-effective, culturally appropriate, standardised survey methodology that could be used by indigenous ranger groups to monitor inshore dolphin and dugong occupancy, distribution, and habitat use in northern Australia.
2. contribute to a regional assessment of the status of inshore dolphins and dugongs in east Arnhem Land, by collaborating with the Dhimurru Rangers to conduct broad-scale distribution surveys throughout Dhimurru Sea Country, and investigate the occurrence and abundance of inshore dolphins in Melville Bay and Port Bradshaw.

Project Objectives:

1. build capacity of Dhimurru Rangers to independently conduct marine mammal surveys
2. develop a standardised survey methodology using appropriate data collection tools that will enable Indigenous ranger groups to independently monitor inshore dolphins and dugongs in sea country
3. obtain information on occurrence of inshore dolphins and other marine megafauna in Dhimurru Sea Country
4. obtain information on inshore dolphin distribution, abundance and habitat preferences in Melville Bay
5. raise local community awareness of the status of marine megafauna in Dhimurru Sea Country

Major Results

- A **Research Partnership Agreement** was developed between Dhimurru Aboriginal Corporation and JCU and signed on 5 June 2014.
- An initial **ranger training** was undertaken with Dhimurru Rangers in May 2014, which was followed by six days of surveys in Melville Bay (see May 2014 report – Report 1). A further ranger training was conducted in November 2014 (see Dhimurru Ranger Training example presentation – Report 4). These trainings assisted with species identification, understanding survey protocols and data collection techniques and development of the survey manual and standardised survey methodology.
- Further **boat-based surveys** were conducted in July 2014 (see July 2014 report – Report 2), November 2014 (see November 2014 report – Report 5) and March 2015, also in Melville Bay (Report being prepared by Dhimurru Rangers).
- **Coastal surveys** throughout Dhimurru Sea Country were planned for November 2014 and February 2015, however, because of poor sea and weather conditions only surveys in Melville Bay and Port Bradshaw were possible (Report 5).
- **Boat-based surveys were conducted throughout Melville Bay** (adjacent to Nhulunbuy), which sighted humpback, snubfin (Figure 1) and bottlenose dolphins.
- **Boat-based surveys in Port Bradshaw** sighted bottlenose and humpback dolphins.
- In addition to dedicated independent surveys, Dhimurru Rangers continued to collect **opportunistic sighting records with associated photographs** while out on Sea Country patrols.
- A **survey manual** for ranger surveys has been developed in collaboration with Dhimurru Rangers (see draft survey manual – Report 4).
- A **workshop training manual** for ranger involvement in marine mammal surveys has been developed in collaboration with Dhimurru Rangers (awaiting final approval from Dhimurru Aboriginal Corporation).
- A **cybertracker sequence** developed to aid in data collection for those ranger groups that prefer using PDA technology to that of hard copy datasheets.



Figure 1. Snubfin dolphin sighted in Melville Bay

2. The Outcomes/Objectives

List of the Project Objectives

The project has five primary objectives:

Objective 1.

Build capacity of Dhimurru Rangers to independently conduct marine mammal surveys.

Objective 2.

Develop a standardised survey methodology using appropriate data collection tools that will enable Indigenous ranger groups to independently monitor inshore dolphins and dugongs in sea country.

Objective 3.

Obtain information on occurrence of inshore dolphins and other marine megafauna in Dhimurru Sea Country.

Objective 4.

Obtain information on inshore dolphin distribution, abundance and habitat preferences in Melville Bay.

Objective 5.

Raise local community awareness of the status of marine megafauna in Dhimurru Sea Country.

The degree to which the Activity has achieved each of the objectives

Objective 1.

Build capacity of Dhimurru Rangers to independently conduct marine mammal surveys

(objective completed)

- >> **Survey kit** donated to Dhimurru Rangers consisting of a Garmin handheld GPS (GPSMap72), Canon EOS70D camera with 100-400 lens, 1 pair of Bushnell binoculars, datasheets and plastic storage bin,
- >> **Training workshops** with Dhimurru Rangers (Figure 2), which included local knowledge mapping of regions rangers had previously sighted dolphins and dugongs,
- >> **Boat-based surveys** conducted independently by rangers, with assistance from the CI,
- >> **Boat-based surveys** conducted independently by rangers,
- >> **Collaborative boat-based surveys** with JCU researchers and Dhimurru rangers (Figure 3),



Figure 2. Inshore dolphin in-class training (left) and mapping exercise (right)



Figure 3. Dhimurru Rangers conducting inshore dolphin surveys in collaboration with JCU researchers

Objective 2.

