MARINE RESERVE IMPLEMENTATION:
WA SOUTH COAST

MARINE WILDLIFE DISTRIBUTION IN THE RECHERCHE ARCHIPELAGO REGION (STOKES INLET TO ISRAELITE BAY)

Report: MRI/WSC/RAR-61/2002

Prepared by
K P Bancroft, J A Davidson and B J Lamb
Marine Conservation Branch

June 2002

Marine Conservation Branch
Department of Conservation and Land Management

47 Henry St, Fremantle
Western Australia, 6160

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This project was funded by the Department of Conservation and Land Management and *Coasts and Clean Seas*, an initiative of the Natural Heritage Trust.

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ACKNOWLEDGEMENTS

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- Dr Chris Burton, Fisheries Consultant.
- Dr John Bannister, Western Australian Museum.
- Bernie Haberley, Esperance.
- Fud MacKenzie, MacKenzies Island Charters.
- Klaus Tiedemann, Esperance District, Department of Conservation and Land Management.
- Phil Fuller, Science Division, Department of Conservation and Land Management.
- Dr Andrew Burbidge, Science Division, Department of Conservation and Land Management.
- David Holley, MCB, Department of Conservation and Land Management.
- Ray Lawrie, MCB, Department of Conservation and Land Management.
- Mark Sheridan, MCB, Department of Conservation and Land Management.
- Nick D'Adamo, MCB, Department of Conservation and Land Management.

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- *Coasts and Clean Seas*, an initiative of the Natural Heritage Trust.

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Copies of this report may be obtained from:

Marine Conservation Branch
Department of Conservation and Land Management
47 Henry St., Fremantle, Western Australia, 6160
Ph: 61-8-9336 0100; Fax: 61-8-9430 5408

SUMMARY

The Western Australian Government's marine and conservation strategy, detailed *in New Horizons – The way ahead in marine conservation and management* (1998), states that there is a requirement for an assessment of the natural marine resources of any proposed marine conservation reserves.

In view of the high standing that the Recherche Archipelago region has in the Marine Parks and Reserves Authority's (MPRA) priority list for implementing new marine conservation reserves, the Marine Conservation Branch (MCB) of the Department of Conservation and Land Management has developed a marine wildlife distribution map for the Recherche Archipelago region (Stokes Inlet to Israelite Bay).

Anecdotal and scientific information on the seasonal distribution and important sites of various species of marine wildlife, including whales, sea lions, fur seals and seabirds, has been compiled and incorporated into a map, which delineates areas of high conservation value, in relation to marine wildlife. The data acquired during this project will contribute to the information base required for the marine reserve planning process, during which marine reserve boundaries and management zones for multiple use will be considered for the area.

Data for this project has been sourced from existing documentation and from direct communication with people (internal and external to the Department of Conservation and Land Management) whom have expert knowledge on the distribution of marine wildlife in the Recherche Archipelago region.

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1 INTRODUCTION

1.1 BACKGROUND

In recognition of the importance of conserving the State's marine biodiversity, the Minister for the Environment established the Marine Parks and Reserves Selection Working Group (MPRSWG) in 1986. The main aim of the MPRSWG was to identify representative and unique areas of Western Australia's waters for consideration as part of a State-wide system of marine conservation reserves under the *Conservation and Land Management Act 1984*. The MPRSWG's report was released in June 1994 and identified over seventy such candidate areas throughout the coastal waters of Western Australia (Department of Conservation and Land Management, 1994).

The State's vesting body for marine conservation reserves is the Marine Parks and Reserves Authority (MPRA) which was established in 1997. The MPRA has prioritized the seventy candidate areas for implementation as marine conservation reserves and the Recherche Archipelago region was one of the MPRA's second tier high priority candidate areas after Jurien Bay, Montebello/Barrow Island, Dampier Archipelago/Cape Preston, Geographe Bay/Cape Leeuwin/Hardy Inlet and Walpole/Nornalup Inlet.

Under the Western Australian Government's marine conservation strategy, detailed in *New Horizons – The way ahead in marine conservation and management* (1998) there is a requirement for:

> *'Extensive assessment, community consultation and management planning before a new marine conservation reserve can be established'.*

An essential component of this being:

> *'A comprehensive assessment of the area's biological and economic resources and social values being carried out'.*

In view of the high standing that the Recherche Archipelago region has in the MPRA's priority list for implementing new marine conservation reserves, the Marine Conservation Branch (MCB) of the Department of Conservation and Land Management applied for funding through the Marine Protected Areas Program of Coasts and Clean Seas, an initiative of the Natural Heritage Trust, for assistance to initiate investigations and were successful. Subsequently, the MCB has developed a marine wildlife distribution map as part of the marine biological resource assessment stage in the planning for a marine conservation reserve in the Recherche Archipelago region.

Anecdotal and scientific information on the seasonal distribution and important sites of various species of marine wildlife, including whales, sea lions, fur seals and seabirds, has been compiled and incorporated into a map, which delineates areas of high conservation value, in relation to marine wildlife. The data acquired during this project will contribute to the information base required for the marine reserve planning process, during which marine reserve boundaries and management zones will be considered for the area.

Data for this project has been sourced from existing documentation and from direct communication with people (internal and external to the Department of Conservation and Land Management) whom have expert knowledge on the distribution of marine wildlife in the Recherche Archipelago region.

1.2 PURPOSE

The purpose of this report is to:

- provide information, in the form of a map, on the marine wildlife distribution in the Recherche Archipelago region;
- document the sources of the marine wildlife information used;
- document the methods used to produce the information layers;
- document the metadata for the Geographical Information System (GIS) information layers, and;
- document the storage location of the GIS information layers.

2 METHODS

2.1 STUDY AREA

The study area for this project is the Recherche Archipelago region, which is located on the south coast of Western Australia (Figure 1). The study area stretches along the coast from stokes Inlet (west of Esperance) to Gegelup Point (east of Isralite Bay) and extends seaward to encompass the State Territorial Waters (three nautical miles from the Territorial Sea Baseline).

2.2 INFORMATION SOURCES

Data layers, such as distributions, breeding/nesting areas, aggregations and migratory pathways of the various marine wildlife (whales, sea lions, fur seals and seabirds) that occur in the study area, were gathered from a range of sources both internal and external to the Department of Conservation and Land Management. The data were reviewed by Klaus Tiedemann (Esperance District, Department of Conservation and Land Management), Bernie Haberley (retired Wildlife Officer from Esperance District, Department of Conservation and Land Management) and Fud MacKenzie (MacKenzies Island Charters).

