Project Plan SP 2012-007

Review, assess and summarise historical data relevant to the management of the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area

Marine Science

Project Core Team

Supervising Scientist	Kim Friedman
Data Custodian	
Site Custodian	

Project status as of July 26, 2017, 1:10 p.m.

Completed and closed

Document endorsements and approvals as of July 26, 2017, 1:10 p.m.

Project Team	granted
Program Leader	granted
Directorate	granted
Biometrician	required
Herbarium Curator	not required
Animal Ethics Committee	not required

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Science and Conservation Division Program

Marine Science

Parks and Wildlife Service

Service 2: Conserving Habitats, Species and Ecological Communities

Project Staff

Role	Person	Time allocation (FTE)
Research Scientist	Margaret Mohring	0.1
Research Scientist	Christopher David Nutt	0.01
Research Scientist	Alan Kendrick	0.0

Related Science Projects

Proposed period of the project

None – None

Relevance and Outcomes

Background

The focus of work for Pluto LNG Project Offset "d" is on implementing research and monitoring that is consistent with the State Government's indicative management plan (IMP) for the Proposed Dampier Archipelago Marine Park and Regnard Marine Management Area (See Figure 1). As outlined in Section 7 of the IMP, while some aspects of the marine biodiversity in the proposed reserves is relatively well understood, knowledge about environmental processes and existing pressures on values of these reserves is limited. Management strategies for scientific activity within the proposed reserves include the implementation of programs to provide for monitoring and assessment of ecological processes and the levels of human impacts. Section 8.4 of the IMP outlines generic research objectives, strategies and targets, with the overarching objective of obtaining an appropriate understanding of the biodiversity and key ecological and social processes within the proposed reserves. This section also aims to promote research that improves knowledge of the reserve and the technical basis for management decisions. Similarly, section 8.5 addresses monitoring of the key ecological values at risk in, and the human usage of, the proposed reserves. It also aims to promote ecological and social monitoring that will detect changes to ecological values to inform management. Pluto LNG Project Offset "d" involves a suite of four inter-related projects which are: (i) Review, assess and summarise historical data relevant to the management of the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area; (ii) Determine distribution, patterns and key processes of major marine communities and large marine fauna of the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area; (iii) Describe patterns and trends in human use in the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area; and (iv) Establish long-term monitoring reference sites in the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area. Large amounts of marine environmental and social data have been collected by a range of agencies and industry in this area since the late 1970s. This data was collected as part of industry development approvals processes, post-approval compliance monitoring programs, State and Commonwealth Government marine research and monitoring programs, university research programs and community projects. This project concentrates on project (i) of the four projects listed above and will identify, assess and collate existing datasets in relation to the marine biodiversity and human use of the

proposed Dampier Archipelago Marine Park and Regnard Marine Management Area. This information will be used to establish long-term monitoring sites, enabling assessment of trends in biodiversity asset condition, pressures acting on these assets, and the efficiency and effectiveness of management responses to these pressures. Data will be incorporated into a marine information management system to secure future access to all information (i.e. 'one-stop shop' approach).

Aims

Primary,

(i) To identify, assess and collate existing biophysical and social datasets relevant to values listed in the IMP for the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area;

(ii) Construct historical time-series of relevance to the conservation of the marine biodiversity and the management of human use of the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area;

(iii) To ensure data is summarised, archived, made accessible and broadly presented to Government, industry and the local community; and

(iv) To assist the design and implementation of Pluto LNG Project Offset "d" projects (ii), (iii) and (iv).

Secondary,

(i) To promote the standardization and uptake of historical time-series development procedures in DEC and elsewhere;

(ii) To promote integration of past, current and future research and monitoring programs to ensure investment delivers effective outputs that address management requirements; and

(iii) Present recommendations on further actions required to access or utilise key datasets.

Expected outcome

This project will provide an improved understanding for government, industry and the local community of historical trends in marine biodiversity asset condition and human use of this region, and the effectiveness of past management programs. It will also identify existing and potential issues and risks where future management action may be needed.

