

# **Wheatstone Project Offset B:**

## **Connectivity and recovery potential of Pilbara marine habitats and associated taxa**

### **ANNUAL REPORT**

**2014/2015**

September 2015



Department of  
**Parks and Wildlife**





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# 1 Introduction

Condition 22 of Ministerial Statement 873 for the Wheatstone Development – Gas Processing, Export Facilities and Infrastructure requires the proponent to contribute funding to seven projects. A memorandum of understanding (“MOU”) between Chevron Australia Pty Ltd in its capacity as operator of the Wheatstone Project (“Chevron”) and the State of Western Australia acting through the Chief Executive Officer of the Department of Environment and Conservation, now the Department of Parks and Wildlife (“Parks and Wildlife”), was signed on the 30 April 2012. The MOU consists of funding for two of these projects; Project B (Connectivity) and Project C (marine fauna). As part of the CEO’s obligations outlined in section 3.1 of the MOU, Parks and Wildlife is required to provide Chevron with a Program Annual Report each year of the Program within one month of the Department’s annual report being tabled in Parliament. The Program Annual Report is to include a summary of the following for Project B:

- (i) Opening balance, income, expenditure and closing balance of the Project Accounts;
- (ii) Description of the Program activities undertaken over the last year;
- (iii) Results of the Program activities undertaken over the last year; and
- (iv) A summary of the Program activities anticipated to be undertaken in the following year.

This document is the Program Annual Report for Project B, comprising \$1.2 M over 4 years for the period 1 July 2014 to 30 June 2015.

The focus of Project B is to add to the understanding of west Pilbara marine habitats (including coral and seagrass communities) and associated taxa, including their level of connectivity and, therefore, recovery potential following natural and human-induced disturbance. This research aims to build on existing knowledge and integrate with current and proposed connectivity projects on habitat-forming taxa and associated fauna in the tropical north-west of Australia. Broad-scale connectivity studies of flora and fauna within and between the offshore islands of the north-west continental shelf have shown varying levels of connectivity. Previous studies have also shown limited connectivity between inshore and offshore marine communities but there have been no studies looking at connectivity between locations within the Pilbara region, and their connections with the broader inshore locations of Ningaloo to the west and the Kimberley to the north-east. For further detail see Appendix 2: Science Project Plan.

## 2 Offset B Program Activities 2014/15

### **Genetic Connectivity**

- Field trip planning and completion have been the major time consumer of this financial year due to the sheer number of and length of trips as well as a number of last minute trip cancellations due to bad weather including two cyclones.
- Ten field trips were conducted to complete tissue samples collections of mangrove, coral, seagrass and Fish at several locations including Broome, West Moore Island, Dampier Archipelago, Passage Islands, Montebello Islands, the Onslow (Wheatstone) region, Exmouth Gulf, Ningaloo, Bunbury and Shark Bay. See Appendix 1 for more detail.
- Collaborations have been formed with ECU (coral, seagrass and mangrove), Curtin University (Fish), UWA (corals), CSIRO (Fish), WAM (Fish and Corals), DoF (Fish) and ANU (macroalgae) to enable the processing of such a large set of genetic samples.
- DNA extractions have just started for the mangroves, seagrass, fish and 1 species of coral. This has been dependent on external collaborators.

### **Coral recovery studies**

- Coral settlement tiles were deployed at 16 sites in the Wheatstone region in February 2015 and subsequently collected in May 2015 after the autumn spawning period. This is the second year of deployment with one more year to complete in 2016 in an attempt to understand coral larval supply to reefs of the Onslow region. Analysis is still in progress.
- In-situ surveys of coral recruits growing on the substrate were conducted at the same 16 sites in the Onslow (Wheatstone) region to compare with coral settlement tiles. This will provide an indication of successful recruitment to the substrate. Analysis pending.
- Measuring size class frequency of corals from the pre-dredge digital imagery, provided by Chevron, is underway. Still awaiting final year of images.