2.2.1 Cetaceans

Southern right whales (*Eubalaena australis*) are often seen close inshore along the coast of the Recherche Archipelago region in winter and spring. Females also use sheltered bays as birthing and nursery areas. The data on migratory pathways and important resting areas of southern right whales were derived from both anecdotal information provided by Dr Chris Burton (Fisheries Consultant), Dr John Bannister (Western Australian Museum), Klaus Tiedemann, Bernie Haberley and Fud MacKenzie and published research (Bannister, 1994; Lee & Bancroft, 2001).

2.2.2 Pinnipeds

Two species of pinnipeds use the islands of the Recherche Archipelago region as breeding and haul-out sites. These are the Australian sea lion (*Neophoca cinerea*) and the New Zealand fur seal (*Arctocephalus forsteri*). Anecdotal data on the location of islands used for breeding and haul-out areas by Australian sea lions and New Zealand fur seals was provided by David Holley (MCB) and Bernie Haberley. Further data was sourced from a Department of Conservation and Land

Management field survey conducted by Dr Nick Gales (Gales *et al.*, 2000) and a literature review (Lee & Bancroft, 2001).

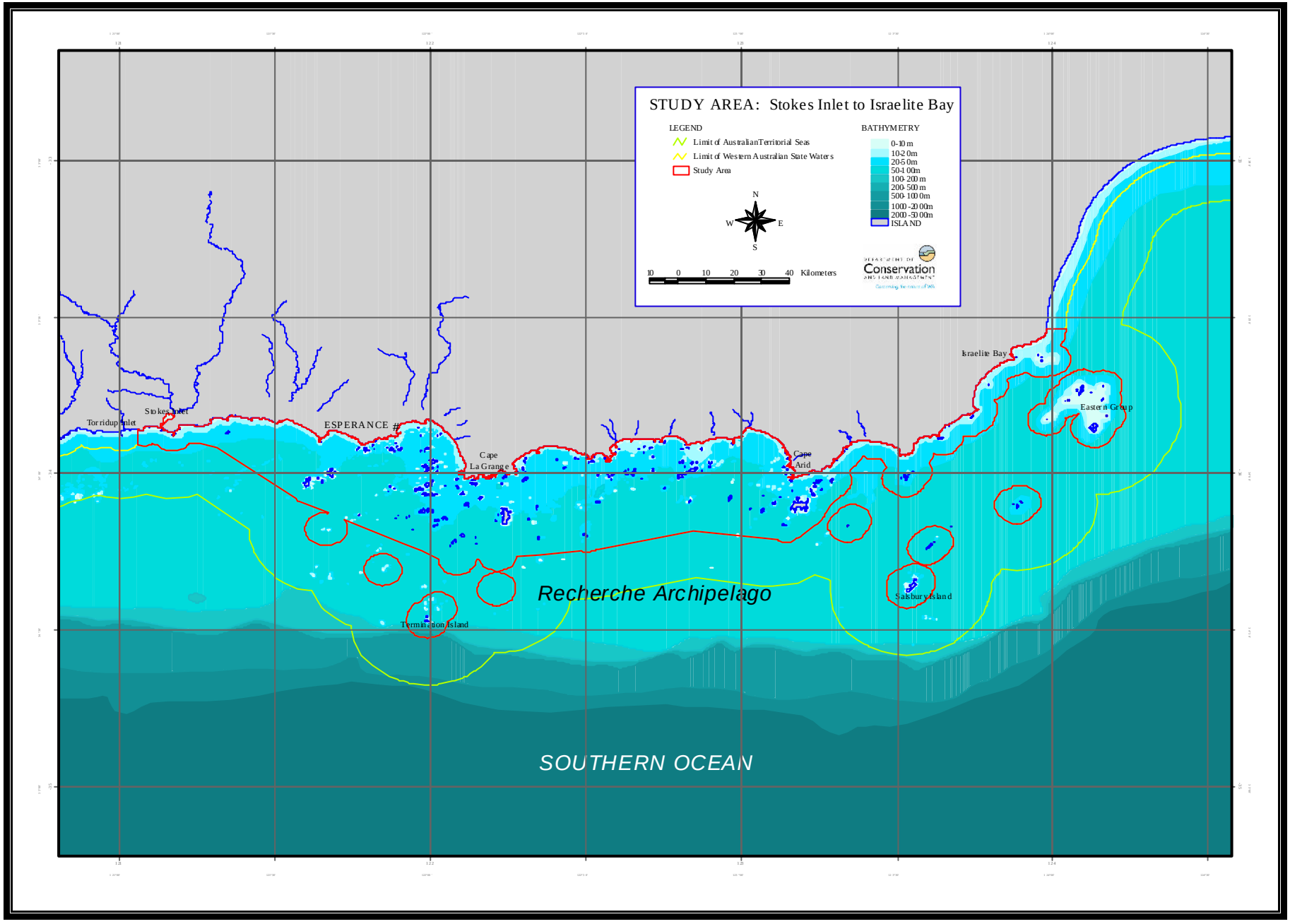

Figure 1: The study area: Recherche Archipelago region

2.2.3 Seabirds

Many species of seabirds use the islands of the Recherche Archipelago region as roosting, breeding and nesting areas. Dr Andrew Burbidge and Phil Fuller (both from the Science Division, Department of Conservation and Land Management) provided the information on locations of seabird nesting areas from the Department's Seabird Breeding Island Database. Further information was provided by Bernie Haberley.

2.3 MAPPING

Information layers were constructed using ArcView GIS 3.2 (ESRI) software.

Detailed descriptions of the methods used in mapping are provided in the metadata pertaining to each individual data layer (see Appendices I - V).

3 RESULTS

The full set of marine wildlife distribution data acquired in this study has been presented as a series of maps (Figure 2, 3, 4 and 5). These maps highlight areas of high conservation value associated with Australian sea lion and New Zealand fur seal breeding and haul-out areas, seabird breeding/nesting areas and southern right whale migration pathways and areas of other activity.