Develop a standardised survey methodology using appropriate data collection tools that will enable Indigenous ranger groups to independently monitor inshore dolphins and dugongs in sea country (*objective completed*)

- >> **Survey recommendation document** development in collaboration with Dhimurru Rangers (Figure 4), with additional input from Girringin, Kenbi, Lama Lama, Larrakia, li-Anthawirriyarra, Normanton, and Yirralka Rangers (final manual in review by Dhimurru Aboriginal Corporation),
- >> **Training workshop document** development in collaboration with Dhimurru Rangers, with additional input from Girringin, Kenbi, Lama Lama, Larrakia, li-Anthawirriyarra, Normanton, and Yirralka Rangers (see survey manual),
- >> **Cybertracker data collection sequence** development in collaboration with Dhimurru Rangers to facilitate data collection,
- >> **Peer reviewed publication in development** in collaboration with Dhimurru Rangers, with additional input from Girringin, Kenbi, Lama Lama, Larrakia, li-Anthawirriyarra, Normanton, and Yirralka Rangers (peer reviewed publication in development in collaboration with Dhimurru Rangers).



Figure 4. Survey lines developed in Melville Bay to facilitate inshore dolphin surveys. Dolphin sightings in Melville Bay during surveys. Humpback dolphins = purple circles (H), Bottlenose dolphins = green circles (B), Snubfin dolphins = red circles (S), Unknown dolphins = grey circle (Dolphin)

Objective 3.

Obtain information on occurrence of inshore dolphins and other marine megafauna in Dhimurru Sea Country (*objective partially completed*)

- >> **Boat-based surveys throughout Dhimurru Sea Country** were not possible due to unfavourable weather conditions, including a Tropical Cyclone in February 2015,
- >> Boat-based surveys were conducted in **Port Bradshaw**, south-eastern Dhimurru Sea Country (November survey report: Figure 5),
- >> Dhimurru Rangers collected **opportunistic sighting data** within Dhimurru Sea Country during regular Sea Country patrols.



Figure 5. Dugongs were sighted in Port Bradshaw, while spinner dolphins have been sighted in offshore waters of Dhimurru Sea Country

Objective 4.

Obtain information on inshore dolphin distribution, abundance and habitat preferences in Melville Bay (*objective completed*)

- >> **Boat-based surveys were conducted within Melville Bay**, using capture-recapture photo-identification study design, to determine inshore dolphin distribution, abundance and habitat preferences (Figures 6-8) (peer reviewed publication now in development in collaboration with Dhimurru Rangers).



Figure 6 – Australian snubfin dolphin sighted in Melville Bay

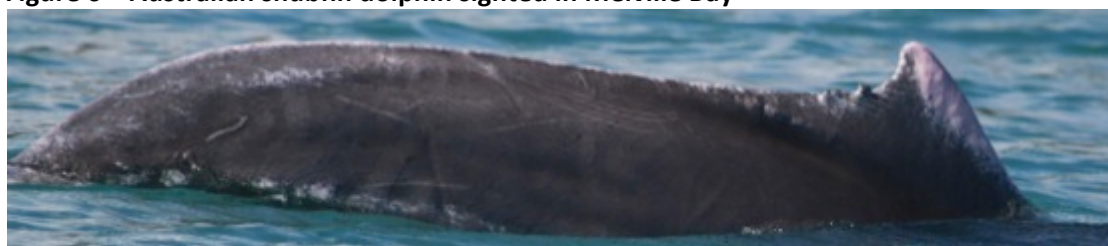


Figure 7 – Australian humpback dolphin sighted in Melville Bay



Figure 8 – Bottlenose dolphin sighted in Melville Bay

Objective 5.

Raise local community awareness of the status of marine megafauna in Dhimurru Sea Country (*objective partially completed*)

- >> Dhimurru Aboriginal Corporation has included dolphins and dugongs in the revised Sea Country Management Plan (revised version available July 2015)
- >> No other activities undertaken to date, however opportunities for local community awareness raising are still being investigated.

As a result of poor weather (including two Tropical Cyclones), and associated community business, boat-based surveys of Dhimurru Sea Contry (including biopsy attempts) had to be postponed on at least two occasions during 2015. As a result of JCU and Dhimurru other commitments it has therefore been unavoidable to delay these surveys and workshop until June 2015. All costs for these surveys have been kept in credit by the various organisations and businesses (and acquitted for in the final financial report), so further boat-based surveys and a final evaluation workshop will be held in June 2015. The final report to accompany this report will be submitted to AMMC by 30 June 2015.

3. Appropriateness

The appropriateness of the approaches used in the development and implementation of the Activity

Objective 1.

Build capacity of Dhimurru Rangers to independently conduct marine mammal surveys

- ***The approach was appropriate, with some variation required for future projects***

Objective 2.

