

# North West Marine Research Inventory WAMSI Project No. 3.8

## Final Report

CSIRO Marine and Atmospheric Research

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## **ABSTRACT**

This project, formulated by the Western Australian Marine Science Institution (WAMSI), developed a metadata database (the North West Marine Research Inventory - NWMRI) of completed, current and planned marine and coastal research in State and Commonwealth waters of Western Australia between Kalbarri to the Northern Territory border (i.e. the North-west Marine Region - NWMR). The project began in late 2007 and was completed in July 2008, with the delivery of the NWMRI metadata database to the hub of advanced computing in WA, iVEC.

The NWMRI was implemented in an on-line searchable format via the metadata entry and search tool (MEST). This will allow for query-able on-line access to the metadata database, with associated web forms to allow additional metadata entry as well as updating of existing entries and links to the data themselves where available.

The metadata database was populated with information from several databases from WA and Commonwealth agencies, and by direct interactions with a comprehensive list of researchers and research custodians. In all, contact was made with 259 individuals from 90 organisations.

As of the 1st July 2008 the NWMRI metadata database contained 709 records for individual research projects, with information associated with 218 Unique Contacts from 79 Organisations, with individual contacts associated with between 1 and 46 research project records.

Project start dates ranged from 1890 to 2011, with the number of concurrent research projects showing a steady increase over time with marked increases in 1993 and 2000. Since 2006, there have been over 200 concurrent research projects running in the NWMR.

While the response from information holders and research providers was generally very positive to the principals of the metadata database, the provision of information from research custodians was generally poor. This highlights a major challenge for the further development of the NWMRI metadata database, and custodians will need to provide incentives for researchers and managers to input into the metadata database to keep it current. While regulation and stipulation will have a place, ultimately the success of the metadata database will rest with its utility and profile.

We used the information collated in the metadata database to describe the coverage of the research, spatially, temporally, topically and in reference to EPBC listed species, and to identify gaps in existing information regarding marine and coastal environments and processes in the region. The coverage of research projects in the NWMR was very patchy, with high concentrations of research effort in Shark Bay, Ningaloo Reef, North West Cape, Barrow Island, Burrup Peninsula, Port Headland, the central Kimberley coast, and, to a lesser extent, the Pilbara coast and off shore reefs. Research effort was low or non-existent in the deeper benthic habitats and the extreme north of the region.

## Recommendations

1. Provide on-line access to the NWMRI metadatabase as soon as possible. This would include the ability for the owners of individual metadata records to update and enter records.
2. Develop a comprehensive communication strategy to raise the profile of the NWMRI metadatabase.
3. Develop suitable incentives/requirement for researchers/industry to contribute to the NWMRI metadatabase.
4. Continue to address known information gaps such as Geoscience Australia and current WAMSI project portfolio.
5. Investigate ways to increase access to unpublished reports (mostly Industry sponsored) cited in the (DEWHA) EPBC online listings.

## 1. INTRODUCTION

Much marine scientific research has been undertaken by a variety of public and private sector organisations within the State and Commonwealth waters of Western Australia between Kalbarri to the Northern Territory border (i.e. the North-west Marine Region - NWMR). A comprehensive review of this research has not been completed to date and would be valuable in assisting Government and the private sector to better evaluate current understanding of the marine environment and target future research as part of coastal and marine planning initiatives.

This project was initiated through collaboration between Commonwealth (DEWHA) and WA State agencies, via WAMSI, for the development of a metadatabase of information on completed, current and planned marine and coastal research in the NWMR — the North West Marine Research Inventory (NWMRI). It was funded by The NWMRI metadatabase would be maintained in a suitable open format that will make the information available to those that need it with the aim of facilitating a strategic and collaborative approach toward future marine research, planning and management in the NWMR.

The project had 3 key outputs:

1. The compilation of a metadatabase of all identified marine and coastal research completed, current or proposed in WA (state and commonwealth waters) from Kalbarri to the NT border (the north west marine region), and for which meta data has been made available, within the study area (NT border to Kalbarri, from the shoreline through the EEZ). Information gathered for the metadatabase should include current and ongoing research relating to the following: distribution, abundance and dynamics of EPBC listed species and other species thought to play a significant ecological role; system level studies that examine broad-scale ecological and physical oceanographic processes, trophic and other natural systems; ecological or biophysical studies (including those on geology, geomorphology and sedimentology) within the study region; studies about the interaction between industry and the environment; and studies or assessments of social and economic issues and impacts within the region. The metadata will identify the type of research (e.g. geological, ecological, taxonomic), status (completed, current, proposed), date of data entry/update research provider and contact details, spatial scale of research, the temporal scale of the research and confidentiality or copyright associated with research outputs. While existing databases and bibliographies will be included into the metadatabase, the priority focus will be on capturing research that is difficult to source and might not have been previously identified.
2. Storage of the above metadatabase in an on-line searchable format via the metadata entry and search tool (MEST). The metadatabase structure will include the metadata fields approved within the marine profile of ISO 19115, compatible for entry into the MEST. This would allow query-able on-line access to the metadatabase, with associated web forms to allow additional metadata entry as well as updating of existing entries and links to the data themselves where available or possible. Links to the data should be made from the metadata where the data is freely available. Such a metadatabase would provide a 'one-stop' online search tool for information on WA marine research and associated data. This would enable the mitigation of lost, forgotten or hard to find information on WA marine research from all

research providers including Australian and State Government agencies, industry, education and science institutions as well as public and private sector organisations.

3. An accompanying report on the metadatabase would describe the project outputs, the coverage of the research, both spatially and topically, to date and identify gaps in existing information regarding marine and coastal environments and processes in the region.

The project began in late 2007 and was substantively completed in June 2008, with the delivery of the NWMRI metadatabase to the WA computing hub, iVEC. This report contains details of the structure of the NWMRI metadatabase, the process for obtaining the information it holds, a description of its contents (both in terms of the metadata itself and of the research coverage within its metadata entries) and recommendations for future maintenance and improvement.

## **2. METHODS AND RESULTS**

### **2.1 MEST compliant metadatabase**

#### **2.1.1 Metadatabase structure**

Metadata systems are typically modelled on the concept of a "dataset", which would typically be a specific data product produced as part of a data acquisition and analysis process. For the purposes of this project, the basic unit was established as a "Research Project", which was defined as a cohesive body of work within a defined area, and over a defined time period. This required some thought as to the most appropriate way to describe a Research Project within the MEST framework, which is based on the Marine Community Profile of ISO 19115 International Metadata Standard for Geographic Information (ISO 19139).

Fields were implemented that gave the ability for subsequent users to search and categorise results based on free text, spatial and temporal extents (Appendix A). In addition a small number of additional fields (such as the source of the metadata information received) were tracked internally by the project, to assist with managing the information and removing duplicates during editing. As part of encoding the information to ISO 19139/19115, each metadata record was allocated one or more broad "Topic Category Codes", to assist with categorization and searching (Appendix B).

#### **2.1.2 Data entry method**

CSIRO used its existing divisional metadatabase, "Marlin" (<http://www.cmar.csiro.au/marlin/search.html>) for data entry and editing, prior to export to the MEST. Marlin provided a web-based, data entry interface that supports multiple concurrent users with the underlying metadata stored in an Oracle database. This system enabled the project team to rapidly enter new records, as we were able to perform bulk imports of the



contents of acquired databases, using standard data transfer techniques. The underlying Oracle database facilitated access to the information by a variety of mechanisms, allowing queries to be made by a wide range of tools. These capabilities are generally lacking in the XML based MEST framework.

Another advantage of this method of metadata entry was that installation and testing of the MEST could occur in parallel with the metadata entry and editing, but remain an independent task. This was considered desirable due to the MEST being in an early stage of development, and the MEST undergoing extensive modification during the operational phase of this project. Export of the NWMRI metadatabase to an existing MEST instance was a separate task that occurred in the final stages of the project. The MEST has the ability to import metadata from a number of supported XML formats. As the delivery mechanism at the end of the project (an external MEST instance managed by iVEC), metadata content was exported out as XML, conforming to the Marine Community Profile of ISO 19115, permitting it to undergo bulk upload successfully by the iVEC MEST.

## **2.2 Information collation**

### **2.2.1 Existing databases and bibliographies**

We acquired several databases that contained information on research projects from WA DEC and DEWHA (Table 2-1). All unique records that represented legitimate research projects carried out within or as part of the NWMR were entered into the NWMRI metadatabase. Mostly the information in the databases was not complete and, where possible, further information was obtained from the internet or by contacting research custodians for clarification/information using research proformas (see next section). In all, 747 records were entered from the combined databases, however, many were duplicate entries that were then merged or deleted.

We also obtained several bibliographies of past literature searches from CSIRO, DEC and DEWHA (Table 2-2). All bibliographies have been entered into a single EndNote database and will be made available at the conclusion of the project.

## METHODS AND RESULTS

Table 2-1 Databases obtained by the project containing information about Research Projects relevant to the NWMR.

	<b>Database name</b>	<b>Source*</b>	<b>Currency</b>	<b>Description</b>	<b>#</b>
1.	Research Projects in Proposal Stage, NMP 2006	DEC (SA)	June 2006	Contains a list of projects that were in proposal stage as of June 2006 – all relevant to Ningaloo Reef	7
2.	Current Research Project Relevant to Ningaloo Reef	DEC (SA)	June 2006	Contains a list of projects that were current (still running) as of June 2006 – all relevant to Ningaloo Reef	46
3.	NinaglooResearchFundProjects	DEC (SA)	June 2006	List of projects that were about to start or had just commenced as of June 2006, that all lie within a major group of research projects relevant to Ningaloo Reef, all coming from the same funding that is the “Ningaloo Research Program”.	11
4.	Ningaloo Cluster projects	DEC (SA)	June 2006	List of projects that fall within the CSIRO Wealth from Oceans Cluster – all relevant to Ningaloo Reef and all current or proposed as of June 2006. Most of these projects are running now.	5
5.	Rowley Shoals Projects	DEC (SA)	June 2007	List of projects that were current or proposed as of June 2007 (all relevant to the Rowley Shoals)	13
6.	WA Marine Science Inventory	DEC (SA)	Oct 2007	Preliminary version of our own WA marine research inventory database. It contains projects all over the state that are relevant to the marine parks of WA.	226
7.	SIERS	DEC (EPASU)	Oct 2007	Study area subset of the WA Spatial Index of Environmental Reports (SIER) database.	28
8.	Pilbara and Lower West Kimberley Spatial Index	DEC (MPU)	Oct 2007	A compilation of spatially located environmental reports for the referred area. Will eventually be imported into the SIER database.	213
9.	EPBC Referrals	DEWHA	Mar 2008	Information required under the Environment Protection and Biodiversity Conservation 1999 (EPBC) Act. The information presented is dynamically generated from an Environment Australia database.	198

\* (SA) Shannon Armstrong, WA DEC; (EPASU) WA Environmental Protection Agency Support Unit; (MPU) WA DEC Marine Policy Unit.

Table 2-2 Databases obtained by project staff containing Literature relevant to the NWMR.

	<b>Table name</b>	<b>Source *</b>	<b>Currency</b>	<b>Description</b>	<b>#</b>
1	Kimberley LitRev	DEC (KW)	Feb2007	Literature review Feb2007 for Kimberley region	868
2	NWMP	NOO (NB)	Oct2007	DEW Hbt, compiling ref list for NWMP work SharkBay-NTBorder.	793
3	NW Shelf	CMAR	~2000?	Source material for the NWS JEMS Project 1999- 2006.	1857
4	NMP Bibliography 2006	DEC (SA)	June 2006	Contains a reference list of publications that were completed prior to June 2006 – all relevant to Ningaloo Reef.	735
5	Pilbara and Lower West Kimberley Endnote Library	DEC (MPU)	Feb 2008	Study Area subset of the WA Spatial Index of Environmental Reports (SIER) database.	683
6	Rowley Shoals Bibliography	DEC (SA)	June 2007	List of publications relevant to the Rowley Shoals completed prior to June 2007	52
	<b>Total</b>				<b>4988</b>

\* (KW) Kelly Waples, WA DEC; (NB) Nadina Beck, NOO, DEWHA; (MPU) Marine Policy Unit, WA DEC.

### 2.2.2 Obtain new information on past, current and future research

The Project Steering Committee (SC) supplied an initial contact list that was augmented by the project team enquiries. Additional contacts were also identified through the various databases acquired by the project. Approaches to these target contacts commenced in late February 2008, with additional leads being followed up until June 2008.