4 METADATA

The simplest definition of metadata is 'data about data'. It describes the content, quality, currency and availability of data. A 'metadata' description of a particular data set will typically include detailed information on data collection methods, processing history, content, quality, accuracy, geographic extent and contact (source) information pertaining to the data. This information is important so potential users of existing data can assess its suitability for other purposes.

The metadata associated with the marine wildlife distribution data for the Recherche Archipelago region presented in Figures 2, 3, 4 and 5 are included in Appendix I (southern right whale migration pathways), Appendix II (southern right whale activity), Appendix III (Australian sea lion breeding and haul-out islands), Appendix IV (New Zealand fur seal breeding and haul-out islands) and Appendix V (seabird breeding islands).

5 DATA MANAGEMENT

5.1 REPORT

Hard copies of this report will be held at the following locations:

1. Marine Conservation Branch, Department of Conservation and Land Management, 47 Henry Street, Fremantle, Western Australia, 6160. Ph: (08) 9336 0100 Fax: (08) 9430 5408.

2. Woodvale Library, Science and Information Division, Department of Conservation and Land Management, Ocean Reef Road, Woodvale, Western Australia, 6026. Ph: (08) 9405 5100 Fax: (08) 9306 1641.

3. Archives, Woodvale Library, Science and Information Division, Department of Conservation and Land Management, Ocean Reef Road, Woodvale, Western Australia, 6026. Ph: (08) 9405 5100 Fax: (08) 9306 1641.

4. Esperance District, Department of Conservation and Land Management, 92 Dempster Street, Esperance, Western Australia, 6450. Ph: (08) 9071 3733 Fax: (08) 9071 3657.

5. South Coast Region, Department of Conservation and Land Management, 120 Albany Highway, Albany, Western Australia, 6330. Ph: (08) 9842 4500 Fax: (08) 9481 3329.

Digital copies of this report will be held at the following:

1. The Marine Conservation Branch server:
   Shareddata on 'Calm-frem-1'
   [T:\144-Marine Conservation Branch\Shared Data\Current_MCB_reports\MRI\mri_6102]

2. The Marine Conservation Branch server full backup DAT tape:
   Shareddata on 'Calm-frem-1'
   [T:\144-Marine Conservation Branch\Shared Data\Current_MCB_reports\MRI\mri_6102]

3. CD ROM held at Marine Conservation Branch and Archives (Woodvale Library, Science and Information Division):
   CD-ROM [mri_6102]

4. The MCB homepage on the Department of Conservation and Land Management Intranet CALMweb
   http://calmweb.calm.wa.gov.au/drb/ncd/mcb/rep_pdf/mri_reps/mri_2002/mrirep02.htm#mri_6102

5.2 GIS LAYERS

The data presented in the form of GIS information layers will be stored digitally in the Marine Information System (MIS) on the MCB Server and the MCB Server full backup DAT tape. File names for GIS information layers are as follows:

1. whales-southern-right-line_rar_20020221_ll_gda94.shp
2. whales-southern-right-poly_rar_20020221_ll_gda94.shp
3. sealion_rar_20020221_ll_gda94.shp
4. furseals_rar_20020221_ll_gda94.shp
5. seabirds_rar_20020221_ll_gda94.shp