### **Planning and Reporting**

- Planning has been undertaken for field work in the 2015/16 year. This includes 1 potential trip to the Kimberley (if not collected by collaborators) to add the final coral samples to the genetics program, which will give an indication of larval supply to and from the Pilbara to the North; and 2 trips to the Onslow region to redeploy and collect the coral settlement tiles for the last year.
- One manuscript has been submitted for publication in the international journal of Coral Reefs entitled "A fluorescence-based quantitative real-time PCR assay for Pocillopora damicornis species identification".

Table 1: Offset B Program Milestones Achieved in 2014/15

	Milestones / Major activities	Timing (by date)	Status (% of work complete)	Comments
	<b>July 2014– June 2015</b>			
1.	Annual project planning complete			
1/1	Complete annual science 'work' planning for 2015/16.	Apr 2015	100	
1/2	Complete annual reporting (e.g. MSP, ARAR, MPRA, EPDP).	June 2015	100	
1/3	Meet with Exmouth district manager and MPC to discuss Ningaloo field work for 2015/16.	May 2015	100	
1/4	Plan two trips to Onslow region to deploy and collect coral settlement tiles.	Feb 2015	100	
1/5	Plan one or two field trips to conduct broad-scale genomics tissue sample collection throughout the Pilbara.	Nov 2014	100	
1/6	Meet with Shark Bay District manager and MPC to discuss Shark Bay field work for 2016/17.	May 2015	na	Fieldwork completed in 2-14/15
1/7	Plan a trip to Exmouth in July/August 2015/16.	June 2015	100	
2.	Annual field program complete			
2/1	Conduct a trip to Exmouth.	July 2015	100	
2/2	Conduct up to two boat-based field trips.	Dec 2014	100	
2/3	retrieve and replace coral settlement tiles.	Feb 2015	100	
2/4	Retrieve and replace coral settlement tiles.	May 2015	100	
3.	Annual data analysis complete			
3/1	Samples stored appropriately.	ongoing		
3/2	Coral tiles visually analysed.	Jun 2015	80	
3/3	Size frequency analysis of corals to date.	Jun 2015	100	
3/4	Bleaching analysis of corals to date.	Jun 2015	100	
3/5	Preliminary analysis of Wheatstone Project water quality data.	Jun 2015	0	Waiting for Chevron to provide data.
3/6	20% of Genetic samples analysed.	Jun 2015	50	Poor weather during first half of calendar year has slowed collection of some taxa. Mangroves, seagrass, corals and fish are now in early stages of DNA extraction.
4.	Reporting complete			
4/1	Field trip meta data report Exmouth trip.	Aug 2015	100	
4/2	Field trip meta data report tissue sample collection trips (1-2).	Dec 2014	100	
4/3	Annual report to Wheatstone Project JV partners.	Sept 2015		This report
4/4	Field trip meta data report coral tile deployment.	Feb 2015	100	
4/5	Field trip meta data report coral tile swap.	May 2015	100	
4/6	1 publication submitted for review in 'Coral Reefs'	June 2015		

### 3 Offset B Program Account 2014/15.

The Wheatstone Offset B Program Account was created by Parks and Wildlife (then DEC) in 2012. In May 2012, Chevron Australia paid \$300,000 and a further \$300,000 in December 2012 into the account before a Research Scientist was employed in July 2013. In January 2014 a third payment of \$300,000 was made into the account and interest of approximately \$18,000 has accrued. A final payment of \$300,000 was made into the account and approximately \$25,000 has accrued in this financial year.

A summary of Account activity for 2014/15 is outlined in Table 1, with more detailed expenditure provided in Table 2.