In all, contact was made with 259 individuals from 90 organisations. Of these, 218 contacts from 79 Organisations were eventually identified as the contact for project metadata information (Appendix E, F).

Initial contact was made by phone, e-mail and/or personnel visits. Contacts were structured and carefully coordinated to achieve maximum cooperation and transparency. The Project Team formulated a concise introductory document that included background information and a project outline – this was sent to every contact at the start of our interaction with them. Where possible the project team would facilitate information gathering process by pre-filling proformas (Appendix C) from existing material and forwarding to the contact for upgrading and validation.

While the response from information holders and research providers was generally very positive to the principals of the NWMRI metadatabase, the provision of information from research custodians was generally poor. The response rate from requests for submitting completed proformas and/or validating NWMRI interpretation of project and/or literature database records was approximately 10%. This highlights a major challenge for the further development of the NWMRI

Resource Companies in particular provided some challenges due to high levels of industry activity in current exploration activities and the resulting low priority on providing project metadata. Also, there may be some sensitivity by Industry where outlining proposed environmental research in a defined area may expose them to a (perceived at least) competitive disadvantage.

## 2.3 Metadatabase description

### 2.3.1 General description

As of the 1st July 2008 the NWMRI metadatabase contained 709 records for individual research projects, with information associated with 218 Unique Contacts from 79 Organisations (Appendix E). Individual contacts are associated with between 1 and 46 research project records.

The number of fields completed for each record varied from 6 to all 20 fields (Table 2-3). All records had a title and contact person, and all were categorised using ISO topic categories, which are a number of broad subject categories that have been standardised by the International Organisation for Standardization for (ISO) (Appendix B). Each record was assigned at least category, and as many was applicable. The primary categories for records in the NWMRI metadatabase were Biota (504), Environment (269) and Oceans (184) (Appendix D). The metadatabase also included records with categories: economy (67), society (50) and geoscientific information (71).

The spatial extents for research projects were obtained either from existing databases acquired by the project (e.g. WA EPA SIER database, WA DEC Marine Ecosystem Branch Spatial database), or derived from information in the title or abstract, and sometimes augmented by web searches or ancillary material. Some records were updated based on feedback from the contacts.

The projects start and end dates were either entered from existing databases or inferred from project material where possible. Some dates were provided by contacts. A total of 491 records contain both valid begin and end dates. A total of 309 records contain identical begin and end dates, which identifies those records that were interpreted from citations by the NWMRI Project Team (and not validated by contacts). There were 98 Unknown Begin dates and 170 Unknown End dates with 52 records with both Unknown Begin and End dates.

While we identified depth as a potentially useful metadata parameter for research projects, we were only able to gather reliable depth range information for 37 records. The usefulness of this information field should be reassessed given the low completion rates in the current metadatabase.

Table 2-3 NWMRI metadatabase fields with number of valid entries (not null or “Unknown”).

FIELD	Count
Title	709
Topic Category Code	709
Contact person/position details	709
Contact organisation	706
Credit list (contributors)	675
Abstract	709
Relevant publications	371
Project start date	671
Project end date	599
South bounding coord	681
North bounding coord	681
East bounding coord	681
West bounding coord	681
Min depth	37
Max depth	37
State of progress	585
Maintenance frequency	54
Lineage	709
Supplementary information	430

### 2.3.2 Information gaps

Known sources of project metadata about research in the NWMR that we were unable to satisfactorily include in the NWMRI metadatabase to date include:

Geoscience Australia. They will probably be in a position to input into the metadatabase soon after it is implemented. We would encourage the targeting of GA initially for their input into the metadatabase.

WAMSI current projects. The projects within the WAMSI portfolio were not entered as a block, however, several other processes in all likelihood captured the majority of these projects. However, it would probably be worthwhile having the WAMSI projects entered into the

metadatabase now, and into the future. They could also be tagged for ease of querying the full WAMSI suite of projects.

Universities. While there are 164 records in the metadatabase sourced from Universities in Australia and abroad, we still feel there could be significant input by this sector. However, this sector will probably be adequately addressed by BlueNet - the Australian Marine Science Data Network.

## 2.4 Research coverage

### 2.4.1 Temporal coverage

Project begin and end dates ranged from 1890 to 2011, with the vast majority beginning and ending between 1993 and 2009 (Figure 2-1, Appendix D). The duration of the 182 projects that had valid Begin and End dates (and not equal to zero) ranged from less than 1 year to 25 years (Figure 2-2, Appendix D) with the majority (131) having a project duration of 5 years or less.

Given that projects such a variable duration, the number of concurrent research projects for each year is probably a better indication of the temporal spread of research in the NWMR (Figure 2-3). This shows a steady increase in the number of concurrent research projects with marked increases in the number of concurrent research projects in 1993 and 2000. Since 2006, there have been over 200 concurrent research projects running in the NWMR.

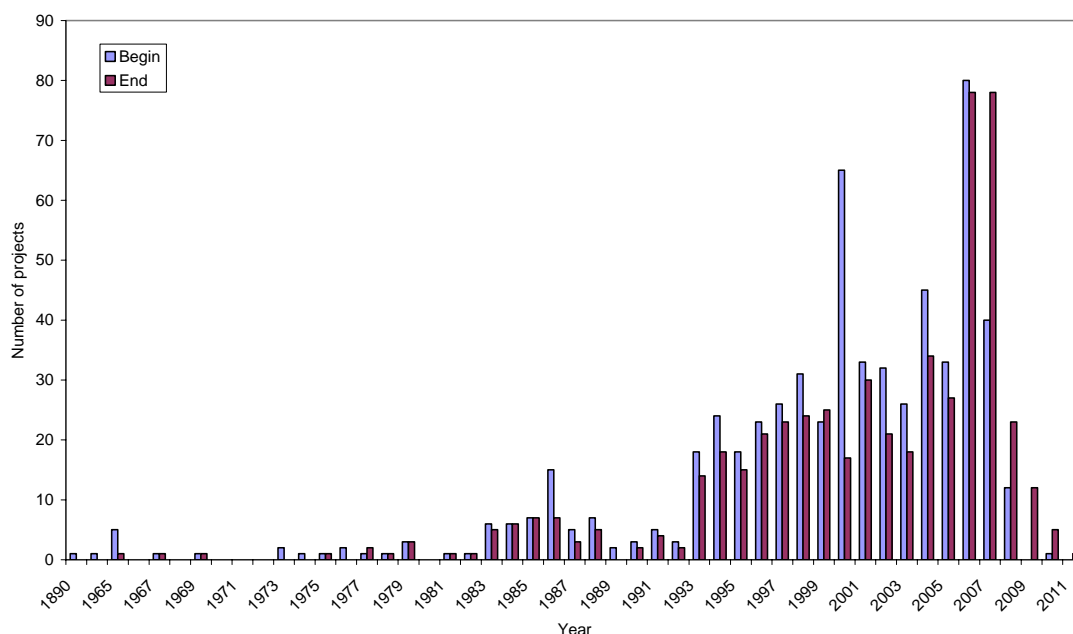


Figure 2-1 Research projects Begin and End date annual frequency within the NWMR.

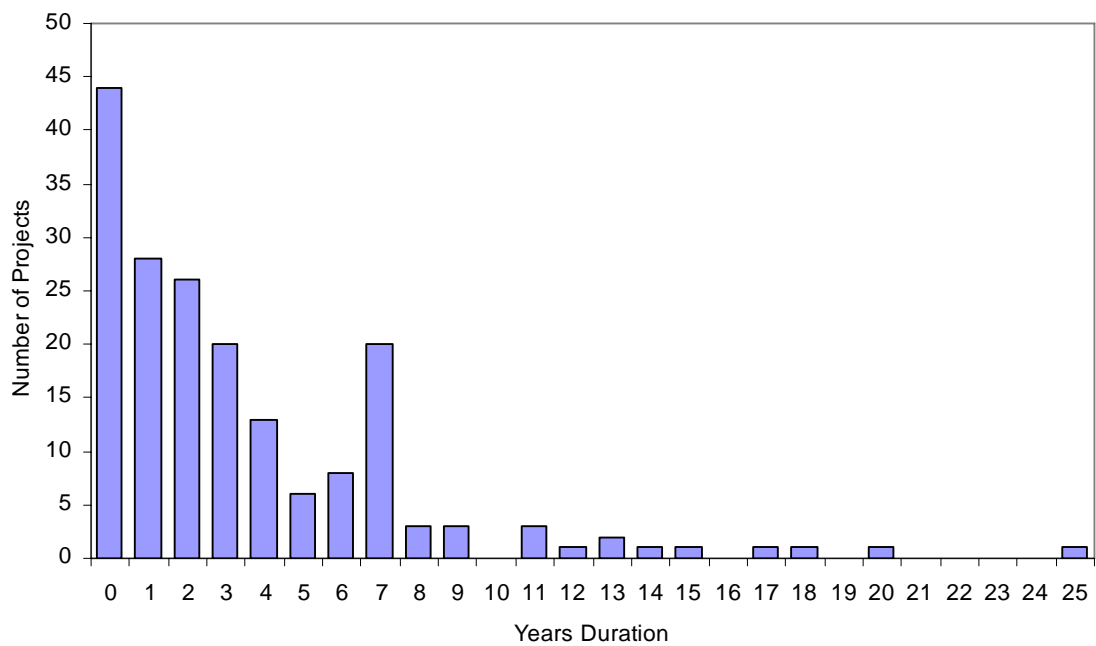


Figure2-2 Duration of projects with valid start and end dates in the NWMR.

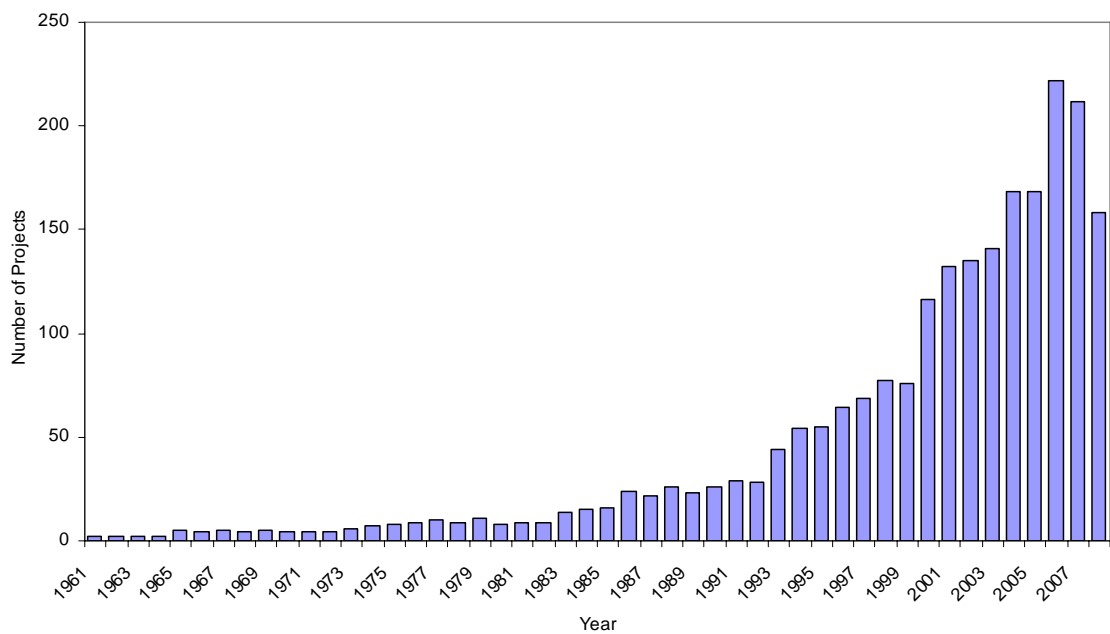


Figure 2-3 Research projects occurring concurrently in the NWMR.

## 2.4.2 Spatial coverage

We characterised the spatial coverage of the research documented in the NWMRI metadatabase by analysing the bounding boxes of the metadata records. The bounding box of a record indicates the geographic extent of the research or data described by the record (Figure 2-4). The bounding box will often provide an approximate extent only, and in particular may over-estimate the extent, because (a) it is constrained to be a rectangle, (b) for research occurring at multiple discrete locations it represents the total geographic range of the locations rather than the individual locations, and (c) it may be based on an indirect or ambiguous source such as a textual description. However, this limitation should not prevent aggregate statistics of the bounding boxes from describing the broadscale distribution of research.