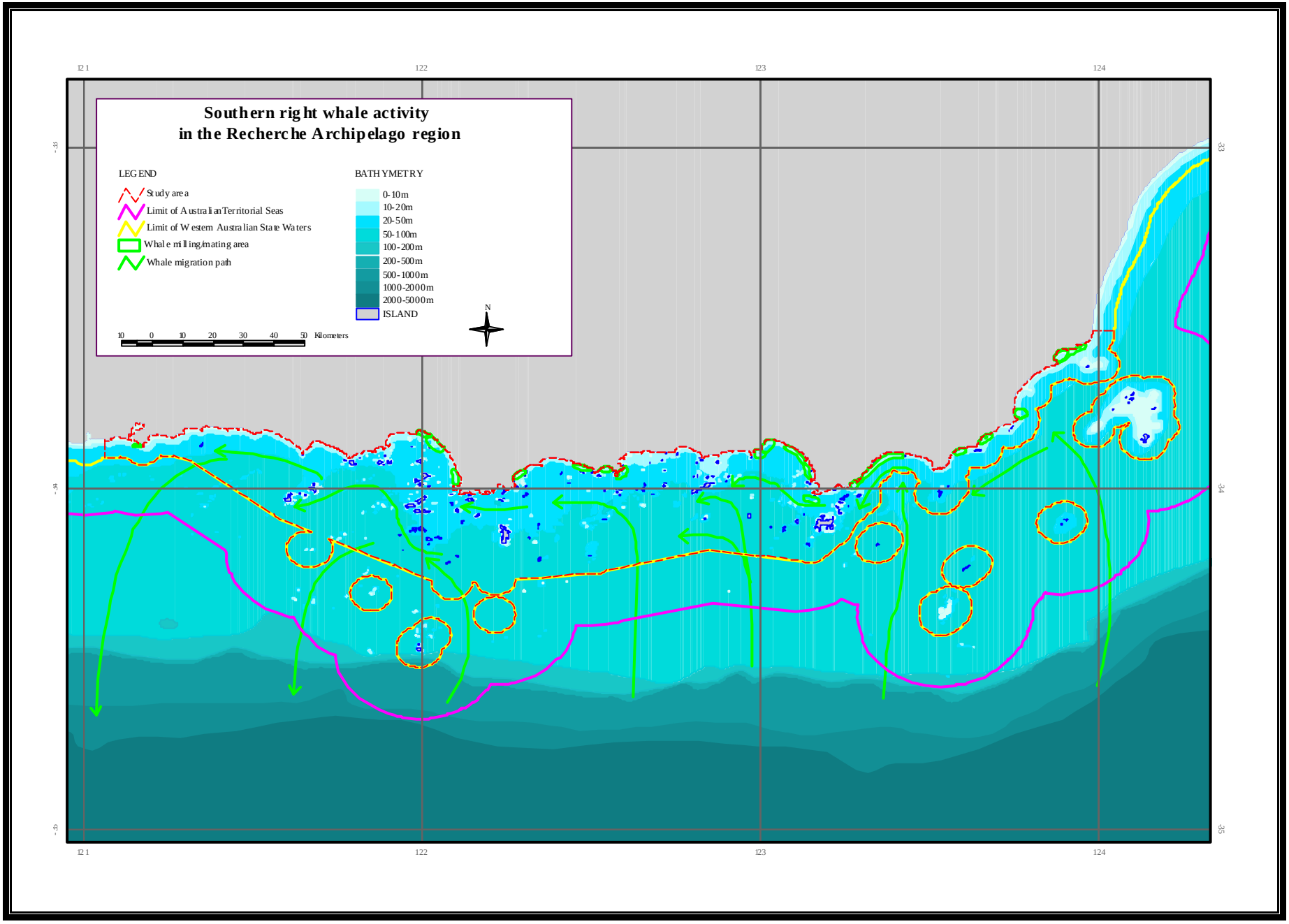

Figure 2: Southern right whale activity in the Recherche Archipelago region

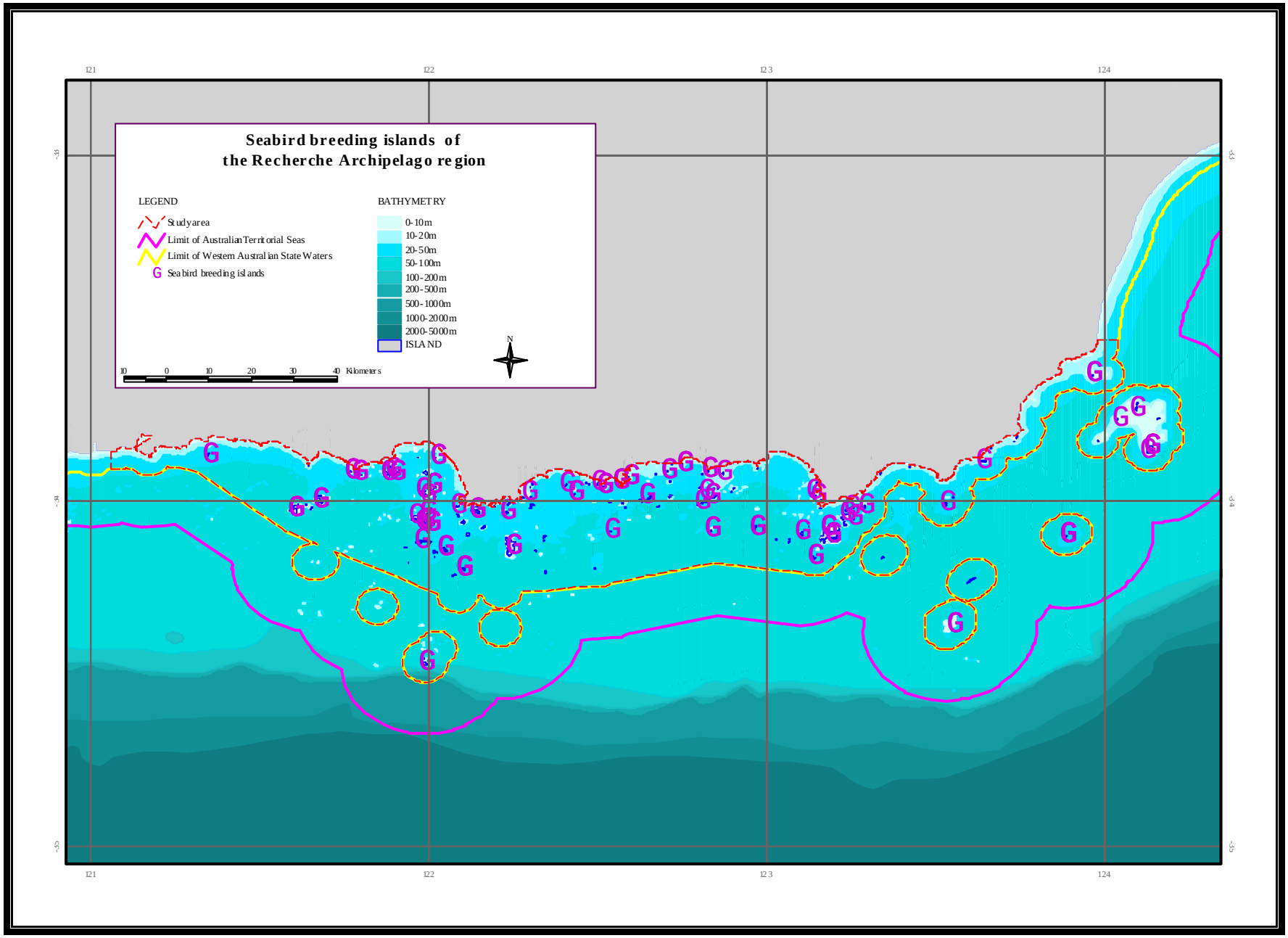

Figure 3: Seabird breeding islands in the Recherche Archipelago region

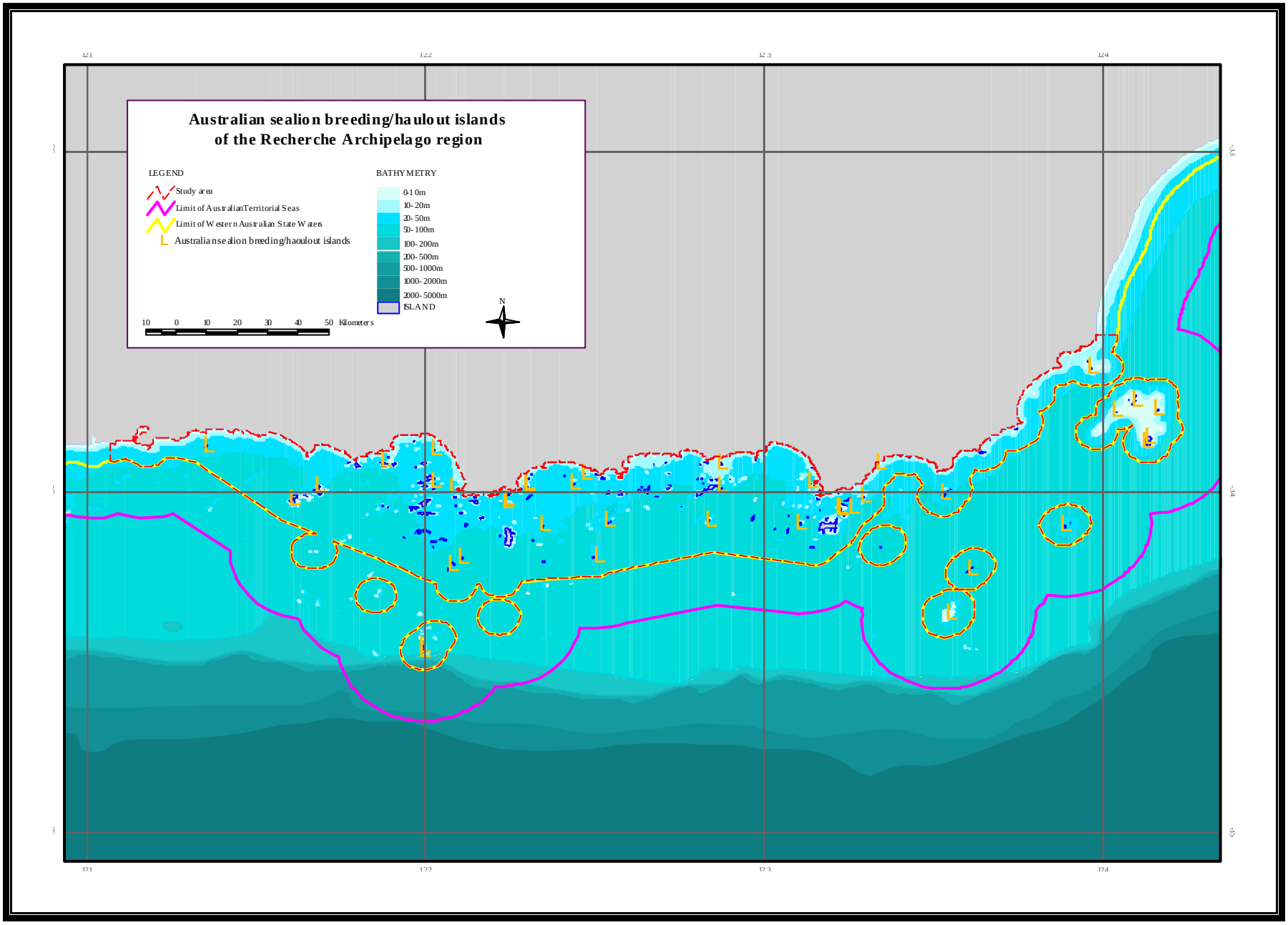

Figure 4: Australian sealion breeding/haulout islands of the Recherche Archipelago region