Consistent with the IMP, this project will provide the information, and a scientific platform, to drive future research and monitoring programs in the Dampier Archipelago area, and facilitate planning and implementation of the remaining Pluto LNG Project Offset "d" projects. Outputs and information generated through this project will further benefit regional managers through the provision of both contextual and technical information to aid in the development of coastal and marine management programs. This project will also seek to formalise and refine the methodology to construct historical time-series datasets developed by the Marine Science Program, and link in with procedures established through the Department of Environment and Conservation Science Division, Marine Science Program Information Management Strategic Plan 2011-2014 (Mayer et al. in prep).

Given the nature of this project it is likely that some aspects will continue through the life of the Pluto LNG Project Offset 'D' program. Although historical time-series data will be prepared within the allotted time period of project (i), acquisition and/or further processing of some data may be required. The final project report will include details of the work that has been completed, as well as recommendations on any further data acquisition or processing that may be of benefit.

Strategic Outcomes:

The project addresses strategies in the following documents:

- DEC Corporate Plan (2007-2009):1.2; 4.1; 7.6; 8.3; 8.4; 8.5; 8.8.
  - DEC Science Division Strategic Plan for Biodiversity Conservation Research (2008-2017): 1.2, 1.7, 1.12; 2.11; 3.1; 3.7; 3.8; 3.9; 4.2; 4.8; 4.10; 5.2; 5.5; 6.7
  - Indicative Management Plan for the Proposed Dampier Archipelago and Cape Preston Marine Management Area.

Knowledge transfer

The anticipated users of the knowledge gained through this project will primarily be DEC staff involved with the management of the proposed reserves, including from the Pilbara Region and the Marine Science Program (and potentially agencies with related responsibilities, e.g. DPA and DoF). Additionally, industry[1] and community groups may utilise information and/or outputs generated through this study to inform environmental management plans and community led conservation initiatives.

The information gained from this study will provide an important foundation for a range of MPA activities including;

- to inform future operational managers of the Dampier MPAs;
- to inform the development and design of DEC's monitoring, evaluation and reporting (MER) program, the Western Australian Marine Monitoring Program (WAMMP);
- to inform on-going MPA research of DEC's Marine Science Program;
- to provide an important basis for future performance assessment of the MPA and inform assessments and audits by DEC and the Marine Parks and Reserves Authority (MPRA);
- to develop improved coordination and integration of industry and government research and monitoring programs. This may facilitate a better return for investments in research and monitoring and provide improved environmental outcomes;
- to refine time-series dataset creation methodology developed by the Marine Science Program; and
- to inform EIA processes for the assessment of future project proposals.

Findings and outputs from the project will be summarised and communicated to applicable units within DEC, to project partners, to other marine science providers and to the MPRA through a series of reports and briefings including:

- A summary of relevant datasets including a 'pedigree' analysis, and where possible a time-series for the key ecological assets and pressures relevant to the management of the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area.
- Annual contributions to the DEC Science Division's Annual Research Activity Report for 2011/12 and 2012/13.
- Annual progress repor to be submitted to Woodside completed by 30 September 2012;
- A summary report including recommendations for Pluto LNG Project Offset "d" sub-projects (ii), (iii) and (iv) (see 16) completed and distributed by 31 December 2012.
- Annual briefing to DEC, WEL, DPA representatives and the MPRA.

Tasks and Milestones

Details of the major tasks, milestones and outputs can be found within Appendix A

References

Bancroft K, Friedman K (in preparation) A practical guide for the development of historical time-series for ecological and social datasets. Department of Environment and Conservation, Perth, Western Australia.

Department of Conservation and Land Management (2005) Indicative Management Plan for the Proposed Dampier Archipelago Marine Park and Cape Preston Marine Management Area. Department of Conservation and Land Management, Perth, Western Australia.

Hockings M, Stolton S, Leverington F, Dudley N, Courrau J (2006) Evaluating Effectiveness: A

framework for assessing management effectiveness of protected areas. 2nd edition. IUCN, Gland, Switzerland and Cambridge, UK. xiv + 105 pp.