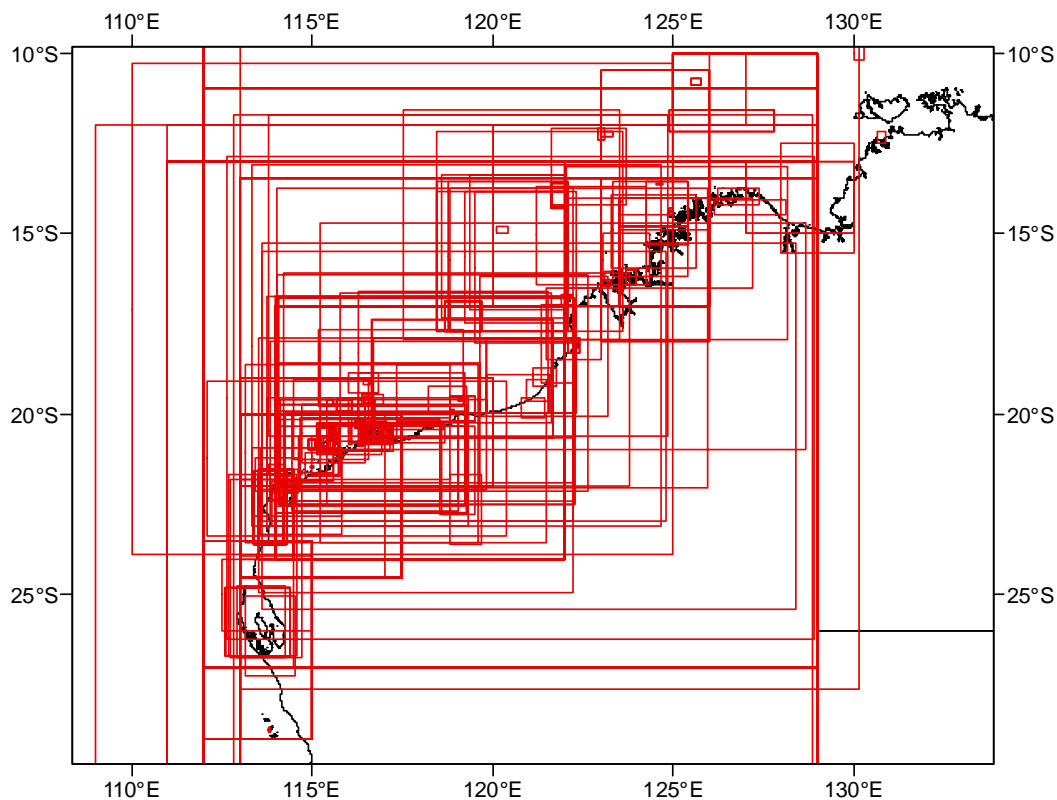


Figure 2-4 The bounding boxes of the metadata records

For ease of interpretation, the size of a bounding box will be defined as the width in degrees of a square box of the same area (one degree of latitude/longitude spans about 100–110 km within the study region). Bounding box sizes ranged from 0 to 255 degrees (Figure 2-5). The median size was 3.3 degrees, and the majority of boxes were in the range 0.7–4.6 degrees. The larger bounding boxes mostly represented a small number of familiar regions: the world (255 degrees, 2 records), Australia (38–48 degrees, 25 records), Western Australia (18–23 degrees, 87 records) and the north of Western Australia (14.5–17.6 degrees, 10 records).



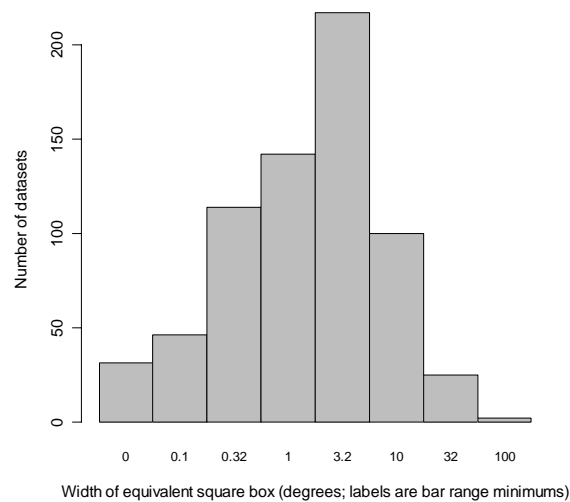


Figure 2-5 Distribution of dataset bounding box sizes. The size of a bounding box is defined to be the width in degrees of a square box with the same area.

The smaller bounding boxes were more variable in size and location. To summarise the distribution of all boxes, we therefore overlaid the boxes to create a map of the number of bounding boxes overlapping each cell of a grid covering the Western Australian region (Figure 2-6).

The map indicates that there is a background set of about 100 large bounding boxes that cover much of the north-west. Within that area, the North West Cape region stands out as having at least 250 records. Over 100 of these records are from the Department of Environment and Conservation project database and share a common 4.5-degree bounding box. The remaining records tend to be broadly concentrated around Shark Bay, the Rowley Shelf (e.g. from the CSIRO NWSJEMS project) and the central Kimberley coast. Although many of the central Kimberley records shared the same bounding box, they were in fact from various sources and covered various subjects and locations in the region.

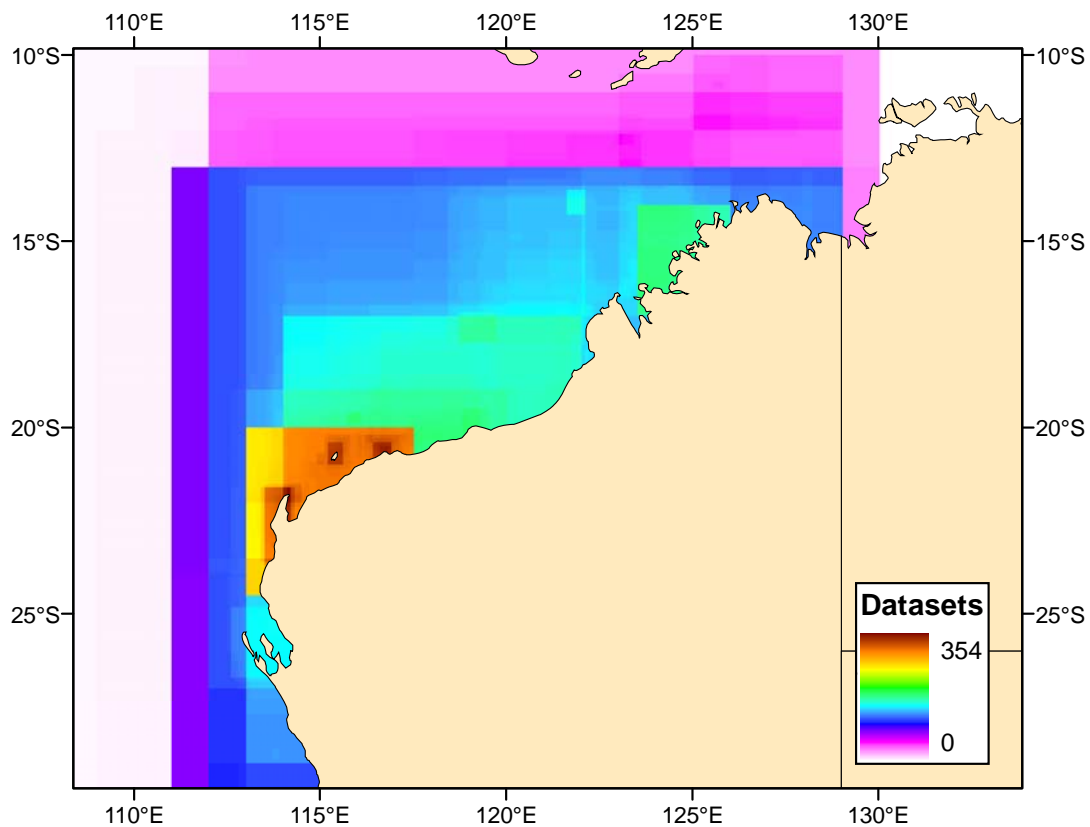


Figure 2-6 The distribution of the bounding boxes of the metadata records. The map indicates the number of bounding boxes that overlapped each cell of a grid covering the study region.

The pattern of the map was clearly driven by the large number of metadata records with large bounding boxes. However, a concentration of local studies around a particular location is also of interest, even if the number of records is small relative to the background number for the broader region. To reveal such concentrations, we regenerated the map using only bounding boxes that were less than 4.5 degrees in size (Figure 2-7). Concentrations of these more local studies occurred around Shark Bay, Ningaloo Reef, North West Cape, Barrow Island, Burrup Peninsula, Port Headland, the central Kimberley coast, Rowley Shoals, Scott Reef, Ashmore Reef and Karnt Shoals region (Big Bank Shoals).

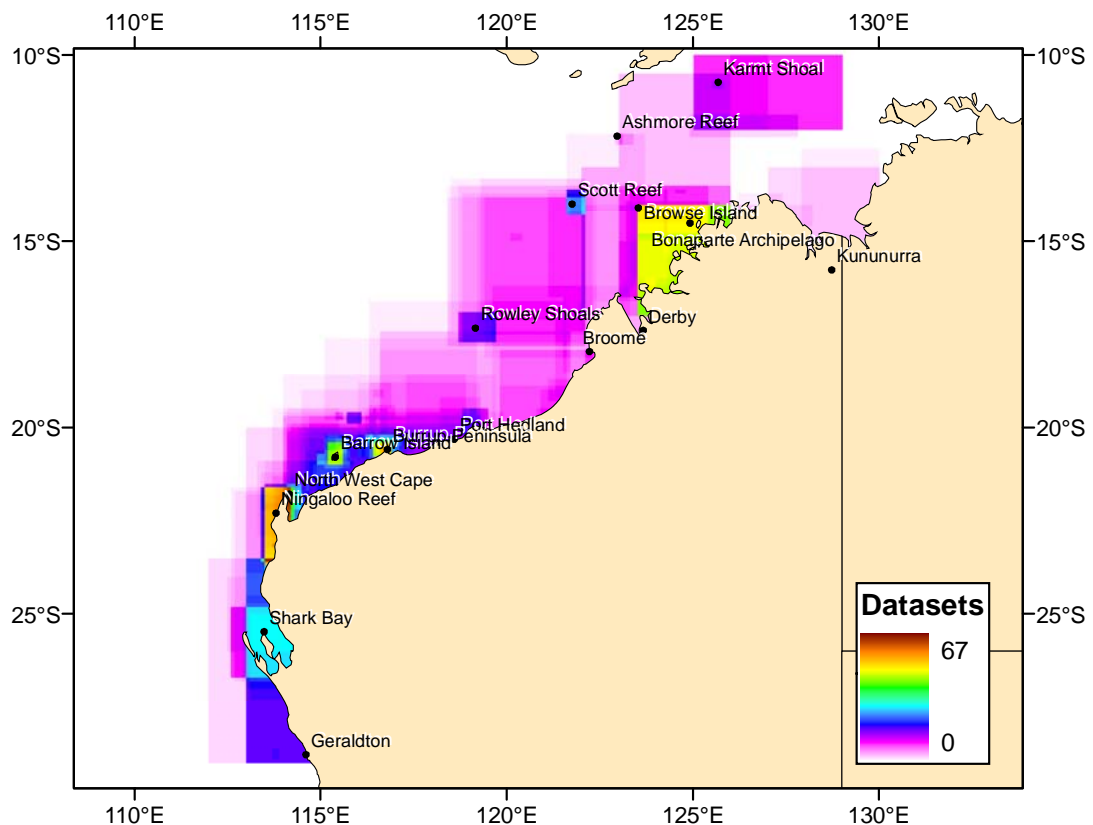


Figure 2-7 The distribution of metadata record bounding boxes that were smaller than 4.5 degrees in size. The map indicates the number of bounding boxes that overlapped each cell of a grid covering the study region.

Each metadata record was tagged with one or more of 17 keywords indicating the subjects of the research. We grouped the keywords into five classes and mapped the distribution of bounding boxes for each class (Figure 2-8). The classes were as follows: biota (biota), environment (environment), physical environment (climatologyMeteorologyAtmosphere, elevation, geoscientificInformation, imageryBaseMapsEarthCover, inlandWaters, oceans), socioeconomics (economy, health, society), and infrastructure (boundaries, location, planningCadastre, structure, transportation, utilitiesCommunication). All classes shared the same general distribution, but there was variation in details. For example, physical environment and socioeconomics datasets were more patchily distributed than biota and environment datasets.