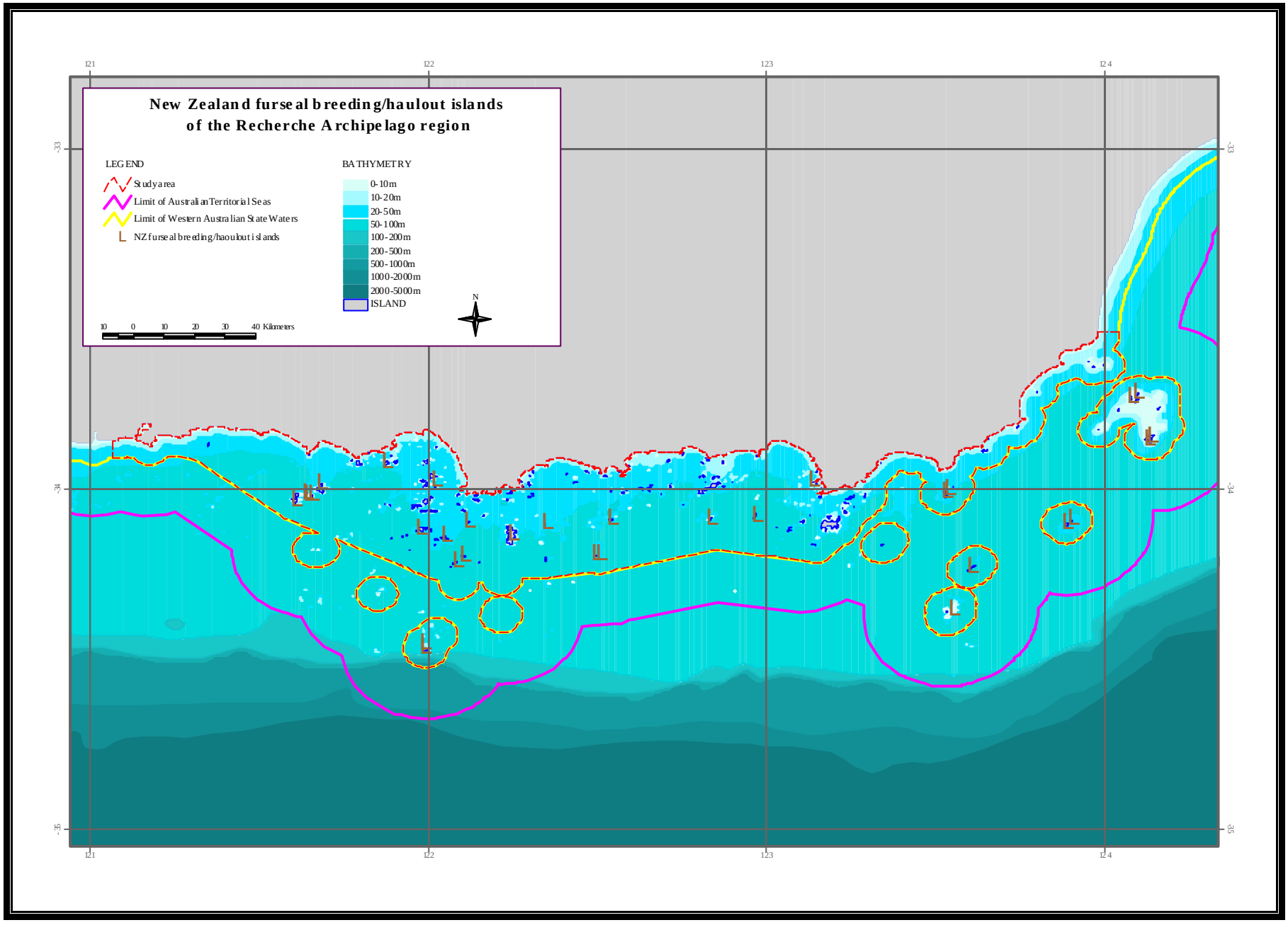

Figure 5: New Zealand furseal breeding/haulout islands of the Recherche Archipelago region

6 REFERENCES

Bannister, J.L. (1994). Report on aerial survey and photoidentification of humpback whales off Western Australia, 1994. Prepared for the Australian Nature Conservation Agency, Perth, Western Australia.

