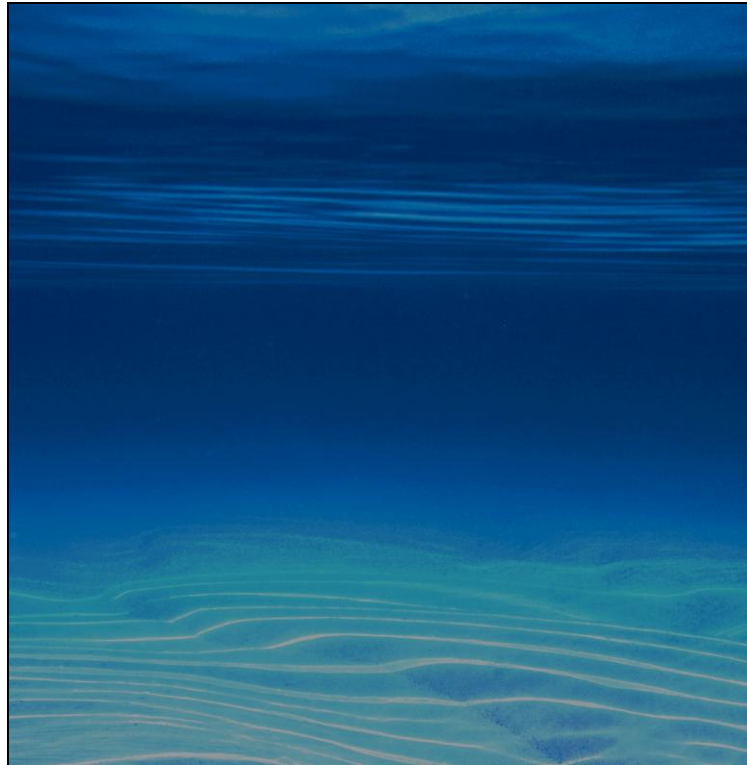


# Revisiting the sediment health in Coral Bay, Ningaloo Marine Park, Western Australia

Marine Science Program Metadata Report  
November 2011



Prepared by  
KP Bancroft  
H Taylor

Marine Science Program  
Science Division  
Department of Environment and Conservation



Department of  
**Environment and Conservation**

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***This metadata report can be cited as:***

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Bancroft KP, Taylor H (2011). Revisiting the sediment health at Coral Bay, Ningaloo Marine Park, Western Australia. Marine Science Program Metadata Report. November 2011. Marine Science Program, Department of Environment and Conservation, Perth, Western Australia. 18p.

**Report**

Who is submitting this report?	Kevin Bancroft Heather Taylor	Research Scientist Marine Park Coordinator	Marine Science Program Ningaloo marine protected areas
Date report submitted?	November 2011		
Who has reviewed this report?	Kim Friedman	Principal Research Scientist	Marine Science Program

**What**

What is the title of the study/project?	Revisiting the sediment health in Coral Bay, Ningaloo Marine Park		
SPP number if relevant (refers to internal MSP projects)	SPP No. ....N/A		
What kind of data was collected (e.g. species richness, species inventory, abundance or density, % coral cover, etc)	Tributyltin concentration in marine sediment Total Kjeldahl Nitrogen concentration in marine sediment		
What would be some key words for searching for these data?	Antifouling paints; Tributyltin; TBT; Dibutyltin; DBT; Monobutyltin; MBT; Nitrogen; Total Kjeldahl Nitrogen; TKN Coral Bay; Mauds Landing; Monck head; Ningaloo Marine Park		

**Who**

Who did the research/monitoring? Please list names, duties and their affiliations.	Kevin Bancroft (Research Scientist) Marine Science Program Heather Taylor (Marine Park Coordinator) DEC Exmouth
--	--

Who is point of contact in case of questions? Please list their contact details - is there a generic contact that could be used to ensure longevity?	Kevin Bancroft <a href="mailto:Kevin.Bancroft@dec.wa.gov.au">Kevin.Bancroft@dec.wa.gov.au</a> (08) 9219 9792
Who else should be acknowledged and what contribution did they make (field, technical, GIS support, post-processing)?	Field Team: Matt Smith, (Senior Marine Ranger) DEC Exmouth Huw Dilley, (Marine Ranger) DEC Exmouth Claire O'Callaghan, (Marine Ranger) DEC Exmouth