Lloyd JJ, Simpson CJ, Grubba, TL (2005 draft) A performance Assessment Framework for Marine Conservation Reserves in Western Australia. MPC/01/2005. Department of Conservation and Land Management, Perth, Western Australia.

Mayer F, Friedman K, Gioia P (in preparation) Department of Environment and Conservation Science Division, Marine Science Program Information Management Strategic Plan 2011-2014. Department of Environment and Conservation, Perth, Western Australia.

Simpson CJ (2007) The Department of Environment and Conservation Marine Science Strategy. Department of Environment and Conservation, Perth, Western Australia.

Study design

Methodology

a) Introduction

Long-term, systematic and integrated marine monitoring, together with evaluation and reporting of change (MER, see Hockings et al. 2006), are key management strategies for measuring the effectiveness of MPA and marine fauna management plans. Early detection of detrimental impacts facilitates the employment of adaptive management for the conservation of marine biodiversity.

Monitoring the status of environmental marine assets assists the DEC to fulfil its statutory responsibilities, including biodiversity conservation. The Marine Science Program is responsible for conducting and facilitating research and MER in MPAs, as well as providing specialist marine scientific advice and a strategic marine science focus across Western Australian state waters. In the case of MER, this is occurring through the establishment and coordination of the Western Australian Marine Monitoring Program (WAMMP).

Historically, monitoring of marine assets in Western Australia has tended to rely on snap-shot surveys or surveys conducted over haphazard spatial and temporal scales, often measured in terms of half decades or less. These studies have largely been opportunistic or in response to particular concerns, which may limit their functional use for gaining knowledge of long term changes in environmental condition. The WAMMP aims to design and implement a more strategic and integrated approach to MER in WA's marine protected areas and for threatened marine fauna.

The WAMMP can benefit from past research, monitoring and associated datasets. These datasets need to be;

(i) identified;

(ii) assessed to determine if they can inform our monitoring program of historical asset condition or pressures; and

(iii) where suitable, obtained and processed into a suitable format.

A guideline is being prepared to provide a generic step by step process for creating historical time-series datasets and assessing them for suitability for use in the WAMMP (Bancroft & Friedman, in prep).

Bancroft and Friedman (in prep) outlines four major stages in establishing historical time-series:

(i) 'Context setting' to provide the background; define assets and management objective; and note relevant condition and pressure indicators, to guide the process.

(ii) 'Prospecting' of potential datasets to identify and acquire potential datasets for use in the construction of the suite of historical time-series.

(iii) 'Data Mining' of suitable datasets to discern the quality, suitability, rank and weighting of historical datasets selected. Typically data will be compiled from various studies where the objective, sites and methods of studies may differ.

(iv) 'Reporting' where a 'Quality Index' is used to report the 'Pedigree' of the resulting time-series. This stage considers the suitability of parameters considered in the first three major stages described above.

Whilst the variability in design, accuracy, methods and approaches make statistical analysis problematic, past studies are collected as they provide important context that inform the future design and results of MER programs.

A key consideration in the design of this project is the development of mechanisms and approaches to facilitate the support and assistance of the various organisations that hold relevant data. In particular the 'Prospecting' and 'Data Mining' stages require the support of organisations in detailing what data they hold, provision of specification of the data, and ultimately if it is applicable and useful, provision of the data in a form that is required. Without this support this project may become ineffectual.

b) Setting the Context

Setting the context for the project will be an important first step to focus the data identification, review and steps for assessment. Given the large amounts of data that exist, this project is not intended to capture all data on the area but rather to focus on the most relevant and applicable data for the future management of the marine reserves. Setting the context will provide this guidance.

The following key sources of contextual and summary information will need to be reviewed in order to define assets and management objectives, and note relevant condition and pressure indicator/s.

- Indicative Management Plan for the Dampier Archipelago Marine Park and Regnard Marine Management Area (ecological and socio-economic values listed in this document, particularly those identified as key performance indicators (KPI), will guide the prioritization for data identification, acquisition and processing).
- DEC information already compiled as part of the MPA planning process (e.g. Regional Perspectives).
- DEC Marine Science Strategy (Simpson, 2007).