Gales, N.J., Haberley, B., and Collins, P. (2000). Changes in the abundance of New Zealand fur seals, *Arctocephalus forsteri*, in Western Australia. Wildlife Research 27 (2): 165-168.

Lee, S. and Bancroft, K.P. (2001). Review of existing ecological information for the proposed Recherche Archipelago marine conservation reserve. Literature Review No. MRI/WSC,EUC/SIN,RAR-51/2001. Marine Conservation Branch, Department of Conservation and Land Management, Perth, Western Australia. (Unpublished report).

APPENDICES

APPENDIX I: METADATA FOR SOUTHERN RIGHT WHALE MIGRATION PATHWAYS IN THE RECHERCHE ARCHIPELAGO REGION

DATASET	
Title	***Southern Right Whale Migration Paths of the Recherche Archipelago***
Custodian	*Department of Conservation and Land Management (CALM)*
Jurisdiction	*Western Australia*
DESCRIPTION	
Abstract	*This dataset consists of lines representing southern right whale migration paths within the proposed study area for the proposed Recherche Archipelago marine conservation reserve off the southern coast of Western Australia. The lines have been attributed with information relating to wildlife as per the naming standards for standardised models for MIS datasets (T:\144-Marine Conservation Branch\GIS Data\MIS\System\Structure_modules\dataset_models\standard_models.htm).* *The dataset has been developed as part of CALM Marine Conservation Branch's resource assessment to assist in the marine reserve implementation process in the proposed Recherche Archipelago marine conservation reserve. This dataset is complemented by other fauna datasets within the region including sealions, seabirds and furseals.* *The data was generated from anecdotal information provided by experts, and from published information gathered during a literature review of marine wildlife in the region. References include:* *i) Bannister, J.L. (1994). Report on aerial survey and photoidentification of humpback whales off Western Australia, 1994. Prepared by the W.A. Museum for the Australian Nature Conservation Agency, Perth, Western Australia.* *Lines were created and attributed by the following methods;* *i) data was drawn on hard copy maps during meetings with CALM regional staff (Klaus Tiedemann) and knowledgable residents (Bernie Haberley and Fud MacKenzie) and from data collated during a literature review during a rapid assessment of the marine wildlife in the region undertaken by Kevin Bancroft.* *ii) the paper base maps were then digitised by Ben Lamb in Arcview 3.2 and a line dataset was created with the attributes as per the CALM Marine Conservation Branch's attribute and naming standards.*
Search Word(s)	
Geographic Extent Name(s)	*Eucla (EUC) and WA South Coast (WSC) IMCRA Regions*

DATA CURRENCY	
Begin Date	*1/10/2001*
End Date	*Ongoing*
DATASET STATUS	
Progress	*In Progress*
Maintenance & Update Frequency	*As required*
ACCESS	
Stored Data Format	*DIGITAL ArcView shapefile, Geographic, Geocentric Datum of Australian 1994 (GDA94).* *NONDIGITAL Paper base maps containing raw information*
Available Format Type	*DIGITAL ArcView 3.2 shapefile*
Access Constraint	*Data available for external use subject to transfer fee and license conditions. Data is not to be distributed without authorisation from CALM. Contact CALM's database administrator for further details.*
DATA QUALITY	
Lineage	***1.*** *Hardcopy base maps containing a coastline, broadscale bathymetry information (10m, 20m, 50m, 100m, 200m isobaths), Australian maritime boundaries and the proposed study area were generated. Maps were produced at a scale of approximately 1:350,000.* ***2.*** *Bernie Haberley, Klaus Tiedemann and Fud MacKenzie were consulted to delineate areas of wildlife activity on the hard copy base maps. (See attribute SOURCE_A for details).* ***3.*** *Mapped lines identified were digitised on screen using the hard copy base map as a reference. Digitising was undertaken at a scale of approximately 1:100,000.* ***4.*** *Polygons were attributed as per the base map and other sources (see attribute SOURCE_A), and data was checked for logical consistency. Where polygons overlapped the area of overlap was attributed with the multiple sources.* ***5.*** *Data datum transformed from AGD84 to GDA94 using the change datum functionality of the extension 'CALM Added Functionality v2000' in Arcview3.2.*
Positional Accuracy	*Due to the nature of the study, positional accuracy should be considered as approximate only as these lines represent a path along which an activity takes place. The data has been collected from information provided by experts and a literature review. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, delineation of areas in which the wildlife is distributed may not be comprehensive and is by it's nature broadscale.*

	Positional inaccuracies may also have occurred due to; *i) the detail of base maps being sufficient for only broad scale delineation of wildlife distribution/activity,* *ii) some information being more precise in it's definition of the extent of location than others.* *The digitising of the hard copy base maps used to delineate migration pathways a positional accuracy of approximately 100m (based on accuracy of 1mm at digitising scale).*
Attribute Accuracy	*Due to the nature of the study, attribute accuracy should be considered as approximate only. The data has been collected from anecdotal information provided by experts and a literature review. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, the attributes of the wildlife distribution may not be comprehensive.*
Logical Consistency	*Attribute names have been checked and validated for consistency across all wildlife datasets created for the implementation of the proposed Recherche Archipeligo marine conservation reserve.* *Attribute values have been checked and validated for consistency, and checked for logic in relation to attribute names. All attributes that require values have had values assigned.* *The shapefile has been compiled carefully to avoid overlaps or duplication of points.*
Completeness	*The dataset is complete as at the date of this metadata statement. The dataset will be upgraded as priorities, time and resources permit. Further work needs to be undertaken on delineation and ground-truthing of many areas of wildlife distribution/activity.*
CONTACT INFORMATION	
Contact Organisation	*Department of Conservation and Land Management, Marine Conservation Branch*
Contact Position	*Marine GIS Co-ordinator*
Mail Address 1	*47 Henry Street*
Mail Address 2	
Suburb or Place or Locality	*Fremantle*
State or Locality 2	*WA*
Country	*Australia*