**Why**

Why was the research done? Provide an abstract that summarises the aim and objectives of the research and where it might be used. This may be taken directly from SPP for internal MSP projects.	This survey was undertaken to investigate whether the levels of TBT and nutrient found in 1990 (Simpson and Field 1990) is persistent or concentrations have diminished and are no longer a concern to the management of pressures on sediment quality in Coral Bay. Tandabiddi was also sampled as historically, it was an area of high vessel usage.
--	--

**How**

How was the research done? (e.g. instrumentation, brief description of procedure)?	The analysis of sediments was undertaken by the National Measurement Institute (NATA accredited) ARRC, 26 Dick Perry Avenue, Kensington, WA 6151 (PO Box 1246, Bentley DC, WA 6983) T: +61 8 9368 8400 F: +61 8 9368 8499  Butyltins were analysed using an Agilent 7500cs ICP-MS Gas Chromatograph (limit of reporting 0.0005mg/kg)
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Please give a brief overview of the sampling design (spatial and temporal), including the spatial array of sample collection, how often measurements were taken and the specific unit of time or space that was used to aggregate samples (e.g. 20 sites, 10 inside sanctuary zones and 10 outside. 5 fixed transects at each site, each transect, surveyed twice a year, once in the summer and once in the winter, etc)?

### Sites

Sites were selected from the Simpson and Field (1995) site list.

- 2 sites located at Inner Coral Bay (CB7, CB8)
- 2 sites at Monck Head (CB22, CB23)
- 2 sites at Mauds Landing (CB24, CB25).
- 2 sites at the Tandabiddi mooring area (TB1, TB2)

NB. CB24 & CB25 were moved perpendicular to shoreline as the original sites are now covered by a sandbar. CB8 was also slightly moved into the appropriate habitat.

### Methods

Sediment Sampling as per ANZECC/ARMCANZ (2000) which reflect the recommended methods outlined in APHA (1998).

5 sediment samples taken in a 5 m<sup>2</sup> area at each site using a 50ml polycarbonate sample jar and scooping sediment to a depth of 2.5 cm. Once on deck samples left to stand for 5-10 mins and excess water decanted off carefully. These samples are pooled and mixed thoroughly using a clean mixing bowl and stainless steel spatula. Stirring is careful, not vigorous and two integrated samples (one for analysis and one to be kept as a backup replicate) are taken from the homogenous mix. (NB do not let homogenous mixture stand exposed to the air, sub-sample promptly after mixing)

### Vessels

The PV 'Yardiyarra' was used to collect samples at Coral Bay

The PV 'Cetea' was used to collect samples at Tandabiddi

### Costings

Analysis will be undertaken by the Aust Measurement Institute (AMI)

- 8 TBT analyses @ \$261 ea = \$2088
- 8 TKN samples @ \$37 ea = \$296
- 8 moisture measurements @ 13 ea = \$104
- 2 handling fees @ \$30 = \$60
- Freight ~\$450

### References

Simpson CJ, Field S (1995) *Survey of water quality, groundwater, sediments and benthic habitats at Coral Bay, Ningaloo Reef, Western Australia*. Department of Environmental Protection, Perth, Western Australia, Technical Series **80**. 31 p.

ATA Environmental, Coral Coast Marina Development Pty Ltd (2000) *Coral Coast Resort, public environmental review appendices. Volume II*

Australian and New Zealand Environment and Conservation Council (1999) *Australian and New Zealand Guidelines for Fresh and Marine Water Quality Draft*. Australia and New Zealand Environment and Conservation Council, Canberra, Australian Capital Territory. 89 p.