The use categorises using the ISO subject categories alone was possibly too general. Providing the option to include a secondary sub-code for each of the subject codes may have been more useful - though it would have required addition resources to implement.

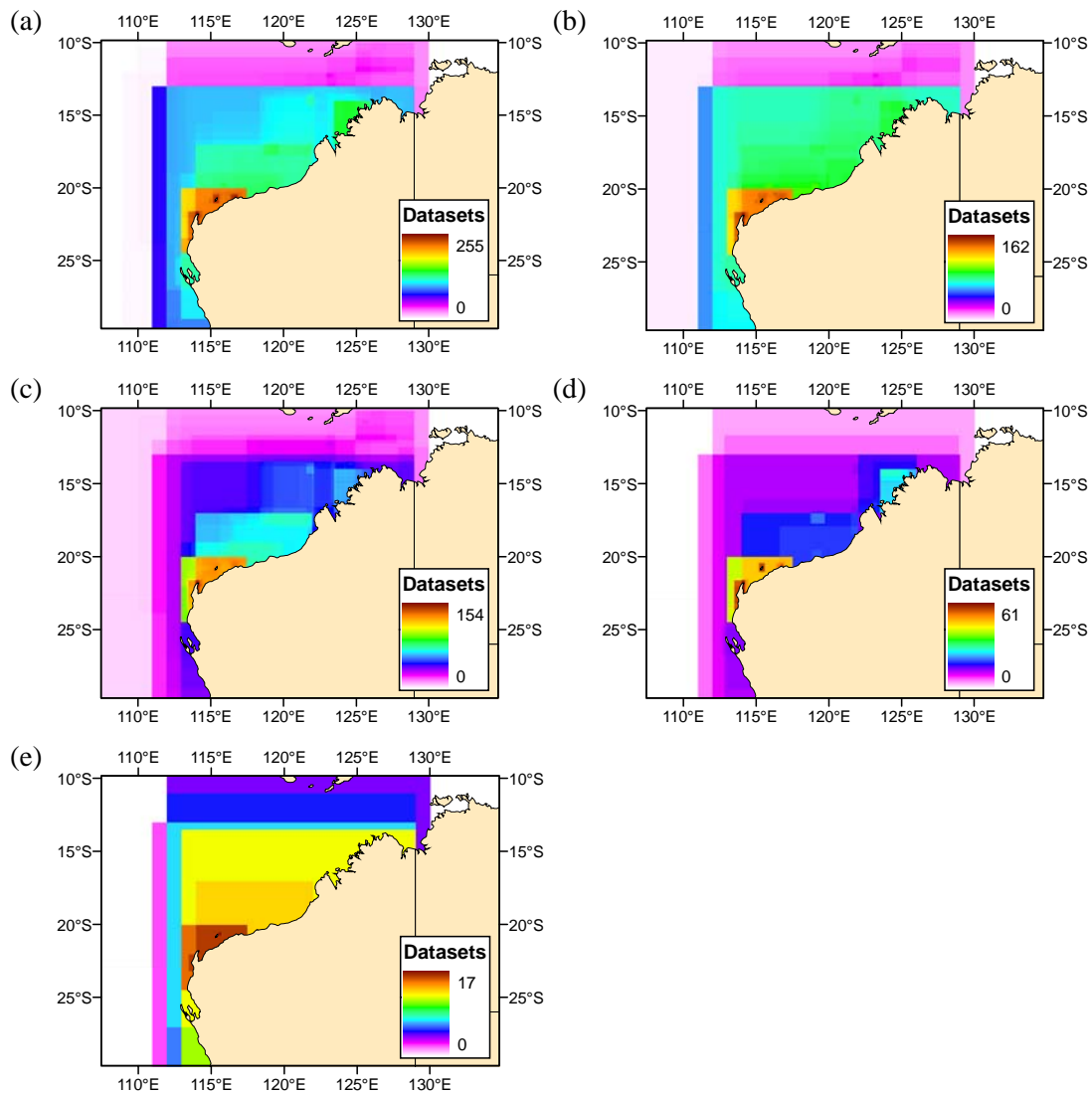


Figure 2-8 The distribution of metadata record bounding boxes for category groups (a) biota, (b) environment, (c) physical environment, (d) socioeconomics and (e) infrastructure

We would expect the geographic distribution of research and data collection to change with time due to changes in drivers such as research priorities and the locations of commercial activities. To summarise such changes we mapped the distribution of metadata record bounding boxes by decade (Figure 2-9). Note that the colour scale on the maps changes from map to map to highlight the geographic variation within each decade rather than show variation among decades at each site. The maps must therefore be interpreted in the context of the large increase in the number of collated records between the first and last decades. The maps reveal at least two notable changes. First, there was a shift in the concentration of records from Burrup Peninsula in the 1980s to North West Cape and Ningaloo Reef in the 1990s. Second, the map for the 2000s is clearly dominated by the large number of records provided by DEC with a common bounding box for the broad region around North West Cape.

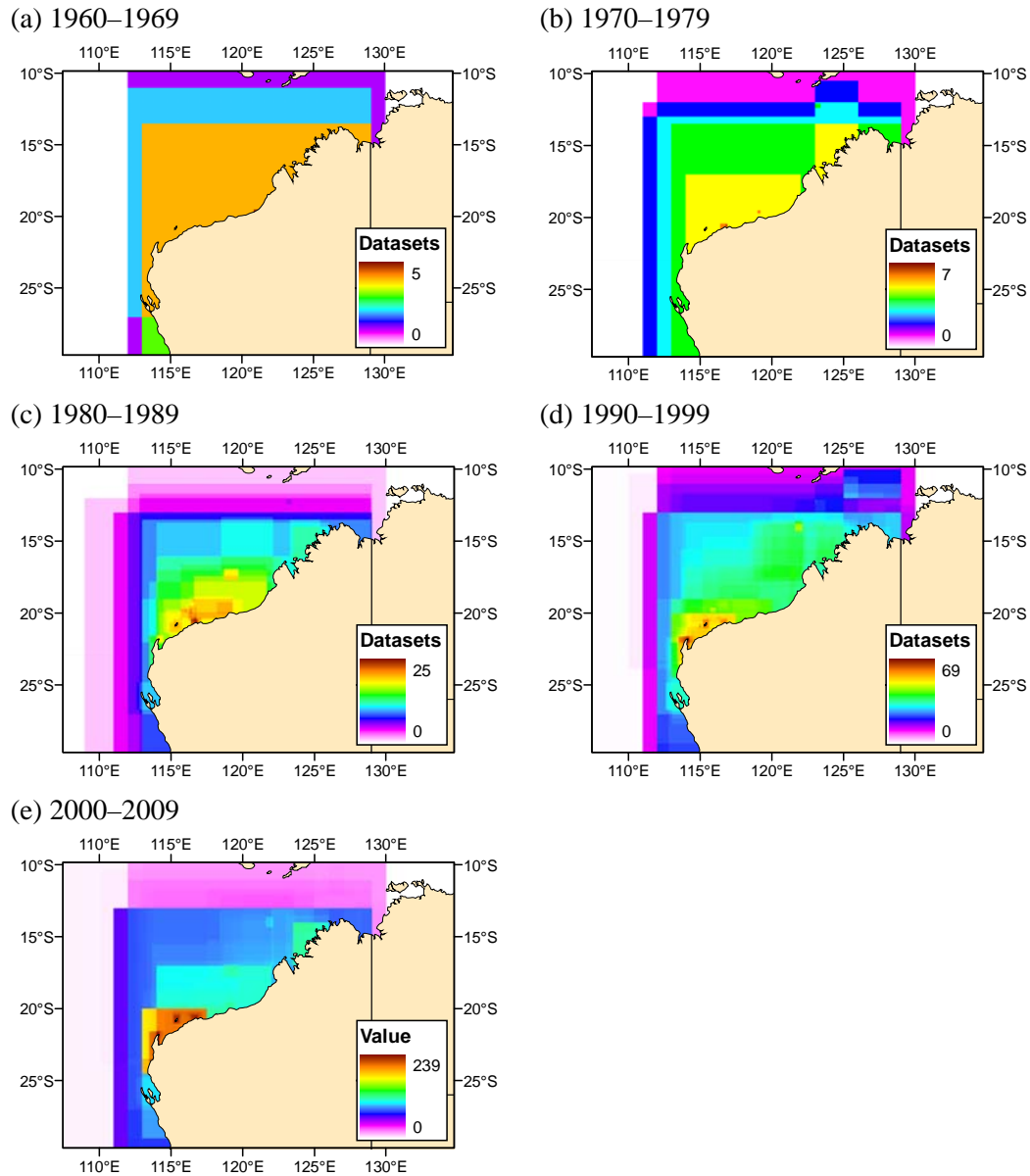


Figure 2-9 The distribution of metadata record bounding boxes for each decade. A record was included in the map for a decade if the time period from the starting date to the ending date overlapped the decade.

### 2.4.3 EPBC Listed species

The number of research projects that refer to a selection of EPBC listed species ranged from zero (specific bird and seasnake species, although more general bird and seasnake projects may contain information about these species) to considerable research coverage for more charismatic species (humpback whales, whale sharks, dugong and turtles) (Table 2-4).

## METHODS AND RESULTS

Table 2-4 EPBC listed species and number of research projects that refer to them in the NWMRI metadatabase

Listed species	Additional Search term	Records	Project scope
Fairy Tern		0	
Roseate Tern		0	
Lesser Frigatebird		0	
Brown Booby		0	
Wedge-tailed Shearwater	Shearwater	2	Population monitoring, Barrow Island
Birds (general)	Birds	19	Monitoring and surveys at various spatial scales
Humpback Whale	Humpback	15	Population monitoring, surveys and distribution. Ecology, tourism
Other cetaceans	Whale, Cetaceans	8	Limited distribution surveys for blue and pygmy blue, killer whales.
Dugong		14	Distribution and habitat interactions, particularly Shark Bay.
Whale Shark		12	Population monitoring, movement. Tourism interactions.
Green Sawfish	Sawfish	0	
Loggerhead Turtle	Loggerhead	4	Limited tagging, genetics, Interactions with boats.
Hawksbill Turtle	Hawksbill	4	Limited tagging, genetics, nesting beaches
Flatback Turtle	Flatback	9	Limited tagging, genetics, nesting beaches
Green Turtle	Green	11	Limited tagging, genetics, nesting beaches, threats, ecology
Short-nosed Seasnake		0	
Dusky Seasnake		0	
Shark Bay Seasnake		0	
Brown-lined Seasnake		0	
Sea snakes	snake	8	Scott, Ashmore and Sahul Shelf surveys. Tiger shark interactions
Fauna (general)		95	At a variety of spatial scales, surveys, assessments, threats, connectivity, ecology, management

### 2.4.4 Key ecological features

The number of research projects that refer to DEWHA key ecological features is shown in Table 2-5. Research coverage ranges from zero, especially for the deep water features such as slope canyons and Wallaby Saddle, to extensive for well studied features such as Scott Reef and Rowley Shoals.

Table 2-5 Ecological features of the NWMR species and number of research projects that refer to them in the NWMRI metadatabase

Ecological feature	Search terms	Entries	Project scope
Carbonate banks in the Joseph Bonaparte Gulf	Joseph Bonaparte Gulf	1	Industry (Woodside) sponsored "baseline" survey carried out by BBG in 2000 and referenced in EPBC referral number: 2000/84. Characterised the benthos in an inshore soft sediment region.
Limestone pinnacles in the Bonaparte Depression	Bonaparte Depression	0	
Commonwealth waters surrounding Ashmore Reef and Cartier Island	Ashmore	8	Faunal (particularly invertebrates) and coral studies. Fishing (particularly Indonesian fishers).
	Cartier	4	Faunal (particularly invertebrates) surveys. Fishing (particularly Indonesian fishers).
Commonwealth waters surrounding Scott and Seringapatam Reefs	Scott	48	Wide range of faunal, finfish and coral studies. Fishing (particularly Indonesian fishers) and oil and gas infrastructure related studies. Some hydrographic studies.
	Seringapatam	13	Wide range of faunal, finfish and coral studies. Fishing (particularly Indonesian fishers).
Demersal slope fish communities	Slope	11	Mostly about demersal fish communities and circulation modelling.

## METHODS AND RESULTS

Table 2-5 Cont.