- Strategic Plan for the Development and Implementation of the Western Australian Marine Monitoring Program: 2008-2017.
- Asset Knowledge Reviews (AKR) for the WAMMP.
- A practical guide for the development of historical time-series (Bancroft & Friedman, in prep).
- A Performance Assessment Framework for Marine Conservation Reserves in Western Australia (Lloyd et al. 2005 draft).
- DEC Science Division, Marine Science Program Information Management Strategic Plan 2011-2014 (Mayer et al. in prep).

The context setting process should consider a risk assessment of human pressures on ecological values and pressures (note, this will be informed by the IMP), and the monitoring methods that have been identified by DEC as showing the greatest promise for future monitoring of ecological assets. “Asset-knowledge reviews” have been undertaken by DEC for some standard MPA assets such as corals, finish, water quality etc, and these should be considered when identifying what asset condition and pressure metrics of historical data is likely to be of greatest usefulness for this project. Part of the context setting will be establishing these aspects for the ecological assets and human use settings for the Dampier area.

c) Establishing Consultative Mechanisms and Organisational Support

It is recommended that a technical reference group be established for the life of the project to communicate project objectives, provide input on strategies, facilitate organisational buy-in and cooperation with the project including advice on relevant data availability, and processes to review and acquire historical information.

The technical reference group is to comprise;

- DEC Marine Science Program (Pluto LNG Project Offset D (i) Coordinator)
- DEC Marine Science Program (WAMMP Coordinator)
- DEC Regional Office representative
- Woodside Energy
- Dampier Port Authority
- WA Museum representative
- Department of Fisheries (ideally finfish research representative)
- Australian Institute of Marine Science
- Office of the Environmental Protection Authority.

d) Identification of Prospective Datasets

‘Prospecting’ of potential datasets will be required to identify studies and data that align with values and variables detailed in the IMP. Assessment of the characteristics of the studies/datasets will rank their relative usefulness and role in developing time-series datasets.

This step will focus on establishing what research and monitoring has been undertaken, and then assessing the relevance of that data to MPA management as set out in the IMP and AKRs. This will primarily be done through liaising with key personnel who have direct scientific research and/or monitoring experience in the study area, and secondarily through online literature and data searches utilising tools such as the DEC Library Catalogues, ‘Web of Knowledge’, ‘Google Scholar’, ‘JSTOR’ and ‘BlueNet MEST / Australian Ocean Data Network’, amongst others.

Key data sources/projects include;

- The North West Shelf Joint Environmental Management Study inventory and bibliography outputs;
- WA Museum biological surveys including major Woodside funded project during the 1990’s;
- AIMS activities in the Dampier Archipelago (circa 1994-2004)
- Department of Conservation and Environment research (circa 1980’s);
- Department of Environment water quality studies (circa early 2000’s);
- EPA assessment information;
- Monitoring reports to the EPA;
- Industry monitoring activities (particularly Woodside, Dampier Port Authority);
- Department of Fisheries research, including Catch and Effort Statistics; and
- Remote sensing data.

Following identification, a refined list of datasets / studies prioritised by spatial relevance, temporal relevance and accessibility of data will drive the data sourcing phase. This list (spreadsheet) should contain adequate information

and contact details to initiate data requests for each dataset. It will also form the basis of the final metadata base which lists all data/studies relevant to the management of the proposed Dampier Archipelago Marine Park and Regnard Marine Management Area.

e) Sourcing Relevant Data

Once priority datasets have been identified, the next step will be to acquire data from custodians, and to store this data accordingly. The data will be compiled and stored as per DEC information management guidelines (Mayer et al, in prep). Given the importance of the spatial component of the datasets it is expected that the datasets will be stored and accessed using a spatially enabled database. The arrangement for data storage and access will need to be confirmed at the start of this project in liaison with DEC staff and iVEC MEST coordinator.