Bowman Bishaw Gorham, Coral Coast Marina Development Pty Ltd (1995) *Public environmental review : Coral Coast Resort, Mauds Landing. Appendices*

American Public Health Association (APHA). 1998. *Standard methods for the examination of water and wastewater*. 20th ed. Washington, DC

How are the data currently stored, that is what format is the data? (e.g. GIS shapefiles, Access database or geodatabase, compressed AVI etc.) Please provide as much information as possible.	<p>Lat/longs as GIS shape files NMP_SedQsurvey_20100812 (on CD provided and in the Corporate File below)</p> <p>Data stored in a Sigmaplot Notebook NMPA_SedQ.JNB and as an Excel workbook 2010_NMPA_seds.xls (on CD provided and in the Corporate File below)</p> <p>Hard copies stored in the Corporate File: 2011/011018-1 BIODIVERSITY CONSERVATION - MONITORING - Marine Science program - Western Australian Marine Monitoring Program - Water and Sediment Quality</p>
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**When**

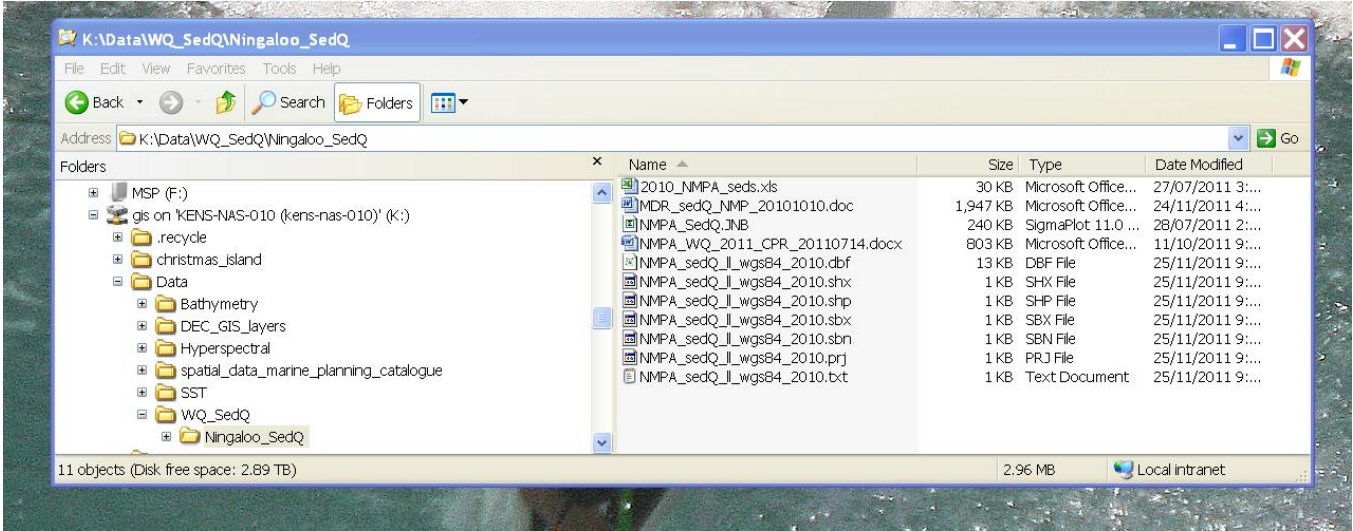
When was the research carried out? When were the start and end dates?	<p>Sediment samples were collected at Tandabiddi on 1 December 2010 and at the three Coral Bay locations on the 18-19 November 2010.</p> <p>Data was analysed by NMI on 1 December 2010 and 8 December 2010, respectively.</p>
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**Where**

Where was the research done? As a minimum Please indicate the 'bounding box' in latitude/longitude (decimal degrees) (e.g. North bound latitude -22.00; West bound longitude 113.00; East bound longitude 114.00; South bound latitude -23.00)	North bound latitude -21.90; West bound longitude 113.76; East bound longitude 113.98; South bound latitude -23.17				
Site names and GPS co-ordinates (in latitude/longitude (decimal degrees))	Site	Location	Latitude (dd)	Longitude (dd)	Datum
	CB7	Bills Bay	-23.1410	113.7702	WGS84
	CB8a	Bills Bay	-23.1411	113.7691	WGS84
	CB22	Moncks Head	-23.1628	113.7621	WGS84
	CB23	Moncks Head	-23.1684	113.7624	WGS84
	CB24a	Mauds Landing	-23.1155	113.7703	WGS84
	CB25a	Mauds Landing	-23.1131	113.7764	WGS84
	TB1	Tandabiddi	-21.9107	113.9728	WGS84
	TB2	Tandabiddi	-21.9091	113.9748	WGS84
Where in the vertical column of the ocean was the research undertaken? (e.g. minimum and maximum depth)	1-5 metres				