<b>Ecological feature</b>	<b>Search terms</b>	<b>Entries</b>	<b>Project scope</b>
Canyons on the slope between the Argo abyssal plain and Scott plateau	Canyons	0	
Commonwealth waters adjacent to Quandong Point	Quandong	1	Current CSIRO/AIMS/DEC mapping project.
Ancient coastline at 125m depth contour	n/a		
Glomar Shoals	Glomar	0	
Commonwealth waters surrounding the Rowley Shoals	Rowley	30	Faunal, finfish and coral surveys. Human use and fishing studies. Hydrographic studies.
Exmouth Plateau	Exmouth Plateau	1	Vertical fluxes of hydrocarbons.
Canyons on the slope between the Cuvier abyssal Plain and the Cape Range Peninsula	Canyons	0	
Commonwealth waters surrounding Ningaloo Reef	Ningaloo	107	Very broad range of topics from fauna and flora, offshore migratory species, corals, human use, fishing, hydrology and water quality, geology, threats.
Wallaby Saddle	Wallaby Saddle	0	



### 3. DISCUSSION

The NWMRI Project captured information on over 700 research projects related to the marine environment in the North West Marine Region. This extensive catalogue, in association with the work captured through other WAMSI tasks, will hopefully provide the critical mass necessary to see the NWMRI being adopted by the wider community.

The overall sentiment during discussions with intending NWMRI contributors was positive, with the importance of such a resource widely recognised. Continuing the momentum by a comprehensive communication and marketing strategy to the broader research and research management community is considered a priority. The poor response rate to requests for information to researchers and research custodians highlights a major challenge for the further development of the NWMRI. The nature of researchers and research custodians at present, being very busy or occupied by field work, made contact with contributors difficult and time consuming. This potentially explains the poor response rate experienced. The metadatabase custodians need to develop suitable incentives for researchers to input into the metadatabase to keep it current. While regulation and stipulation will have a place, ultimately the success of the metadatabase will probably rest with its utility and profile.

Communication with metadata contributors highlighted their desire to continue maintenance of their specific metadata records on the internet. It is considered to be mutually beneficial to have the WAMSI metadatabase administrator inform all metadata contacts/owners when their metadata records are publicly available and to provide them the privileges to effectively update their records. This is also seen as a strong opportunity to promote the availability, uptake and maintenance of the NWMRI metadatabase.

A considerable proportion of the project contacts identified from existing databases were past University students who were no longer with the institution. Expectations from this sector that uses historic information will be problematic unless less transient contacts are identified (e.g. supervisors).

During the course of this project, we identified numerous existing 'in-house' metadatabase systems, particularly within consultancies where the entry of metadata is mandatory and the system well defined and resourced for staff. An option that may benefit the uptake of the NWMRI /MEST (if dedicated to an online service) is to have senior management, particularly within Government Agencies mandate the capture of metadata similar to that employed in other businesses.

As the MEST tool was still under development at the commencement of the NWMRI Project, the process of initial data entry into the Oracle backed MarLIN metadatabase was adopted. This method was also seen as instrumental in successfully capturing the high number of metadata records achieved. While the MEST is an appropriate tool for entry of independent metadata entries, it would have been very time consuming to submit multiple entries from similar sources. Fortunately the process of mass upload from Marline to the MEST was reasonably straight forward and is seen as an advantage to have the MEST adopted by the greater community.

The DEWHA publicly accessible EPBC online referral listing was a valuable resource which cited a number of unpublished research study reports by consultancies. Unfortunately, these reports were not accessible through the referral system. Further investigation of the *Environment Protection and Biodiversity Conservation Act 1999* as set out in the *Environment Protection and Biodiversity Conservation Regulations 2000* ([http://www.frli.gov.au/ComLaw/Legislation/LegislativeInstrumentCompilation1.nsf/0/2C17C033939E3803CA257288007A2097/\\$file/EnvirProtBiodivConser2000.doc#\\_Toc159733038](http://www.frli.gov.au/ComLaw/Legislation/LegislativeInstrumentCompilation1.nsf/0/2C17C033939E3803CA257288007A2097/$file/EnvirProtBiodivConser2000.doc#_Toc159733038) - pages 205-207) was interpreted (by EA Policy Section) to mean that 'it is not a requirement of the Act that unpublished reports, which are only referred to in a referral, be provided to the public or that they be published on the Internet., even if requested'. This is unfortunate as these reports may well be a valuable resource for environmental planning in the broader context. It was noted that DEWHA EPBC referrals in recent years have also been submitted to WA DoIR (Industry and Resources) for approval, providing another possibility for public access to these important research outputs.

### 3.1 Recommendations

1. Provide on-line access to the NWMRI metadatabase as soon as possible. This would include the ability for the owners of individual metadata records to update and enter records.
2. Develop a comprehensive communication strategy to raise the profile of the NWMRI metadatabase.
3. Develop suitable incentives/requirement for researchers/industry to contribute to the metadatabase.
4. Continue to address known information gaps such as Geoscience Australia and current WAMSI project portfolio.
5. Investigate ways to increase access to unpublished reports (mostly Industry sponsored) cited in the (DEWHA) EPBC online listings.

## REFERENCES

Armstrong, S.J. (2006). Bibliography of Marine Scientific Research Relevant to the Ningaloo Marine Park and Adjacent Waters. Marine Science Program, Science Division, Department of Environment and Conservation.

Brodie, P., M. Fuller, T. Rees and L. Wilkes (2006) Data warehouse and metadata holdings relevant to Australia's North West Shelf. NWSJEMS Technical Report No. 5.

Heyward, A., A. Revill and C. Sherwood (2006) Review of research and data relevant to marine environmental management of Australia's North West Shelf. NWSJEMS Technical Report No. 1.

Jernakoff, P., L. Scott, A. Heyward, A. Revill and C. Sherwood (2006) Bibliography of research and data relevant to marine environmental management of Australia's North West Shelf. NWSJEMS Technical Report No. 2.

## APPENDIX A. NWMRI METADATABASE FIELDS

Common Name	Element Name	Marine Community Profile Element Definition	Project Notes
<b>MD_Metadata</b>			
1. Unique record identifier	MD_Metadata.fileIdentifier	Value is a metadata file name following naming convention defined by organisation	System generated globally unique identifier used.
2. Metadata point of contact	MD_Metadata.contact.CI_ResponsibleParty	Party responsible for the metadata	Contact details for Luke Edwards supplied. Note: this is not the person associated with the Project – That is held in Resource contact information (below).
3. Metadata creation date	MD_Metadata.dateStamp	Date that the metadata was created	System date stamp used.
4. Metadata encoding	MD_Metadata.metadataStandardName	Name of the metadata encoding standard used	The Australian Marine Community Profile of ISO 19115:2005/19139 was used (v1.3).
5. Dataset resource link	MD_Metadata.dataSetURI	Uniformed Resource Identifier (URI) of the resource to which the metadata applies	Direct link to the resource was provided where possible.
6. Metadata revision date	MD_Metadata.revisionDate	Date of last revision of the metadata.	System time stamp used.
<b>MD_Identification</b>			
7. Resource title	MD_Identification.citation.CI_Citation.title	Citation data for the resource	Unique descriptive title of program/study/project.
8. Resource reference date	MD_Identification.citation.CI_Citation.date	Citation date of the resource	A date of 2008-06 of date-type 'revision' was used for all records.
9. Abstract describing the resource	MD_Identification.abstract	Brief narrative summary of the content of the resource	Summary of project objectives/publication findings/dataset contents. Keywords included at end. May be a duplicate of title where limited information was available.
10. Credit list *	MD_Identification.credit	Recognition of those who contributed to the resource(s)	Names of significant others involved. Both individuals and organisations were credited where possible.
11. State of progress of the research project	MD_Identification.status.MD_ProgressCode	Status of the resource progress	Current status of research; Planned (=proposed); In progress; Completed; Not known
12. Resource contact information	MD_Identification.pointOfContact .CI_ResponsibleParty	Identification of, and means of communication with, person(s) and organization(s) associated with the resource.	Person who can provide further information about the program/study/project. Often will be the Principal Investigator, or could be the Research Manager for a corporation. (Would be best to be Company/Person that holds the IP).

## Appendix A (cont.)

Common Name	Element Name	Marine Community Profile Element Definition	Project Notes
13. Frequency of resource updates	MD_Identification.resourceMaintenance.MD_MaintenanceInformation	Provides information about the frequency of resource updates, and the scope of those updates	Update frequency where known. (mostly "Not known")
14. Access or use constraints	MD_Identification.resourceConstraints.MD_LegalConstraints.otherConstraints	Other restrictions and constraints on accessing and using the resource	All metadata information collected is considered as 'No Restrictions'
15. Relevant publications*	MD_Identification.aggregationInfo.MD_AggregateInformation	Provides aggregate resource information	Contains relevant publication information (literature citations).
16. Resource Topic Category Code *	MD_Identification.topicCategory.MD_TopicCategoryCode	Provides the broad category code(s) that can be applied to the resource	ISO 19115 Topic Category Code (see Appendix B). If aquaculture = farming. Socioeconomics = economy.
17. Spatial extent (Bounding box)	MD_Identification.extent.EX_Extent.geographicElement.EX_GeographicBoundingBox	Bounding box extent of the resource	N, S, E, W bounding box extents of study are supplied.
18. Date range	MD_Identification.extent.EX_Extent.temporalElement.EX_TemporalExtent	Temporal extent of the resource	Start date and end date supplied where possible. End dates are not entered for ongoing projects.
19. Depth range	MD_Identification.extent.EX_Extent.verticalElement.EX_VerticalExtent	Vertical extent of the resource	Minimum and Maximum depth ranges supplied in metres where possible.
20. Supplementary information	MD_Identification.supplementalInformation	Any other descriptive information about the resource	Any additional information describing the project/study was entered heret. e.g. List of sub-projects.
21. Data quality - lineage	<b>DQ_DataQuality</b>	Non-quantitative quality information about the resource	A brief indication of source information and quality is provided here where possible. The standard string 'Original record compiled for the Western Australian Marine Science Institution (WAMSI), Project 3.8, 2008.' was inserted for all records.
	DQ_DataQuality.lineage.LI_Lineage		
22. Online distribution information *	<b>MD_Distribution</b>	Provides information about the distribution options for obtaining the resource	URL address of publicly available information (e.g. publications, project outcomes, web pages). This information was supplied where publically accessible
	MD_Distribution.transferOptions.MD_DigitalTransferOptions.online.CI_OnlineResource		

\* signifies multiple elements may be present

## APPENDIX B. CATEGORY CODES

Topic category codes (From MD\_TopicCategoryCode (ISO 19115 REF: B.5.27))

Name	Code	Definition
MD_TopicCategoryCode	Topic CatC d	high-level geographic data thematic classification to assist in the grouping and search of available geographic data sets. Can be used to group keywords as well. Listed examples are not exhaustive. NOTE It is understood there are overlaps between general categories and the user is encouraged to select the one most appropriate.
Farming	001	rearing of animals and/or cultivation of plants Examples: agriculture, irrigation, aquaculture, plantations, herding, pests and diseases affecting crops and livestock
Biota	002	flora and/or fauna in natural environment. Examples: wildlife, vegetation, biological sciences, ecology, wilderness, sealife, wetlands, habitat
Boundaries	003	legal land descriptions Examples: political and administrative boundaries
Climatology	004	processes and phenomena of the atmosphere. Examples: cloud cover, weather, climate, atmospheric conditions, climate change, precipitation
Economy	005	economic activities, conditions and employment. Examples: production, labour, revenue, commerce, industry, tourism and ecotourism, forestry, fisheries, commercial or subsistence hunting, exploration and exploitation of resources such as minerals, oil and gas
Elevation	006	height above or below sea level. Examples: altitude, bathymetry, digital elevation models, slope, derived products
Environment	007	environmental resources, protection and conservation Examples: environmental pollution, waste storage and treatment, environmental impact assessment, monitoring environmental risk, nature reserves, landscape
Geoscientificinformation	008	information pertaining to earth sciences. Examples: geophysical features and processes, geology, minerals, sciences dealing with the composition, structure and origin of the earth's rocks, risks of earthquakes, volcanic activity, landslides, gravity information, soils, permafrost, hydrogeology, erosion
Health	009	health, health services, human ecology, and safety Examples: disease and illness, factors affecting health, hygiene, substance abuse, mental and physical health, health services
Imagerybasemapsearthcover	010	base maps Examples: land cover, topographic maps, imagery, unclassified images, annotations
Intelligencemilitary	011	military bases, structures, activities Examples: barracks, training grounds, military transportation, information collection
Inlandwaters	012	inland water features, drainage systems and their characteristics. Examples: rivers and glaciers, salt lakes, water utilization plans, dams, currents, floods, water quality, hydrographic charts
Location	013	positional information and services. Examples: addresses, geodetic networks, control points, postal zones and services, place names
Oceans	014	features and characteristics of salt water bodies (excluding inland waters) Examples: tides, tidal waves, coastal information, reefs
Planningcadastre	015	information used for appropriate actions for future use of the land. Examples: land use maps, zoning maps, cadastral surveys, land ownership
Society	016	characteristics of society and cultures. Examples: settlements, anthropology, archaeology, education, traditional beliefs, manners and customs, demographic data, recreational areas and activities, social impact assessments, crime and justice, census information
Structure	017	man-made construction. Examples: buildings, museums, churches, factories, housing, monuments, shops, towers
Transportation	018	means and aids for conveying persons and/or goods. Examples: roads, airports/airstrips, shipping routes, tunnels, nautical charts, vehicle or vessel location, aeronautical charts, railways
Utilitiescommunication	019	energy, water and waste systems and communications infrastructure and services Examples: hydroelectricity, geothermal, solar and nuclear sources of energy, water purification and distribution, sewage collection and disposal, electricity and gas distribution, data communication, telecommunication, radio, communication networks