Postcode	*6160*
Telephone	*08 9336 0109*
Facsimile	*08 9430 5408*
Electronic Mail Address	*rayl@calm.wa.gov.au*
METADATA DATE	
Metadata Date	*08/03/2002*
ADDITIONAL METADATA	
Additional Metadata	*For further information refer to:* *i) Lee, S. & Bancroft, K.P. (2001). Review of existing ecological information for the proposed Recherche Archipelago marine conservation reserve. Literature Review MRI/WSC,EUC/SIN,RAR-51/2001. Marine Conservation Branch, Department of Conservation and Land Management, Perth, Western Australia.* *ii) Bannister, J.L. (1994). Report on aerial survey and photoidentification of humpback whales off Western Australia, 1994. Prepared by the W.A. Museum for the Australian Nature Conservation Agency, Perth, Western Australia.*

APPENDIX II: METADATA FOR SOUTHERN RIGHT WHALE ACTIVITY IN THE RECHERCHE ARCHIPELAGO REGION

DATASET	
Title	***Southern Right Whale Activity (other than migration) of the Recherche Archipelago***
Custodian	*Department of Conservation and Land Management (CALM)*
Jurisdiction	*Western Australia*
DESCRIPTION	
Abstract	*This dataset consists of polygons representing areas of southern right whale activity other than migration within the proposed study area for the proposed Recherche Archipelago marine conservation reserve off the southern coast of Western Australia. The polygons have been attributed with information relating to wildlife as per the naming standards for standardised models for MIS datasets (T:\144-Marine Conservation Branch\GIS Data\MIS\System\Structure_modules\dataset_models\standard_models.htm).* *The dataset has been developed as part of CALM Marine Conservation Branch's resource assessment to assist in the marine reserve implementation process for the proposed Recherche Archipelago marine conservation reserve. This dataset is complemented by other fauna datasets within the region including sealions, seabirds and furseals.* *The data was generated from anecdotal information provided by experts, and from published information gathered during a literature review of marine wildlife in the region. References include:* *i) Bannister, J.L. (1994). Report on aerial survey and photoidentification of humpback whales off Western Australia, 1994. Prepared by the W.A. Museum for the Australian Nature Conservation Agency, Perth, Western Australia.* *Polygons were created and attributed by the following methods;* *i) data was drawn on hard copy maps during meetings with CALM regional staff (Klaus Tiedemann) and knowledgable residents (Bernie Haberley and Fud MacKenzie), during a rapid assessment of the marine wildlife in the region undertaken by Kevin Bancroft.* *ii) the paper base maps were then digitised by Ben Lamb in Arcview 3.2 and a polygonal dataset was created with the attributes as per the CALM Marine Conservation Branch's attribute and naming standards.*
Search Word(s)	
Geographic Extent Name(s)	*Eucla (EUC) and WA South Coast (WSC) IMCRA Regions*

DATA CURRENCY	
Begin Date	*1/10/2001*
End Date	*Ongoing*
DATASET STATUS	
Progress	*In Progress*
Maintenance & Update Frequency	*As required*
ACCESS	
Stored Data Format	*DIGITAL ArcView shapefile, Geographic, Geocentric Datum of Australian 1994 (GDA94).* *NONDIGITAL Paper base maps containing raw information*
Available Format Type	*DIGITAL ArcView 3.2 shapefile*
Access Constraint	*Data available for external use subject to transfer fee and license conditions. Data is not to be distributed without authorisation from CALM. Contact CALM's database administrator for further details.*
DATA QUALITY	
Lineage	***1.*** *Hardcopy base maps containing a coastline, broadscale bathymetry information (10m, 20m, 50m, 100m, 200m isobaths), Australian maritime boundaries and the proposed study area were generated. Maps were produced at a scale of approximately 1:350,000.* ***2.*** *Bernie Haberley, Klaus Tiedemann and Fud MacKenzie were consulted to delineate areas of wildlife activity on the hard copy base maps. (See attribute SOURCE_A for details).* ***3.*** *Mapped polygons identified were digitised on screen using the hard copy base map as a reference. Digitising was undertaken at scales of between 1:50,000 and 1:250,000. Polygons were cut to the DOLA coastline 28/02/2001 where the two intersected.* ***4.*** *Polygons were attributed as per the base map and other sources (see attribute SOURCE_A), and data was checked for logical consistency. Where polygons overlapped the area of overlap was attributed with the multiple sources.* ***5.*** *Data datum transformed from AGD84 to GDA94 using the change datum functionality of the extension 'CALM Added Functionality v2000' in Arcview3.2.*
Positional Accuracy	*Due to the nature of the study, positional accuracy should be considered as approximate only as these polygons represent an area where the activity takes place. The data has been collected from information provided by relevant local experts. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, delineation of areas in which the wildlife is distributed may not be*

	comprehensive. *Positional inaccuracies may also have occurred due to;* *i) the detail of base maps being sufficient for only broad scale delineation of wildlife distribution/activity,* *ii) some information being more precise in it's definition of the extent of location than others.* *The digitising of the hard copy base maps used to delineate areas of wildlife distribution varies in positional accuracy from 50m to approximately 250m (based on accuracy of 1mm at digitising scale).*
Attribute Accuracy	*Due to the nature of the study, attribute accuracy should be considered as approximate only. The data has been collected from anecdotal information provided by experts and a literature review. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, the attributes of the wildlife distribution may not be comprehensive.*
Logical Consistency	*Attribute names have been checked and validated for consistency across all wildlife datasets created for the implementation of the proposed Recherche Archipeligo marine conservation reserve.* *Attribute values have been checked and validated for consistency, and checked for logic in relation to attribute names. All attributes that require values have had values assigned.* *The shapefile has been compiled carefully to avoid overlaps or duplication of points.*
Completeness	*The dataset is complete as at the date of this metadata statement. The dataset will be upgraded as priorities, time and resources permit. Further work needs to be undertaken on delineation and ground-truthing of many areas of wildlife distribution/activity.*
CONTACT INFORMATION	
Contact Organisation	*Department of Conservation and Land Management, Marine Conservation Branch*
Contact Position	*Marine GIS Co-ordinator*
Mail Address 1	*47 Henry Street*
Mail Address 2	
Suburb or Place or Locality	*Fremantle*
State or Locality 2	*WA*