**GIS/ Remote Sensing (to be filled in by the GIS officer responsible for the work)**

<b>Supporting Imagery</b>			
What satellite sensor/s or raster data type (ie Landsat , WV2 or bathymetry data)	N/a		
What was the date of imagery capture?	N/a		
Imagery location: What regional mosaic or path/row was used?	N/a		
What is the imagery file name?	N/a		
What are the names of any derived raster products?	N/a		
<b>Site Selection</b>			
Which datasets were used for site selection?	Sites used in the 1995 study of sediment contaminants in Coral Bay undertaken by Simpson & Field (1995)		
Provide a brief description of the site selection method used	Used the sites previously used in the 1995 study	Also moved sites nearby when habitat was not suitable	
GPS format created for use in the field	N/a		
What are the names of any derived vector products?	N/a		
Data Creation date	N/a		
Who is the custodian of the GIS products? Please list names, duties and their affiliations.	Kevin Bancroft, Research Scientist,. Marine Science Program		

<p>Where is the original source data stored? (database, computer directory and computer name)</p>	 <p>K:\Data\WQ_SedQ\Ningaloo_SedQ</p>
<p>Where are the derived data stored? (computer directory and computer name)</p>	<p>See above image</p>

### How to Access

<p>Where are the raw data stored (include full file name and location, corporate file number etc)?</p>	<p>K:\Data\WQ_SedQ\Ningaloo_SedQ:</p> <ul style="list-style-type: none"> <li>2010_NMPA_seds.xls</li> <li>NMPA_SedQ.JNB</li> </ul> <p>Corporate File: 2011/011018-1 BIODIVERSITY CONSERVATION - MONITORING - Marine Science program - Western Australian Marine Monitoring Program - Water and Sediment Quality</p>
<p>Where are derived data products and processed data stored (include full file name and location)?</p>	<p>K:\Data\WQ_SedQ\Ningaloo_SedQ:</p> <ul style="list-style-type: none"> <li>NMPA_SedQ.JNB</li> </ul> <p>Corporate File: 2011/011018-1 BIODIVERSITY CONSERVATION - MONITORING - Marine Science program - Western Australian Marine Monitoring Program - Water and Sediment Quality</p>



Where are any other related publications/information about the research published - if any? (e.g. url )	Bancroft KP (2011). Ningaloo Marine Park and Muiron Islands Marine Management Area Water Quality 2011. Western Australian Marine Monitoring Program: Annual Asset Condition Pressure Response Update. August 2011. Marine Science Program, Department of Environment and Conservation, Perth, Western Australia. 9p K:\Data\WQ_SedQ\Ningaloo_SedQ\NMPA_WQ_2011_CPR_20110714
What constraints/restrictions would you place on the data and access to it (e.g. legal, usage - purposes that shouldn't use the data)	No restrictions