*Table 2: Summary of Wheatstone Offset B Activity 2014/15.*

<b>Activity</b>	<b>Opening balance (1 July 2014)</b>	<b>Income (2014/5)</b>	<b>Expenditure (2014/15)</b>	<b>Closing balance (30 June 2015)</b>
	\$670,222.51			
Interest		\$24,689.29		
Invoices for services		\$1,954.77		
Deposit by Chevron		\$300,000.00		
Auditing of marine environment response and recovery			\$307,979.06	
<b>Total</b>	<b>\$670,222.51</b>	<b>\$326,644.06</b>	<b>\$307,979.06</b>	<b>\$688,887.51</b>

*Table 3: Expenditure against the Wheatstone Offset B Account 2014/15.*

<b>DPaW Budget category</b>	<b>Expense</b>
Consultants	\$2342.00
Operating & travel	\$149,812.49
Plant	\$474.15
Salary & wages	\$104,652.28
Salary & Wages O/H	\$42,060.23
<b>TOTAL</b>	<b>\$307,979.06</b>



## 4 Planned Offset B Activities 2015/16

In 2014/15, activities for the Offset B will be undertaken by Parks and Wildlife in collaboration with several external institutions. Activities include:

- Field research to collect tissue samples for genomic seascape analysis project- 1 potential trip.
- Field research to Wheatstone region to understand recovery potential of corals project.
- Continue historical size frequency distribution analysis of Wheatstone Projects benthic images.
- Begin analysing water quality data provided by the Wheatstone Project.
- Finalise extractions of DNA for all species, send off for sequencing, and begin analyses.
- Begin analysing water quality and benthic data, which will be provided by Chevron.
- Compiling and submitting the 2014/15 annual report.
- Have one manuscript submitted in an international journal by end of financial year.

**Estimated expenditure 2015/16:           \$435,310**

*Table 4: Proposed Milestones/Major Activities for 2015/16*

	Milestones / Major activities	Timing (by date)	Status (% of work complete)	Comments
	<b>July 2015– June 2016</b>			
1.	Annual project planning complete			
1/1	Complete annual science 'work' planning for 2016/17.	Apr 2016	100	
1/2	Complete annual reporting (e.g. MSP, ARAR, MPRA, EPDP).	June 2016		
1/3	Plan two trips to Onslow region to deploy and collect coral settlement tiles.	Dec 2015		
2.	Annual field program complete			
2/1	Conduct a trip to Exmouth.	July 2015	100	as per 1/7 of last financial year
2/2	Retrieve and replace coral settlement tiles.	Feb 2016		as per 1/3
2/3	Retrieve and replace coral settlement tiles.	May 2016		as per 1/3
3.	Annual data analysis complete			
3/1	Samples stored appropriately.	ongoing		
3/2	Coral tiles visually analysed.	Jun 2016		
3/3	Size frequency analysis of corals to date.	Jun 2016		
3/4	Bleaching analysis of corals to date.	Jun 2016		

3/5	Preliminary analysis of Wheatstone Project water quality data.	Jun 2016		
3/6	100% of genetic samples extracted	Dec 2015		
3/7	1 species of Coral and 2 species of seagrass samples sent for sequencing for Microsatellite analysis	Feb 2016		
3/8	2 <sup>nd</sup> species of Coral samples sent for sequencing for Microsatellite analysis	June 2016		
3/9	100% fish samples sent for NGS and preliminary bioinformatics started	June 2016		
3/10	100% Mangrove samples sent for NGS and preliminary bioinformatics started	June 2016		
3/11	1 species of seagrass and coral sent for NGS	June 2016		
4.	Reporting complete			
4/1	Field trip meta data report Exmouth trip.	Aug 2015	100	As per 2/1
4/2	Annual report to Wheatstone Project JV partners.	Sept 2015		
4/3	Field trip meta data report coral tile deployment.	Feb 2016		As per 2/2
4/4	Field trip meta data report coral tile swap.	May 2016		As per 2/3
4/5	At least 1 manuscript submitted to international journal	June 2016		

## 5 Proposed budget for 2015/16

Table 5: Proposed budget for the Wheatstone Offset B Account 2015/16

DPaW Budget category	Expense
Operating & travel	\$60,000
Lab expenses	\$180,000
Plant	\$1000
Salary & wages +O/H	\$194,310
<b>TOTAL</b>	<b>\$435,310</b>

## 6 Conclusion

This is the 2<sup>nd</sup> end of financial year report of an ongoing 4 year project. Sound progress has been made in completing all aspects of the program. The major focus of the project is shifting into the lab processing phase before finalising reports and publications in the final year. Proposed expenditure is going according to plan, with just under half the funds used by the mid-point of the project. The next financial year will be quite expensive due to the high expense of DNA laboratory costs. One publication has been submitted and another is in preparation.