## APPENDIX C. RESEARCH PROFORMA

### **PROJECT Proforma (one table for each project)**

Metadata provider if not Project point of contact (name/phone/email):

Metadata provider (organisation):

(Please see Glossary for explanation of table field names and hints)

<b>Mandatory information for each project</b>	
Title	
Contact Person (Role/Phone/Email)	
Contact Organisation (Address/Phone)	
Abstract	
Keywords	
<b>Geographic Location</b>	
Location Name/s	
AND/OR Extents (N,E,S,W)	
<b>Temporal Attributes</b>	
Start date (YYYY-MM-DD)	
End Date (YYYY-MM-DD)	
<b>Depth Range</b>	
Shallow (-m)	
Deep (-m)	
<b>Additional information that would be helpful.</b>	
Contributors (Agency)	
Output Reference/s (include publicly accessible hyperlink/s where available)	
Other publicly available hyperlinks (eg project web pages)	
Project Status (complete/in progress/planned/not known)	
Constraints (no restrictions/restricted)	
Supplementary Information	

## APPENDIX D. NWMRI METADATABASE STATISTICS

ISO Categories used with counts – note a record can be assigned to multiple categories

ISO CATEGORY	Count
Biota	524
Boundaries	5
Climatology, Meteorology, Atmosphere	22
Economy	67
Elevation	4
Environment	269
Geoscientific Information	71
Health	7
Imagery, Base Maps, Earth Cover	6
Inland Waters	3
Location	3
Oceans	184
Planning and Cadastre	3
Society	50
Structure	4
Transportation	2
Utilities and Communication	3

Counts of metadata records assigned Geographic Coordinates (Latitude, Longitude in Decimal Degrees)

SOUTH	NORTH	WEST	EAST	IS_VALID IS_NON_ZERO	COUNT
681	681	681	681	677	709

Count of Valid Begin and End dates (and both valid)

BEGINNING DATE TEXT	ENDING DATE TEXT	BOTH	COUNT(*)
610	538	491	709



## Project duration

<i>Duration (Years)</i>	<i>Frequenc y</i>
<1	44
1	28
2	26
3	20
4	13
5	6
6	8
7	20
8	3
9	3
10	0
11	3
12	1
13	2
14	1
15	1
16	0
17	1
18	1
19	0
20	1
21	0
22	0
23	0
24	0
25	1
Total	182

## Counts of study Area (Approx. Sq Km)

<i>Study Area (Sq Km)</i>	<i>Count</i>
0.00	1
0.01	1
0.12	11
1	9
12	8
116	46
1160	114
11600	142
116000	217
1160000	100
11600000	25
116000000	2

## APPENDIX D. NWMRI METADATABASE STATISTICS

### Frequency of Begin and End Years

<i>Year</i>	<i>Begin</i>	<i>End</i>
1965	5	1
1966	0	0
1967	1	1
1968	0	0
1969	1	1
1970	0	0
1971	0	0
1972	0	0
1973	2	0
1974	1	0
1975	1	1
1976	2	0
1977	1	2
1978	1	1
1979	3	3
1980	0	0
1981	1	1
1982	1	1
1983	6	5
1984	6	6
1985	7	7
1986	15	7
1987	5	3
1988	7	5
1989	2	0
1990	3	2
1991	5	4
1992	3	2
1993	18	14
1994	24	18
1995	18	15
1996	23	21
1997	26	23
1998	31	24
1999	23	25
2000	65	17
2001	33	30
2002	32	21
2003	26	18
2004	45	34
2005	33	27
2006	80	78
2007	40	78
2008	12	23
2009	0	12
2010	1	5
2011	0	1

## APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

Counts of reported Projects grouped by Organisation and Contact Person - Including Extents of Project Dates

CUSTODIAN ORGANISATION	CONTACT PERSON	No.	BeginDate	EndDate
Aeronautical Maritime Research Labs	AMRL Manager	1	01-Jan-1997	01-Jan-1997
<b>Aeronautical Maritime Research Labs Total</b>		<b>1</b>		
Agip Australia Limited	AGIP Manager	1	01-Jan-2001	01-Jan-2001
<b>Agip Australia Limited Total</b>		<b>1</b>		
Apache Energy Limited	Myles Hyams (Environmental Manager)	24	01-Jan-1986	26-Sep-2006
<b>Apache Energy Limited Total</b>		<b>24</b>		
Asia-Pacific Applied Science Associates	APASA Manager (Contact person)	2	01-Jan-2007	01-Jan-2007
<b>Asia-Pacific Applied Science Associates Total</b>		<b>2</b>		
Astron Environmental Services	Julian Kruger (Scientific Manager)	5	01-Jan-1997	Not Known
Astron Environmental Services	V Long	1	01-Jan-2001	Not Known
<b>Astron Environmental Services Total</b>		<b>6</b>		
Australian Institute of Marine Science	Data Manager	45	01-Aug-1993	21-Apr-2003
Australian Institute of Marine Science	AIMS Manager	2	01-Jan-1998	01-Jan-2004
Australian Institute of Marine Science	Andrew Halford	1	01-Jan-1990	Not Known
Australian Institute of Marine Science	Andrew Heyward (Research Scientist)	11	01-Jan-1986	Not Known
Australian Institute of Marine Science	James Gilmour (Research Scientist)	1	Not Known	Not Known
Australian Institute of Marine Science	Mark Meekan	1	01-Jan-2006	Not Known
Australian Institute of Marine Science	Ray Berkelmans (Research Scientist)	1	Not Known	Not Known
<b>Australian Institute of Marine Science Total</b>		<b>62</b>		
Australian Museum	HG Cogger	1	01-Jan-1969	01-Jan-1969
<b>Australian Museum Total</b>		<b>1</b>		
Australian National University - Research School of Earth Sciences	Malcolm McCulloch	1	01-Jul-2007	30-Jun-2010
<b>Australian National University - Res School of Earth Sciences Total</b>		<b>1</b>		

## APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

Bamford Consulting Ecologists	Michael J Bamford (Manager)	3	01-Jan-2002	01-Jan-2007
<b>Bamford Consulting Ecologists Total</b>		<b>3</b>		
BHP Billiton Limited	Rochelle Smith (HSE Manager)	9	01-Jan-1995	01-Jan-2007
<b>BHP Billiton Limited Total</b>		<b>9</b>		
Broome International Airport Holdings	BIAH Manager	1	01-Jan-2000	01-Jan-2000
<b>Broome International Airport Holdings Total</b>		<b>1</b>		
Burrup Holdings Limited	Wolfgang Jovanovic (Secretary)	3	01-Jan-2001	01-Jan-2001
<b>Burrup Holdings Limited Total</b>		<b>3</b>		
Centre for Whale Research	Curt Jenner (Managing Director)	8	01-Jan-1991	Not Known
<b>Centre for Whale Research Total</b>		<b>8</b>		
Charles Darwin University	Andrea Whiting	1	19-Apr-2006	19-Oct-2007
Charles Darwin University	Jai Sleeman	1	01-Dec-2004	01-Jun-2007
Charles Darwin University	Michael Guinea	3	01-Jan-2005	31-Dec-2006
Charles Darwin University	S Whiting	2	01-Jan-1999	Not Known
<b>Charles Darwin University Total</b>		<b>7</b>		
Chevron Australia Pty Ltd	Sophie Williams (HSE Manager)	2	01-Jan-1999	Not Known
<b>Chevron Australia Pty Ltd Total</b>		<b>2</b>		
ConocoPhillips Australia Exploration	Chris Serginson (Sen. Enviro. Specialist)	1	01-Jan-2005	01-Jan-2005
<b>ConocoPhillips Australia Exploration Total</b>		<b>1</b>		
CSIRO Division of Marine and Atmospheric Research - Aspendale	Bill Physick (Air Quality Modelling)	1	01-Jan-2001	01-Jan-2001
<b>CSIRO Division of Marine and Atmospheric Res - Aspendale Total</b>		<b>1</b>		
CSIRO Division of Marine and Atmospheric Research - Cleveland	Gary Fry	1	01-May-2008	01-Aug-2008
CSIRO Division of Marine and Atmospheric Research - Cleveland	Stephen Blaber	2	01-Jan-1986	01-Jan-1986
CSIRO Division of Marine and Atmospheric Research - Cleveland	Tim Skewes	1	01-Jan-1998	30-Jun-1999
<b>CSIRO Division of Marine and Atmospheric Research - Cleveland Total</b>		<b>4</b>		
CSIRO Division of Marine and Atmospheric Research - Floreat	Chris Fandry	2	01-Jan-1994	30-Jun-2007
CSIRO Division of Marine and Atmospheric Research - Floreat	Russ Babcock (Benthic Ecologist)	1	01-Jan-2005	01-Jan-2008
<b>CSIRO Division of Marine and Atmospheric Research - Floreat Total</b>		<b>3</b>		

# APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

CSIRO Division of Marine and Atmospheric Research - Hobart	Beth Fulton	2	01-Jul-2000	30-Jun-2007
CSIRO Division of Marine and Atmospheric Research - Hobart	Brian Hatfield	1	01-Jul-2000	30-Jun-2007
CSIRO Division of Marine and Atmospheric Research - Hobart	Cathy Bulman	1	01-Jul-2000	30-Jun-2007
CSIRO Division of Marine and Atmospheric Research - Hobart	CMAR Manager	3	01-Jan-1984	01-Jan-1996
CSIRO Division of Marine and Atmospheric Research - Hobart	David McDonald	2	01-Jan-2006	Not Known
CSIRO Division of Marine and Atmospheric Research - Hobart	Franzis Althaus	1	01-Jan-1973	30-Dec-1997
CSIRO Division of Marine and Atmospheric Research - Hobart	Gary Meyers	1	01-Jan-1995	01-Jan-1995
CSIRO Division of Marine and Atmospheric Research - Hobart	George Cresswell	2	01-Jan-1991	01-Jan-1993
CSIRO Division of Marine and Atmospheric Research - Hobart	Jeffrey Dambacher	1	Not Known	Not Known
CSIRO Division of Marine and Atmospheric Research - Hobart	John Hunter	1	01-Jan-1998	01-Jan-1998
CSIRO Division of Marine and Atmospheric Research - Hobart	John Stevens	3	01-Jan-1998	Not Known
CSIRO Division of Marine and Atmospheric Research - Hobart	Keith Sainsbury	2	01-Feb-2007	01-Jun-2010
CSIRO Division of Marine and Atmospheric Research - Hobart	Nugzar Margvelashvili	1	01-Jul-2000	30-Jun-2007
CSIRO Division of Marine and Atmospheric Research - Hobart	Pamela Brodie	1	01-Jul-2000	30-Jun-2007
CSIRO Division of Marine and Atmospheric Research - Hobart	R. J. McLoughlin	1	01-Jan-1985	01-Jan-1985
CSIRO Division of Marine and Atmospheric Research - Hobart	RG Chittleborough	1	01-Jan-1965	01-Jan-1965
CSIRO Division of Marine and Atmospheric Research - Hobart	Rich Little (Research Scientist)	1	01-Jul-2000	30-Jun-2007
CSIRO Division of Marine and Atmospheric Research - Hobart	Scott Condie	7	01-Jan-2002	30-Jun-2007
CSIRO Division of Marine and Atmospheric Research - Hobart	SF Rainer	1	01-Jan-1991	01-Jan-1991
CSIRO Division of Marine and Atmospheric Research - Hobart	Sharon Appleyard	2	01-Jan-1994	Not Known
CSIRO Division of Marine and Atmospheric Research - Hobart	Trevor Ward	1	01-Jan-1988	01-Jan-1988
CSIRO Division of Marine and Atmospheric Research - Hobart	Vincent Lyne	1	01-Jul-2000	30-Jun-2007
CSIRO Division of Marine and Atmospheric Research - Hobart	William White	1	Not Known	Not Known
<b>CSIRO Division of Marine and Atmospheric Research - Hobart Total</b>		<b>38</b>		
Curtin University of Technology	Andrew Kingham	1	01-Jan-2004	Not Known
Curtin University of Technology	CUT Manager	2	01-Jan-1999	01-Jun-2008
Curtin University of Technology	David Wood	1	01-Jan-1999	01-Dec-2009
Curtin University of Technology	Emily Twiggs	1	Not Known	06-Mar-2007
Curtin University of Technology	HD Shortland-Jones	1	Not Known	30-Jun-2006

# APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

Curtin University of Technology	James Catlin	1	01-Jan-2006	01-Dec-2009
Curtin University of Technology	Lindsay Collins	11	01-Jan-1995	Not Known
Curtin University of Technology	Merv Lynch	1	Not Known	Not Known
Curtin University of Technology	MM Gagnon	1	01-Jan-2004	01-Jan-2004
Curtin University of Technology	RD McCauley	6	01-Jan-1998	01-Jan-2007
Curtin University of Technology	Sam Lee	1	01-Jun-2002	Not Known
Curtin University of Technology	William Featherstone (ARC Prof.I Fellow)	4	01-Jan-1996	Not Known
<b>Curtin University of Technology Total</b>		<b>31</b>		
Deakin University	Deborah Thiele	2	Not Known	Not Known
Deakin University Total		2		
Department of the Environment, Water, Heritage and the Arts	James Shevlin (First Assistant Secretary)	3	01-Jan-1990	01-Jan-2007
Department of the Environment, Water, Heritage and the Arts	Rod Kennett	1	01-Jan-1997	01-Jan-1997
<b>Department of the Environment, Water, Heritage and the Arts Total</b>		<b>4</b>		
ECOCLEAN	Brad Norman (Founder ECOCLEAN)	2	Not Known	Not Known
ECOCLEAN Total		2		
Edith Cowan University	Dave Holley	1	01-Jan-2002	01-Jan-2006
Edith Cowan University	Glen Hyndes	1	01-Jun-2007	Not Known
Edith Cowan University	Jeremy Northcote	1	Not Known	Not Known
Edith Cowan University	Muriel Brasseur (PhD student)	2	01-Jan-2002	Not Known
<b>Edith Cowan University Total</b>		<b>5</b>		
Environment Australia	DEWHA Manager	10	01-Jan-1999	01-Jan-2008
<b>Environment Australia Total</b>		<b>10</b>		
Florida International University	Aaron Wirsing (Res. Ass – Biol Sciences)	2	Not Known	02-May-2007
Florida International University	Derek Burkholder	1	Not Known	Not Known
Florida International University	Jeremy Vaudo	1	Not Known	21-Aug-2006
Florida International University	Michael R. Heithaus (Ass Prof - Biol Sci)	2	Not Known	28-Feb-2007
<b>Florida International University Total</b>		<b>6</b>		
Georgetown University USA	Janet Mann	1	Not Known	31-Dec-2006
<b>Georgetown University USA Total</b>		<b>1</b>		

## APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

Groningen University	T Piersma	1	Not Known	31-Dec-2007
<b>Groningen University Total</b>		<b>1</b>		
INPEX Browse Ltd	Greg Oliver (Environmental Manager)	12	01-Aug-2006	Not Known
<b>INPEX Browse Ltd Total</b>		<b>12</b>		
Institute for Applied Ecology (University of Canberra)	Nancy N. FitzSimmons (Biology)	1	01-Jan-1996	01-Jan-1996
<b>Institute for Applied Ecology (University of Canberra) Total</b>		<b>1</b>		
IRC Global Risk Management	Grant O'Connell (General Manager)	1	01-Jan-2002	01-Jan-2002
<b>IRC Global Risk Management Total</b>		<b>1</b>		
James Cook University - Department of Marine Biology	A.R Preen	2	01-Jan-1997	01-Jan-1998
James Cook University - Department of Marine Biology	Amanda Hodgson	3	01-Jan-2002	Not Known
James Cook University - Department of Marine Biology	Anthony McMahon	1	Not Known	31-Mar-2007
James Cook University - Department of Marine Biology	George E. Heinsohn	1	01-Jan-1979	01-Jan-1979
James Cook University - Department of Marine Biology	RA Birtles	1	Not Known	31-Jan-2006
<b>James Cook University - Department of Marine Biology Total</b>		<b>8</b>		
LeProvost Dames & Moore	LDM Manager (Manager)	4	01-Jan-1984	01-Jan-2000
<b>LeProvost Dames &amp; Moore Total</b>		<b>4</b>		
ME Trudgen and Associates	Malcolm Trudgen	3	19-May-2000	04-Sep-2000
<b>ME Trudgen and Associates Total</b>		<b>3</b>		
MetOcean Engineers	Mark Beardsley (Data Res Manager)	1	01-Jan-1974	Not Known
<b>MetOcean Engineers Total</b>		<b>1</b>		
Mscience Pty Ltd	Jim Stoddard (Principal Marine Scientist)	9	01-Aug-2006	01-May-2007
<b>Mscience Pty Ltd Total</b>		<b>9</b>		
Murdoch University	Rosser	1	01-Jan-2004	01-Feb-2005
Murdoch University	David Holliday	1	Not Known	Not Known
Murdoch University	David Waayers	1	Not Known	01-Dec-2006
Murdoch University	F.C. Maxwell	2	01-Jan-2003	Not Known
Murdoch University	Fiona Webster	1	01-Jan-2004	01-Aug-2007
Murdoch University	Flavio Gazzani	1	Not Known	Not Known
Murdoch University	Frazer McGregor	1	Not Known	01-Jun-2009

# APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

Murdoch University	Halina Kobryn	1	Not Known	Not Known
Murdoch University	J Webb	1	Not Known	06-Jun-2007
Murdoch University	J.G. Taylor	2	01-Jan-1996	01-Jan-1999
Murdoch University	JN Dunlop	2	01-Jan-1996	01-Jan-2002
Murdoch University	John Davis (PhD student)	1	01-Jan-2001	Not Known
Murdoch University	Kate Rodger	1	Not Known	01-Jun-2007
Murdoch University	Kristin Warren	1	01-Dec-2006	01-Feb-2009
Murdoch University	Leanne Smith	1	Not Known	01-Aug-2006
Murdoch University	Lisa Nicholson	1	01-Jan-1996	01-Jan-1996
Murdoch University	Lynnath Beckley	2	01-Nov-2006	Not Known
Murdoch University	Michael Travers	2	Not Known	03-Feb-2006
Murdoch University	Michelle Brooker (Research Assistant )	1	01-Jan-1988	01-Jan-1988
Murdoch University	Mike van Keulen	4	01-Jan-2002	Not Known
Murdoch University	Murdock Manager	5	01-Jan-2005	Not Known
Murdoch University	Neil Loneragan (Dir CFF)	4	01-Jan-2006	01-Jan-2009
Murdoch University	Sarah Fretzer	1	Not Known	Not Known
<b>Murdoch University Total</b>		<b>38</b>		
New Jersey Academy for Aquatic Sciences, USA	Alex A Vagelli	1	Not Known	04-Nov-2005
<b>New Jersey Academy for Aquatic Sciences, USA Total</b>		<b>1</b>		
Northern Territory Department of Primary Industry, Fisheries and Mines	Jennifer Ovenden	1	01-Jan-2002	01-Jan-2002
<b>Northern Territory Department of Primary Industry, Fisheries and Mines Total</b>		<b>1</b>		
Pearl Sea Coastal Cruises	T Willing	1	Not Known	01-Apr-2006
<b>Pearl Sea Coastal Cruises Total</b>		<b>1</b>		
Pendoley Environmental Pty Ltd	Kellie Pendoley	6	01-Jan-1996	01-Jan-2007
<b>Pendoley Environmental Pty Ltd Total</b>		<b>6</b>		
PPK Environment & Infrastructure	PPK Manager (Manager)	2	01-Jan-2001	01-Jan-2001
<b>PPK Environment &amp; Infrastructure Total</b>		<b>2</b>		
Queensland Museum	John Hooper	1	01-Jan-2002	01-Jan-2002



APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

<b>Queensland Museum Total</b>		<b>1</b>		
Racal Survey Australia Ltd	Racal Manager (Manager)	1	01-Jan-1998	01-Jan-1998
<b>Racal Survey Australia Ltd Total</b>		<b>1</b>		
ReefQuest Centre for Shark Research	R. Aiden Martin (Director)	1	01-Jan-2007	01-Jan-2007
<b>ReefQuest Centre for Shark Research Total</b>		<b>1</b>		
Rick Scoones & Associates	Rick Scoones	1	01-Jan-2001	01-Jan-2001
<b>Rick Scoones &amp; Associates Total</b>		<b>1</b>		
Royal Australasian Ornithologists Union	Peter Collins	1	01-Jan-1995	01-Jan-1995
<b>Royal Australasian Ornithologists Union Total</b>		<b>1</b>		
Royal Netherlands Institute for Sea Research	I. Tulp	2	01-Jan-1994	01-Jan-1994
<b>Royal Netherlands Institute for Sea Research Total</b>		<b>2</b>		
RPS Environmental Group	Jeremy Fitzpatrick (Principal Scientist)	14	01-Jan-1998	Not Known
<b>RPS Environmental Group Total</b>		<b>14</b>		
Santos Ltd	Steve Hewitt (HSE Manager)	3	01-Jan-2001	01-Jan-2004
<b>Santos Ltd Total</b>		<b>3</b>		
Seagrass-Watch	Danielle Bain (Seagrass Monitoring Project Coordinator, Broome)	1	01-Sep-2006	Not Known
<b>Seagrass-Watch Total</b>		<b>1</b>		
Shell Australia	Jane Meadows (HSE Manager)	1	01-Jan-1998	01-Jan-1998
<b>Shell Australia Total</b>		<b>1</b>		
Simon Fraser University (Canada)	JA Thomson	1	Not Known	01-Oct-2006
<b>Simon Fraser University (Canada) Total</b>		<b>1</b>		
Sinclair Knight Merz	Martin Heller	1	01-Jan-2001	Not Known
Sinclair Knight Merz	Martin Heller (HSE Manager)	2	01-Jan-2005	01-Jan-2006
<b>Sinclair Knight Merz Total</b>		<b>3</b>		
Tap Oil Ltd	Tap Manager (HSE Manager)	1	01-Jan-2002	01-Jan-2002
<b>Tap Oil Ltd Total</b>		<b>1</b>		
TGS-NOPEC Geophysical Company Pty Ltd	TGS Manager (Operations Manager)	1	01-Jan-2001	01-Jan-2001
<b>TGS-NOPEC Geophysical Company Pty Ltd Total</b>		<b>1</b>		

## APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

University of Illinois	Jennifer Schmidt	1	Not Known	31-Jul-2006
<b>University of Illinois Total</b>		<b>1</b>		
University of New South Wales - Centre for Marine Science	Bill Sherwin	1	Not Known	20-Sep-2006
University of New South Wales - Centre for Marine Science	Brett Neilan	1	Not Known	10-Nov-2006
University of New South Wales - Centre for Marine Science	PE Holloway	12	01-Jan-1983	01-Jan-1996
<b>University of New South Wales - Centre for Marine Science Total</b>		<b>14</b>		
University of Newcastle - Depart. of Geology	Brett McCallum	1	01-Jan-2007	01-Jan-2011
<b>University of Newcastle - Depart. of Geology Total</b>		<b>1</b>		
University of Queensland	Cath Lovelock	3	01-Jan-1999	Not Known
University of Queensland	D. Broderick	1	01-Jan-1994	01-Jan-1994
University of Queensland	Helen Penrose	1	01-Jan-2005	30-Dec-2008
University of Queensland	John Pandolfi	1	01-Jan-2000	Not Known
University of Queensland	Ove Hoegh_Guldberg	1	15-Sep-2007	15-Oct-2007
University of Queensland	Pippa Moore	2	01-Jan-2006	Not Known
University of Queensland	W.R. Kay	1	01-Jan-2004	01-Jan-2004
<b>University of Queensland Total</b>		<b>10</b>		
University of Sheffield	Stuart Humphries	1	01-Jan-2005	01-Jul-2009
<b>University of Sheffield Total</b>		<b>1</b>		
University of Tasmania - Hobart	George Jackson	1	Not Known	Not Known
<b>University of Tasmania - Hobart Total</b>		<b>1</b>		
University of the Sunshine Coast	Leslie Brooker (Senior Lecturer, Physiology)	1	Not Known	05-May-2007
<b>University of the Sunshine Coast Total</b>		<b>1</b>		
University of Western Australia	Alex Wyatt	1	Not Known	Not Known
University of Western Australia	Anya Waite	2	01-Jan-2006	Not Known
University of Western Australia	Ben Fitzpatrick	1	Not Known	06-Mar-2007
University of Western Australia	Bob Black	1	Not Known	Not Known
University of Western Australia	Brooke Fowles	1	01-Jan-2007	30-Oct-2007
University of Western Australia	Charitha Pattiaratchi (Professor - School	4	01-Jan-2006	Not Known

# APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

	of Environmental Systems Engineering)			
University of Western Australia	Diana Walker (Editor)	3	01-Jan-2005	04-Dec-1996
University of Western Australia	Gerald Kuchling	2	01-Jul-2004	30-Jun-2007
University of Western Australia	Greg Ivey	1	Not Known	Not Known
University of Western Australia	Grey Coupland (Hon Res Associate)	1	Not Known	19-May-2007
University of Western Australia	Jim Underwood	1	Not Known	01-Dec-2005
University of Western Australia	Justin Parker	1	Not Known	01-Dec-2006
University of Western Australia	Kayley Usher (School of Plant Biology)	1	Not Known	27-Apr-2007
University of Western Australia	Mark Meekan	1	01-Jan-2006	01-Jan-2009
University of Western Australia	Michael Burton	1	Not Known	Not Known
University of Western Australia	Mike Johnson (School of Animal Biology )	2	01-Jan-2006	Not Known
University of Western Australia	Sandra Bowdler (Professor)	1	01-Jan-1995	01-Jan-1995
University of Western Australia	SG Wilson	1	01-Jan-2001	01-Jan-2001
University of Western Australia	SM Gardner	1	Not Known	Not Known
University of Western Australia	UWA Manager	7	01-Jan-1985	Not Known
<b>University of Western Australia Total</b>		<b>34</b>		
University of Zurich	MC Krutzen	1	Not Known	Not Known
<b>University of Zurich Total</b>		<b>1</b>		
URS Australia	Ian Baxter (Principal Enviro Scientist)	1	Not Known	24-Feb-2006
<b>URS Australia Total</b>		<b>1</b>		
WA Department of Agriculture and Food	A.M.E Van Vreeswyk	1	01-Jan-2004	01-Jan-2004
<b>WA Department of Agriculture and Food Total</b>		<b>1</b>		
WA Department of Indigenous Affairs	WADIA Manager	2	01-Jan-1993	01-Jan-2007
<b>WA Department of Indigenous Affairs Total</b>		<b>2</b>		
WA Department of Local Government and Regional Development	Rebecca Rosher (Project Officer)	2	01-Jan-2006	01-Jan-2006
<b>WA Department of Local Government and Regional Dev Total</b>		<b>2</b>		
WA Dept of Conservation and Land Management	Kevin McAlpine (Mar Ecosystems Branch)	4	01-Jun-2008	23-Jun-2005
WA Dept of Conservation and Land Management	P Higgs	1	Not Known	01-Jan-2001
<b>WA Dept of Conservation and Land Management Total</b>		<b>5</b>		

# APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

WA Dept of Environment and Conservation	Bob Prince	5	01-Dec-1988	Not Known
WA Dept of Environment and Conservation	Brooke Halkyard	9	01-Jan-1998	Not Known
WA Dept of Environment and Conservation	Cath Samson	1	Not Known	Not Known
WA Dept of Environment and Conservation	Claire O'Callaghan	1	01-Jan-2006	Not Known
WA Dept of Environment and Conservation	Colin Ingram (Policy and Planning Branch)	1	Not Known	Not Known
WA Dept of Environment and Conservation	Emily Wilson (Fremantle Branch)	2	01-Jan-1995	Not Known
WA Dept of Environment and Conservation	Fiona Galloway	6	01-Jan-2006	Not Known
WA Dept of Environment and Conservation	Fran Stanley	1	Not Known	01-May-2006
WA Dept of Environment and Conservation	Grant Pearson (Landscape Conservation Section)	4	01-Jan-1999	Not Known
WA Dept of Environment and Conservation	Kevin Bancroft	5	01-Jan-2000	Not Known
WA Dept of Environment and Conservation	Marissa Speirs	6	01-Aug-2000	Not Known
WA Dept of Environment and Conservation	Michelle Hughes (Spatial Information Officer)	1	01-Oct-2004	Not Known
WA Dept of Environment and Conservation	Ray Masini	2	01-Jun-2008	03-Apr-2008
WA Dept of Environment and Conservation	Robert Connel	1	Not Known	Not Known
WA Dept of Environment and Conservation	Rod Nowrojee (Manager, Environmental Analysis and Review Section)	25	01-Jan-1967	Not Known
WA Dept of Environment and Conservation	Roland Mau (A/District Manager Exmount District)	1	02-Dec-2002	Not Known
WA Dept of Environment and Conservation	Sabrina Trocine	1	08-Jan-2007	Not Known
WA Dept of Environment and Conservation	Shannon Armstrong (Marine Sci Branch )	41	01-Aug-2006	Not Known
WA Dept of Environment and Conservation	Suzanne Long (Marine Science Branch )	3	01-Dec-2007	17-Dec-2007
WA Dept of Environment and Conservation	Tamara Chapman (Species and Communities Branch)	1	01-Jul-2007	Not Known
WA Dept of Environment and Conservation	Tim Grubba	2	01-Jan-2007	21-Jan-2008
WA Dept of Environment and Conservation	W Richards	1	Not Known	Not Known
<b>WA Dept of Environment and Conservation Total</b>		<b>120</b>		

# APPENDIX E. CONTACTS AND CONTACT ORGANISATIONS IN NWMRI METADATABASE

WA Dept of Fisheries	Daniel Gaughan	7	01-Jan-2004	Not Known
WA Dept of Fisheries	Fred Wells	3	01-Jul-2006	29-Nov-1995
WA Dept of Fisheries	Ross Marriot	1	Not Known	Not Known
WA Dept of Fisheries	Stephen Newman	4	01-Jan-2006	Not Known
WA Dept of Fisheries	WADoF Manager (Enquiries Desk)	46	01-Jan-1984	Not Known
<b>WA Dept of Fisheries Total</b>		<b>61</b>		
WA Dept of Industry and Resources	WADOIR Manager	5	01-Jan-1994	01-Jan-2003
<b>WA Dept of Industry and Resources Total</b>		<b>5</b>		
WA Dept of Planning and Infrastructure	Rebecca Ince (Manager OSRA)	2	01-Jan-1998	Not Known
WA Dept of Planning and Infrastructure	Rodney Hoath	7	01-Jan-1890	Not Known
<b>WA Dept of Planning and Infrastructure Total</b>		<b>9</b>		
WA Water Corporation	Steve Wilke (Manager)	5	01-Jan-1998	01-Jan-2006
<b>WA Water Corporation Total</b>		<b>5</b>		
Western Australian Museum (Perth)	Barry Hutchins (Curator of Fishes in the Department of Aquatic Zoology)	1	01-Jan-2010	01-Jan-2010
Western Australian Museum (Perth)	Clay Bryce (Senior Project Manager)	25	01-Jan-1976	Not Known
Western Australian Museum (Perth)	Jane Fromont	3	Not Known	Not Known
Western Australian Museum (Perth)	N Kolichis	1	Not Known	30-Sep-2006
Western Australian Museum (Perth)	Ron Johnstone (Curator Ornithology)	3	01-Jan-1973	Not Known
<b>Western Australian Museum (Perth) Total</b>		<b>33</b>		
Woods Hole Oceanographic Institution	Amy Samuels	1	Not Known	08-Nov-2006
<b>Woods Hole Oceanographic Institution Total</b>		<b>1</b>		
Woodside Petroleum Ltd	Luke Smith (HSE Manager)	38	02-Sep-1978	01-Jan-1987
Woodside Petroleum Ltd	Stephen Ley (Environmental Advisor)	2	01-Jan-2005	Not Known
<b>Woodside Petroleum Ltd Total</b>		<b>40</b>		
<b>Grand Total</b>		<b>709</b>		

**APPENDIX F. PROJECT CONTACTS NOT IN NWMRI METADATABASE**

Australian Petroleum Production & Exploration Association (APPEA)	Richard Ellis (Director, Government Affairs WA) Mark McCallum (Director ACT)
BHP Billiton Limited	Gavin Price (Manager, Environment Health and Safety) Robin Wright (Manager, Mine Maintenance, Engineering)
Broome Port Authority	Chris Overell (Manager)
Chevron Australia Pty Ltd	Russell Lagdon (Environmental Manager)
CSIRO Division of Marine and Atmospheric Research - Cleveland	Scott, Meryn (Librarian)
CSIRO Division of Marine and Atmospheric Research - Hobart	Brendon Ward (Oceans Portal Manager)
Dampier Port Authority	Angela Willcocks (Environment Officer)
Department Environment, Water, Heritage and the Arts (DEWHA)	Nadeena Beck (National Oceans Office) Amanda Corbett (EPBC Referrals, Business Entry Point)
Ecologia	Valerie Ee (Manager)
GeoScience Australia	Andrew Heap (Project Ldr - Seabed Mapping and Characterisation) Peter Harris (Group Ldr - Marine and Coastal Environment Group)
INPEX Browse Ltd	Catriona Stuart-Andrews (Environmental Advisor)
Kimberley Land Council (KLC)	Tom Vigilante (Director)
MetOcean Engineers	Steve Buchan (Director) Greg Reed (AODC GeogName Extent Register Manager)
Strike Oil	Don Poynton (Manager, Exploration and Environment)
Tourism WA	Steve Crawford (Director, Policy and Planning)
University of Tasmania - Hobart	Regina Magierowski (MEST Facilitator Coordinator) Simon Pigot (MEST Developer) Kate Roberts (BlueNet overseer)

# APPENDIX F. PROJECT CONTACTS NOT IN NWMRI METADATABASE

URS Australia	Ian Baxter (Principal Marine Environmental Scientist)
WA Dept of Environment and Conservation	Ray Laurie (Senior Marine Information Officer, Marine Policy & Planning Branch) Kelly Waples (Science Coordinator, WAMSI Node 3)
WA Dept of Fisheries	Rick Fletcher (Director, Fisheries Research) Rachel Green (Fisheries Management, Broome) Brent Wise (Database Administrator)
WA Dept of Industry and Resources	Tanya Carpenter (Oil Spill Response Officer) Richard Langford (Manager, Office of Dir. General)
WA Dept of Planning and Infrastructure	Ric Mahoney (Senior Cartographer) John O'Hurley (Officer dealing with response) Susan McCall (PA to acting CEO) Barbara Pedersen ()
WA Fishing Industry Council	Felicity Horn (Director)
WA Land Information System Office (WALIS)	Marnie Leybourne (Director) Jenny Smith (Marine Group Prj Officer)
Western Australian Museum (Perth)	Diana Jones (Executive Director)
World Wildlife Fund (WWF)	Paul Gamblin (Manager)
Woodside Petroleum Ltd	Cameron Greeves ()

## **APPENDIX G. COMMUNICATIONS**

### **Presentations/seminars**

WA Marine & Coastal Data Management Seminar

An overview of the Project and its objectives was presented by Mat VanderKilift of the project team. Main message was “Please co-operate”.

### **News articles/media**

Project outline and objectives ere forwarded to the Editor, Spatial Business News for publication to industry wide.

### **Marine Science Case for the Kimberley.**

Also had some contact with Des Mills in regards to a strategic assessment of marine science in the Kimberley. He has given us some guidance on the information needs for the Research Inventory (e.g. depth ranges and categorisations). We will maintain contact with Des and his team to facilitate synergies for the two projects.







### Contact Us

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