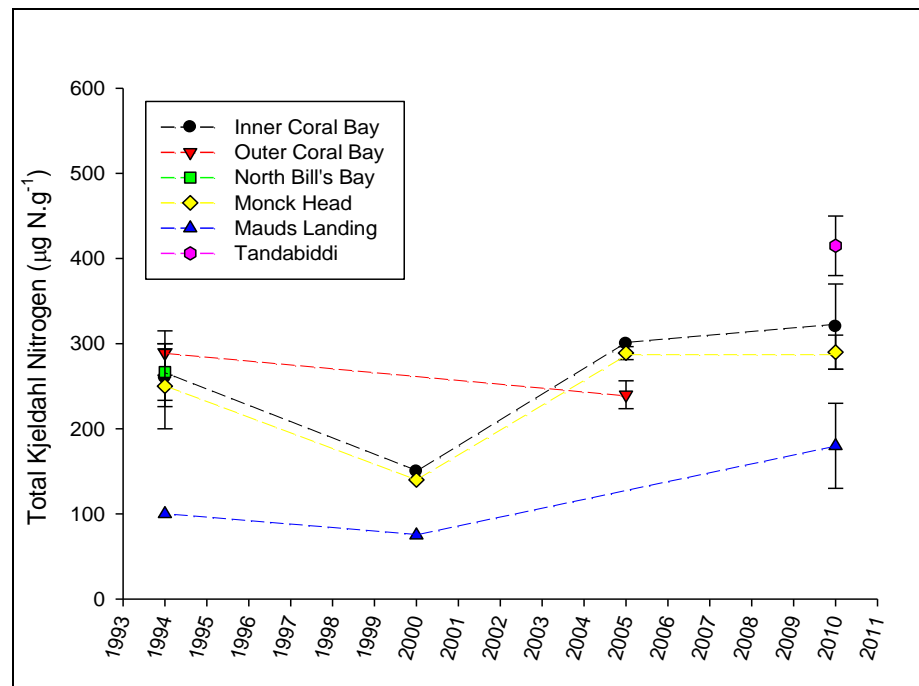
**Supplementary information -**

Please attach any further information you think would be useful for future researchers

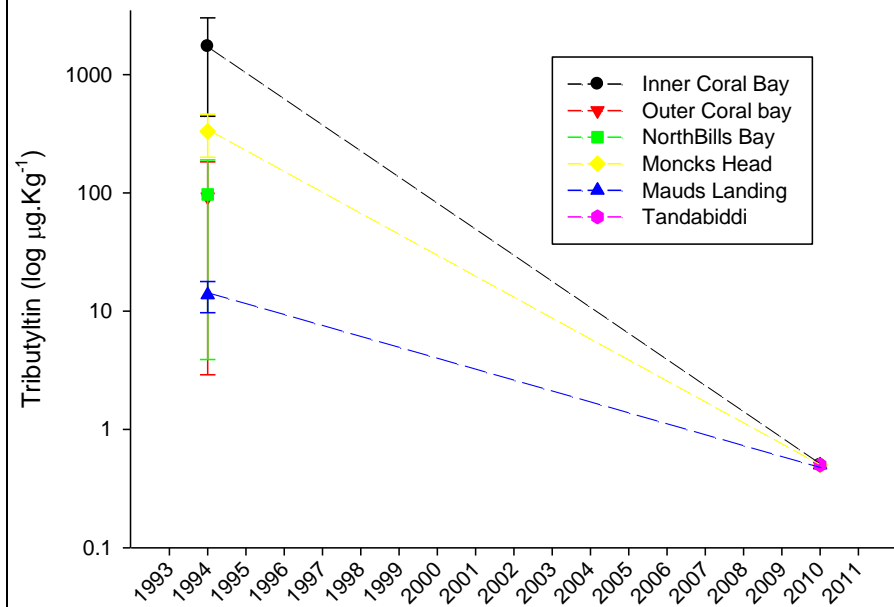
Laboratory results attached in Appendix 1

**Image**

If you have one handy please also attach a picture (JPEG preferable) that best describes your research. This will be used as the thumbnail image next to the metadata records in the MEST



TKN in marine sediments of Ningaloo MPAs



TBT in marine sediments of Ningaloo MPAs

## Appendices

### Appendix 1



Australian Government  
National Measurement Institute



# REPORT OF ANALYSIS

Page: 1 of 4 Report No. RN830063

Client : DEPARTMENT OF ENVIRONMENT AND CONSERVATION  
Job No. : DOEC01\_W/101123\_50  
Quote No. : QT-01731  
Order No. :  
Date Sampled : 18-NOV-2010  
Date Received : 23-NOV-2010  
Attention : HEATHER TAYLOR  
Sampled By : CLIENT  
LOCKED BAG 104  
BENTLEY DELIVERY CENTRE WA 6983

Lab Reg No.	Sample Ref	Sample Description
W10/028631	CB8a	SOIL 18-19/11/10
W10/028632	CB7	SOIL 18-19/11/10
W10/028633	CB25a	SOIL 18-19/11/10