*Appendix 1. Field trips and sample collections in financial year 2014/15.*

Fieldtrip	Date	Location	Taxa	Species collected	Population x # ind.	Comments
1	July 2014	Ningaloo/ Exmouth Gulf - 10 days	mangrove	Avicennia marina	4 x 50	Ningaloo/ Exmouth Gulf
			Seagrass	Halodule uninervis	1 x 50	Ningaloo
			Fish	Lutjanus carponotatus	2 x 27	Ningaloo
			Fish	Pomacentrus milleri	1 x 27	Exmouth Gulf
2	Nov 2014	Montebello Islands/ Passage Islands - 10 days	Mangrove	Avicennia marina	4 x 50	Montebello Islands/ Passage Islands
			Coral	Turbinaria mesenterina	4 x 30	Montebello Islands/ Passage Islands
			Coral	Turbinaria reniformis	4 x 30	Montebello Islands/ Passage Islands
			Coral	Cyphastrea microphthalma	2 x 30	Montebello Islands
			Coral	Merulina ampliata	2 x 30	Montebello Islands
			Seagrass	Halophila ovalis	2 x 50	Montebello Islands
			Seagrass	Halodule uninervis	2 x 50	Montebello Islands
			Fish	Lutjanus carponotatus	3 x 27	Montebello Islands/ Passage Islands
			Fish	Pomacentrus milleri	2 x 27	Montebello Islands
			Crown of thorns	Acanthaster planci	1 x 44	Montebello Islands
			Algae	Sargassum polycystum	1 x 50	Montebello Islands
3	Dec 2014	Bunbury – 1 day	Mangrove	Avicennia marina	1 x 50	
4	Feb 2015	Onslow/ Exmouth Gulf – 7 days Deploy coral settlement tiles and genetics collection.	Coral	Turbinaria mesenterina	4 x 30	Onslow/ Exmouth Gulf
			Coral	Turbinaria reniformis	2 x 30	Onslow/ Exmouth Gulf
			Coral	Cyphastrea microphthalma	3 x 30	Onslow/ Exmouth Gulf
			Coral	Merulina ampliata	3 x 30	Onslow/ Exmouth Gulf
			Fish	Pomacentrus milleri	1 x 27	Exmouth Gulf

			Algae	Sargassum polycystum	1 x 50	Exmouth Gulf
5	Mar 2015	Shark Bay – 8 days	Coral	Turbinaria mesenterina	2 x 30	Cyclone Olwyn cut trip short
			Coral	Turbinaria reniformis	2 x 30	
			Coral	Cyphastrea microphthalma	1 x 18	Could only find 18
			Fish	Lutjanus carponotatus	2 x 27	
			Fish	Pomacentrus milleri	2 x 27	
6	Mar 2015	Shark Bay – 5 days	Seagrass	Halophila ovalis	2 x 50	
			Seagrass	Halodule uninervis	2 x 50	
			Coral	Cyphastrea microphthalma	1 x 30	
7	Apr 2015	Broome – 3 days	Mangrove	Avicennia marina	2 x 50	
			Seagrass	Halophila ovalis	2 x 50	
			Seagrass	Halodule uninervis	2 x 50	
8	Apr 2015	Onslow – 0 days				Cyclone Quang cancelled trip day before commenced.
9	May 2015	Onslow (Take II) – 10 days				Collect coral settlement tiles
10	May 2015	Dampier/ Balla Balla – 10 days	Coral	Turbinaria mesenterina	4 x 30	Dampier/ Balla Balla
			Coral	Turbinaria reniformis	4 x 30	Dampier/ Balla Balla
			Coral	Cyphastrea microphthalma	2 x 30	Dampier
			Coral	Merulina ampliata	2 x 30	Dampier
			Fish	Lutjanus carponotatus	1 x 27 18 ind	Dampier Finish Balla Balla pops
			Fish	Pomacentrus milleri	1 x 27 3 ind	Dampier Finish Balla Balla pops