Develop a standardised survey methodology using appropriate data collection tools that will enable Indigenous ranger groups to independently monitor inshore dolphins and dugongs in sea country

- ***The approach was appropriate, with the resulting documents important for standardisation of survey methods and training workshops***

Objective 3.

Obtain information on occurrence of inshore dolphins and other marine megafauna in Dhimurru Sea Country

- *The approach was appropriate, however significant restrictions because of poor sea and weather conditions*

Objective 4.

Obtain information on inshore dolphin distribution, abundance and habitat preferences in Melville Bay

- *The approach was appropriate, with longer period required on-site to account for poor weather conditions*

Objective 5.

Raise local community awareness of the status of marine megafauna in Dhimurru Sea Country

- *Few direct activities conducted but significantly more activities to be incorporated into ongoing Dhimurru programs*

In addition to the above objectives, a number of other activities were conducted which were essential towards achieving a good outcome for this project.

- **Development and finalisation of a Research Partnership Agreement**

Development of a Research Partnership Agreement (RPA) provides the fundamental basis from where the project can begin. The RPA details the roles and responsibilities of each of the partner organisations (Dhimurru Aboriginal Corporation, Dhimurru rangers and JCU researchers) to ensure a clear understanding regarding survey and data gathering protocols, roles and responsibilities, data access arrangements, data storage and use of the data by each group and the key products from the project (i.e. knowledge handbook, survey manual, database). These agreements will necessary to protect Traditional Owners' Intellectual Property; ensure appropriate regional and national data standardisation; and to establish survey protocols and information protocols that authorise which data are to be retained by Traditional Owners and/or shared with external agencies, including other Indigenous communities.

The RPA between Dhimurru Aboriginal Corporation and JCU was signed on 5 June 2014.

- **Boat-based surveys of Port Bradshaw**

Although boat-based surveys were not possible throughout Dhimurru Sea Country because of poor weather, it was possible to charter a live-aboard to conducted surveys of Port Bradshaw, which is located in the southeastern portion of Dhimurru Sea Country. This survey was requested by the rangers as the bay is particularly important to the rangers and Yolngu. It was a very significant and positive achievement for the project to be able to comprehensively survey this bay in collaboration with the rangers.

4. Effectiveness

The degree to which the Activity has effectively met its stated objectives

Objective 1.

Build capacity of Dhimurru Rangers to independently conduct marine mammal surveys

>> **Survey kit donation** (*very effective for meeting stated objectives*)

- ✓ An inshore dolphin survey kit was donated to Dhimurru Rangers. The survey kit consisted of a Garmin handheld GPS (GPSMap72), Canon EOS70D camera with 100-400 lens, one pair of Bushnell binoculars, datasheets and nelly bin (Figure 9). Donation of this survey kit enable the rangers to conduct independent surveys, with the camera being particularly valuable to obtain excellent quality photographs that could be used for photo-identification purposes.



Figure 9 – Isabel Beasley with Vanessa Drysdale and survey kit (left), Dhimurru Rangers with camera and survey kit (right)

>> **Training workshops** (*effective for the short-term towards achieving objectives*)

- ✓ This training workshop (Figure 10) was effective at building capacity of Dhimurru Rangers to identify and conduct marine mammal species at the time (i.e. May 2014).
- ✓ For this activity to be more effective, short training workshops should have been held every three months, to recap on project objectives and evaluate how independent surveys, and project progress, were going.



Figure 10. Conducting mapping during the in-class training

>> **Boat-based surveys conducted independently by rangers, with assistance from the CI** (*very effective for meeting stated objectives*)

- ✓ These surveys worked very well to build capacity of Dhimurru Rangers to conduct marine mammal surveys.
- ✓ With the CI on-board during surveys, it was easy for rangers to ask questions and obtain assistance to complete datasheets (Figure 11).
- ✓ This activity was effective at building capacity, and should have been continued for longer at the start of the project to give Dhimurru Rangers confidence to undertaken independent monitoring.



Figure 11. Completing datasheets on Malarra; Daryl Lacey, Milika Marika, Isabel Beasley and Anthony Crafter

- >> **Boat-based surveys conducted independently by rangers (*not effective because of long duration between surveys*)**
 - ❖ As a result of funding and ranger time restrictions, rangers were only able to conduct independent surveys once every few months. This activity was not effective at building capacity because rangers had forgotten survey methodologies by the time the next survey was due to be completed.
- >> **Collaborative boat-based surveys (*very effective at meeting stated objectives*)**
 - ✓ The collaborative boat-based surveys were very beneficial for rangers, and were effective to building capacity of Dhimurru Rangers to conduct marine mammal surveys (Figure 12).
 - ✓ During these surveys rangers were able to both work with JCU researchers and also work independently from their own vessel, where questions could be easily answered quickly and more days were spent on the water at a time.