Lab Reg No.	Units	LOR	W10/028631	W10/028632	W10/028633	Method
Sample Reference			CB8a	CB7	CB25a	
Organotins						
Monobutyltin as Sn	ng/g		<0.5	<0.5	<0.5	NR_35
Dibutyltin as Sn	ng/g		<0.5	<0.5	<0.5	NR_35
Tributyltin as Sn	ng/g		<0.5	<0.5	<0.5	NR_35
Tripropyltin	%		100	99	101	NR_35
Dates						
Date extracted			30-NOV-2010	30-NOV-2010	30-NOV-2010	
Date analysed			1-DEC-2010	1-DEC-2010	1-DEC-2010	

Luke Baker, Analyst  
Organics -NSW  
Accreditation No. 198

8-DEC-2010

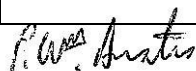
Lab Reg No.	Units	LOR	W10/028631	W10/028632	W10/028633	Method
Sample Reference			CB8a	CB7	CB25a	
Inorganics						
Moisture	%	0.1	24	25	19	WL170
Total Kjeldahl Nitrogen	mg/kg	50	270	370	130	WL132

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National Measurement Institute

## REPORT OF ANALYSIS Page: 2 of 4 Report No. RN830063

Lab Reg No.			W10/028631	W10/028632	W10/028633	Method
Sample Reference	Units	LOR	CB8a	CB7	CB25a	



Peter Anstis, Analyst  
Inorganics -WA  
Accreditation No. 2474

8-DEC-2010

## REPORT OF ANALYSIS Page: 3 of 4 Report No. RN830063

Client : DEPARTMENT OF ENVIRONMENT Job No. : DOEC01\_W/101123\_50 AND CONSERVATION Quote No. : QT-01731  
 LOCKED BAG 104 Order No. : BENTLEY DELIVERY CENTRE WA 6983 Date Sampled : 18-NOV-2010

Date Received : 23-NOV-2010 Attention :  
 HEATHER TAYLOR Sampled By : CLIENT Project Name :Your Client Services Manager : David Lynch Phone : (08) 9368  
 8420

Lab Reg No.	Sample Ref	Sample Description
W10/028634	CB24a	SOIL 18-19/11/10
W10/028635	CB23	SOIL 18-19/11/10
W10/028636	CB22	SOIL 18-19/11/10

Lab Reg No.			W10/028634	W10/028635	W10/028636	
Sample Reference			CB24a	CB23	CB22	
	Units	LOR				Method
Organotins						
Monobutyltin as Sn	ng/g		<0.5	<0.5	<0.5	NR_35
Dibutyltin as Sn	ng/g		<0.5	<0.5	<0.5	NR_35
Tributyltin as Sn	ng/g		<0.5	<0.5	<0.5	NR_35
Tripropyltin	%		101	82	98	NR_35
Dates						
Date extracted			30-NOV-2010	30-NOV-2010	30-NOV-2010	
Date analysed			1-DEC-2010	1-DEC-2010	1-DEC-2010	



Luke Baker, Analyst  
 Organics -NSW  
 Accreditation No. 198  
 8-DEC-2010

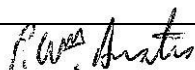
Lab Reg No.			W10/028634	W10/028635	W10/028636	
Sample Reference			CB24a	CB23	CB22	
	Units	LOR				Method
Inorganics						
Moisture	%	0.1	23	29	28	WL170
Total Kjeldahl Nitrogen	mg/kg	50	230	310	270	WL132

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## REPORT OF ANALYSIS Page: 4 of 4 Report No. RN830063

Lab Reg No.			W10/028634	W10/028635	W10/028636	Method
Sample Reference	Units	LOR	CB24a	CB23	CB22	



Peter Anstis, Analyst  
Inorganics -WA  
Accreditation No. 2474

8-DEC-2010

All results (except moisture) are expressed on a dry weight basis.