Data may not be available in a format that is easily incorporated and may require significant processing work to convert it into a usable format (i.e. hard copy data, reprocessing of imagery to obtain accurate spatial locations etc). An assessment will need to be made on the relative worth of the data against the time required to process it. Where a decision is taken to defer the incorporation of data due to the significant costs of reprocessing, the project final report will identify these datasets with recommendations on the resources and tasks required to carry out reprocessing and the potential benefits of this work.

Obtaining approval and acquiring data can sometimes take time and long delays in acquiring data should not delay the completion of this project. It will be important to establish a cut-off date for obtaining datasets (i.e. mid-2012), to allow the next steps of the project to be completed in accordance with the project milestones.

f) 'Mining', Evaluation and Reporting of Data

This will require a review of the prioritized datasets to assess for;

(i) metric and presentation;
(ii) collection methods;
(iii) spatial relevancy, extent and replication;
(iv) temporal relevance and replication in sampling; and
(v) data reliability and accuracy.

The project will evaluate key datasets and evaluate them against a 'Quality Index' (see Bancroft & Friedman, in prep) to be able to report on the 'Pedigree' of any resulting time-series. This stage considers the suitability and reliability of the data identified. A key consideration is the compatibility of methods of past research and monitoring as this will impact on the comparability of datasets and the capacity to develop an informative time-series of the various datasets.

A summary report will be required that outlines the key assets and pressures. To inform future management this will include a summary of the data available, its general suitability and a basic assessment of its capacity for providing a time-series of change, and where possible, an historical time-series dataset.

Biometrician's Endorsement

required

Data management

No. specimens

Herbarium Curator's Endorsement

not required

Animal Ethics Committee's Endorsement

not required

Data management

Information Management Strategic Plan 2011-2014 (Mayer et al. in prep) outlines a framework for the management of scientific data from monitoring and research for DEC's Marine Science Program. Data for this project will be managed according to this plan. Data under custodianship of DEC will be stored in a future-proof standard format on a corporate DEC server using the Corporate Applications' shared application stack. The data server will be

compatible to OGC standards; it will provide access to data sets using web services behind an authentication layer. Metadata will be stored alongside the data sets and harvestable via the internationally recognized CSW query standard. A further possible implementation is to store geospatially explicit datasets in the netCDF format, hosted on an opendap server such as Thredds and metadata being harvested into a GeoNetwork metadata catalogue. All of these applications are Java applets and can be run on the corporate shared application stack. There will be a small amount of customization necessary to integrate these applets within the corporate environment. Hard copies of any reports resulting from the project will be held at the following locations: (i) Marine Science Program, Science Division, Department of Environment and Conservation, 17 Dick Perry Avenue, Kensington, Western Australia, 6152. Ph: (08) 9334 0333. (ii) DEC Conservation Library, Science Division, Department of Environment and Conservation, 17 Dick Perry Avenue, Kensington, Western Australia, 6152. Ph: (08) 9334 0333 (CD attached). (iii) Pilbara Region, Department of Environment and Conservation, Lot 3 Anderson Road, Karratha Industrial Estate, Karratha, Western Australia, 6530. Ph: (08) 9143 1488 Fax: (08) 91441118. (iv) Serials Section, State Library of Western Australia. Alexander Library Building, Perth Cultural Centre, Perth, Western Australia, 6000. Digital copies of any reports resulting from the project will be held at the following: (i) The Pluto LNG Project Offset 'D' (i) project confluence web space: https://confluence.dec.wa.gov.au/display/sd/Marine+Science+Project+Pluto (ii) The DEC Science Division Server: T:\529-CALMscience\Shared Data\Marine Science Program\ (iii) CD-ROM held at Marine Science Program, Science Division, Department of Environment and Conservation, 17 Dick Perry Avenue, Kensington, Western Australia, 6152. Ph: (08) 9334 0333.

Budget

Consolidated Funds

Source	Year 1	Year 2	Year 3
FTE Scientist			
FTE Technical			
Equipment			
Vehicle			
Travel			
Other			
Total			

External Funds

Source	Year 1	Year 2	Year 3
Salaries, Wages, OVertime			
Overheads			
Equipment			
Vehicle			
Travel			
Other			
Total			