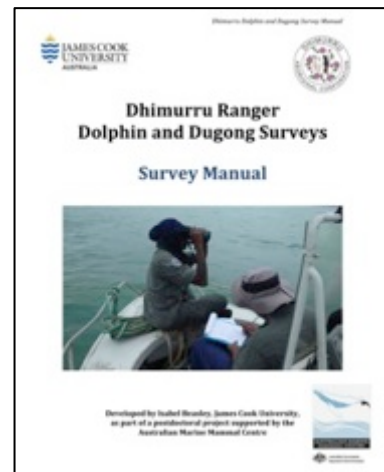
Figure 12. Isabel Beasley taking photographs, Grace Wunungmurra and Barrata Marika assisting to observe dolphin groups (Photo – Mat Golding)

Objective 2.

Develop a standardised survey methodology using appropriate data collection tools that will enable Indigenous ranger groups to independently monitor inshore dolphins and dugongs in sea country

>> **Survey recommendation document** (*very effective – although needs to be more ranger friendly*)

- ✓ This is a very useful document that can be refined and modified by future ranger surveys and collaborative efforts.
- ✓ This document should be effective towards enabling Indigenous ranger groups to independently monitor inshore dolphins and dugongs in sea country.



>> **Training workshop document** (*very effective and assists to meet objectives for the long term*)

- ✓ Ranger groups will always require some form of external assistance to begin their independent monitoring program.
- ✓ The training workshop document is intended to guide future researchers and collaborators to train ranger groups, while being adaptive depending on the experience and capabilities of each ranger group.

>> **Peer reviewed publication** (*very effective and assists to meet objectives for the long term*)

- ✓ The peer review publication is intended to assist with guiding future researchers, collaborators and ranger groups to conduct marine mammal surveys, with lessons learnt and recommendations for future surveys being key components of this manuscript. This manuscript is still in development with Dhimurru Rangers.

Objective 3.

Obtain information on occurrence of inshore dolphins and other marine megafauna in Dhimurru Sea Country

>> **Boat-based surveys throughout Dhimurru Sea Country** (*not effective - because of poor weather conditions*)

- ❖ Poor sea and weather conditions prevented broad-scale collaborative surveys from being conducted.
- >> **Dhimurru Rangers collected opportunistic sighting data** (*very effective*)
- ✓ Dhimurru Rangers collected opportunistic sighting data during regular sea country patrols which was very effective at obtaining information on inshore dolphin occurrence in Dhimurru Sea Country.

Objective 4.

Obtain information on inshore dolphin distribution, abundance and habitat preferences in Melville Bay

>> **Boat-based surveys were conducted within Melville Bay** (*very effective*)

- ✓ Collaborative and independent ranger surveys collected significant information on inshore dolphin distribution, abundance and habitat preferences within Melville Bay.
- ✓ These surveys were facilitated by the bay being small, and often protected from poor weather.

Objective 5.

Raise local community awareness of the status of marine megafauna in Dhimurru Sea Country (*partially effective*)

- ✓ Inshore dolphins were sufficiently highlighted within this project that Dhimurru Aboriginal Corporation included management of dolphins in their revised Sea Country Management Plan.

5. Communication**How results will be communicated to management**

The results will be communicated through the following:

- Submission of **final report and presentation (if possible) to Dhimurru Aboriginal Corporation and Northern Land Council**
- Once approved by Dhimurru Aboriginal Corporation, submission of **final reports and manuals** to AMMC and relevant researchers
- Once approved by Dhimurru Aboriginal Corporation, posting of final reports and manuals on **Dhimurru and JCU websites**
- Incorporation of results and major management outcomes and recommendations into **Dhimurru Sea Country/Indigenous Protected Area Plans**
- Submission of **peer reviewed publication** on '*Survey methods relevant to indigenous ranger involvement in marine mammal monitoring in Northern Australia*'
- Submission of **peer reviewed publication** on '*Looking for Mutjalanydjaj (Dolphins) and Galangami (Dugongs) in Dhimurru Sea Country, Arnhem Land – distribution, abundance and habitat use of marine mammals in east Arnhem Land*'

6. Financial Account of the Activity

To be provided by James Cook University

Final invoice submitted to AMMC on 27 May 2015

7. Attachments Included With This Report

Report 1 – Results of May 2014 training workshop and surveys

Report 2 – Results of July 2014 surveys

Report 3 – Dhimurru Ranger survey manual

Report 4 – Ranger training example presentation

Report 5 – Results of November 2014 surveys