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This Report supersedes reports: RN829871





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## REPORT OF ANALYSIS

Page: 1 of 2

Report No. RN829052

<b>Client</b>	: DEPARTMENT OF ENVIRONMENT AND CONSERVATION LOCKED BAG 104 BENTLEY DELIVERY CENTRE WA 6983	<b>Job No.</b>	: DOEC01_W/101118_49
		<b>Quote No.</b>	: QT-01731
		<b>Order No.</b>	:
		<b>Date Sampled</b>	: 15-NOV-2010
		<b>Date Received</b>	: 18-NOV-2010
<b>Attention</b>	: Heather Taylor	<b>Sampled By</b>	: CLIENT
<b>Project Name</b>	: -		
<b>Your Client Services Manager</b>	: David Lynch	<b>Phone</b>	: (08) 9368 8420

Lab Reg No.	Sample Ref	Sample Description
W10/028138	TB1	MARINE SEDIMENT 15/11/10
W10/028139	TB2	MARINE SEDIMENT 15/11/10

Lab Reg No.			W10/028138	W10/028139	
Sample Reference	Units	LOR	TB1	TB2	Method
<b>Organotins</b>					
Monobutyltin as Sn	ng/g		<0.5	<0.5	NR 35
Dibutyltin as Sn	ng/g		<0.5	<0.5	NR 35
Tributyltin as Sn	ng/g		<0.5	<0.5	NR 35
Tripropyltin	%		69	99	NR 35
<b>Dates</b>					
Date extracted			19-NOV-2010	19-NOV-2010	
Date analysed			25-NOV-2010	25-NOV-2010	

Luke Baker, Analyst  
Organics - NSW  
Accreditation No. 198

1-DEC-2010

Lab Reg No.			W10/028138	W10/028139	
Sample Reference	Units	LOR	TB1	TB2	Method
<b>Inorganics</b>					
Moisture	%	0.1	30	29	WL170
Total Kjeldahl Nitrogen	mg/kg	50	450	380	WL132

Peter Anstis, Analyst  
Inorganics - WA  
Accreditation No. 2474

1-DEC-2010

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National Measurement Institute

**REPORT OF ANALYSIS**

Page: 2 of 2  
Report No. RN829052

All results (except moisture) are expressed on a dry weight basis. Unless notified to the contrary, the above samples will be disposed of one month from the reporting date.



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Results relate only to the sample(s) tested.

This Report supersedes reports: *RN828583*



Australian Government  
National Measurement Institute

NMI Job No.

DOEC01\_W/101118\_49

Sample Matrix:

Soil/ Sediment

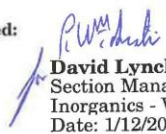
Page 1 of 1

**INORGANIC QUALITY ASSURANCE REPORT**

Analyte	Acceptability Criteria %	LOR	Units	Blank	Recovery %
Moisture	N/A	0.1	%	<0.1	-
Total Kjeldahl Nitrogen	80 - 110	50	mg/kg	<50	99%

LOR: Limit Of Reporting

Signed:

  
**David Lynch**  
Section Manager  
Inorganics - WA  
Date: 1/12/2010

THIS REPORT SHALL NOT BE REPRODUCED EXCEPT IN FULL



Australian Government  
National Measurement Institute

### QUALITY ASSURANCE REPORT

**Client:** DEPARTMENT OF ENVIRONMENT  
**NMI QA Report No:** DOEC01\_W/101118\_49 **Sample Matrix:** Solid

Analyte	Method	LOR	Blank	Sample Duplicates			Spike Recoveries	
				Sample	Duplicate	RPD	LCS	Matrix Spike
		ng/g	ng/g	ng/g	ng/g	%	%	%
Organics Section								
Organotin								
Monobutyltin	NR_35	0.5	<0.5	NA	NA	NA	55	NA
Dibutyltin	NR_35	0.5	<0.5	NA	NA	NA	65	NA
Tributyltin	NR_35	0.5	<0.5	NA	NA	NA	60	NA
Organotin Surrogate								
Tripropyltin (%Rec)	NR_35	-	-	NA	NA	NA	57	NA

Results expressed in percentage (%) or ng/g wherever appropriate.  
Acceptable Spike recovery is 20-150% (monobutyltin); 40-150% (dibutyltin and tributyltin)  
Acceptable RPDs on spikes and duplicates is 40%.  
RPD= Relative Percentage Difference.  
This report shall not be reproduced except in full.

**Signed:**

Danny Slee  
Organics Manager, NMI-Pymble  
29/11/2010

**Date:**