Country	*Australia*
Postcode	*6160*
Telephone	*08 9336 0109*
Facsimile	*08 9430 5408*
Electronic Mail Address	*rayl@calm.wa.gov.au*
METADATA DATE	
Metadata Date	*08/03/2002*
ADDITIONAL METADATA	
Additional Metadata	*For further information refer to:* *i) Lee, S. & Bancroft, K.P. (2001). Review of existing ecological information for the proposed Recherche Archipelago marine conservation reserve. Literature Review MRI/WSC,EUC/SIN,RAR-51/2001. Marine Conservation Branch, Department of Conservation and Land Management, Perth, Western Australia.* *ii) Bannister, J.L. (1994). Report on aerial survey and photoidentification of humpback whales off Western Australia, 1994. Prepared by the W.A. Museum for the Australian Nature Conservation Agency, Perth, Western Australia.*

APPENDIX III: METADATA FOR AUSTRALIAN SEA LION BREEDING AND HAUL-OUT ISLANDS IN THE RECHERCHE ARCHIPELAGO REGION

DATASET	
Title	***Sealion Breeding and Haul-out Islands of the Recherche Archipelago***
Custodian	*Department of Conservation and Land Management (CALM)*
Jurisdiction	*Western Australia*
DESCRIPTION	
Abstract	*This dataset consists of points representing breeding and haul-out islands for Australian sea lions within the proposed study area for the proposed Recherche Archipelago marine conservation reserve off the southern coast of Western Australia. The points have been attributed with information relating to wildlife as per the naming standards for standardised models for MIS datasets (T:\144-Marine Conservation Branch\GIS Data\MIS\System\Structure_modules\dataset_models\standard_models.htm).* *The dataset has been developed as part of CALM Marine Conservation Branch's resource assessment to assist in the marine reserve implementation process for the proposed Recherche Archipelago marine conservation reserve. This dataset is complemented by other fauna datasets within the region including furseals, seabirds and whales.* *Points were created and attributed by the following methods;* *i) data was collated from a CALM field survey conducted by N. Gales in 2000 and during a literature review by Kevin Bancroft of the existing ecological information for the Recherche Archipelago.* *ii) a dataset for locations of offshore sealion breeding/haul-out features e.g. islands and rocks were generated and attributed by Kevin Bancroft with the ecological information from the literature review and survey data.* *iii) this dataset was reviewed by CALM regional staff (Klaus Tiedemann) and knowledgable residents (Bernie Haberley and Fud MacKenzie) and modifications/additions were marked up on the hardcopy map.* *iv) the wildlife modifications/additions were incorporated into the dataset by Ben Lamb in Feb 2002 by generating centroids of polygons created from the DOLA coastline dated 28 Feb 2001 and attributing the appropriate points with the wildlife information on the hardcopy map.*
Search Word(s)	
Geographic Extent Name(s)	*Eucla (EUC) and WA South Coast (WSC) IMCRA Regions*

DATA CURRENCY	
Begin Date	1/10/2001
End Date	*Ongoing*
DATASET STATUS	
Progress	*In Progress*
Maintenance & Update Frequency	*As required*
ACCESS	
Stored Data Format	*DIGITAL ArcView shapefile, Geographic, Geocentric Datum of Australian 1994 (GDA94).* *NONDIGITAL Paper base maps containing raw information*
Available Format Type	*DIGITAL ArcView 3.2 shapefile*
Access Constraint	*Data available for external use subject to transfer fee and license conditions. Data is not to be distributed without authorisation from CALM. Contact CALM's database administrator for further details.*
DATA QUALITY	
Lineage	***1.*** *Relevant experts/papers/surveys were consulted to delineate locations of wildlife activity. (See attribute SOURCE_A for details).* ***2.*** *The collated information was then input into Arcview by manually digitising on screen or entering the coordinate of the point from the field survey results and attributed accordingly. This was performed by Kevin Bancroft at various input scales.* ***3.*** *Hardcopy maps containing the digitised data along with coastline, broadscale bathymetry (10m, 20m, 50m, 100m, 200m, 500m, 1000m isobaths), and a graticule were produced at approximately 1:350,000. These maps were sent to Bernie Haberley for review and additions in Jan 2002.* ***4.*** *The DOLA coastline dated 28 Feb 2001 was modified to create a set of polygons to represent the mainland, islands and rocks of the region. This was done by clipping the WA coastline dataset to the region and to high or mean high water mark. Using the union function, a multipart shape was created. This was then made into a series of single part shapes using the XTools convert multipart shape functionality. A clean and build algorithm was then run to construct polygons that were topologically consistent. Centroids were generated for the polygons using XTools and any points that had not been marked up on the hardcopy map were deleted. These points were then used as the basis for the additional locations of the sealion breeding or haul-out islands and cut and pasted into the existing dataset created by Kevin Bancroft.* ***5.*** *The attribute table of the combined dataset was setup as per the 'Standardised Models for*

	the MIS datasets' (L:\MIS\System\Structure_modules\dataset_models\standard_models.htm). The attribute information for the new points was incorporated and other fields were populated as required. ***6.*** *Data datum transformed from AGD84 to GDA94 using the change datum functionality of the extension 'CALM Added Functionality v2000' in Arcview3.2.*
Positional Accuracy	*Due to the nature of the study, positional accuracy should be considered as approximate only as these points represent an island on which the activity takes place. The data has been collected from information provided by experts and a literature review. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, delineation of areas in which the wildlife is distributed may not be comprehensive.* *Positional inaccuracies may also have occurred due to;* *i) the detail of base maps being sufficient for only broad scale delineation of wildlife distribution/activity,* *ii) some information being more precise in it's definition of the extent of location than others.*
Attribute Accuracy	*Due to the nature of the study, attribute accuracy should be considered as approximate only. The data has been collected from anecdotal information provided by experts and a literature review. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, the attributes of the wildlife distribution may not be comprehensive.*
Logical Consistency	*Attribute names have been checked and validated for consistency across all wildlife datasets created for the implementation of the proposed Recherche Archipeligo marine conservation reserve.* *Attribute values have been checked and validated for consistency, and checked for logic in relation to attribute names. All attributes that require values have had values assigned.* *The shapefile has been compiled carefully to avoid overlaps or duplication of points.*
Completeness	*The dataset is complete as at the date of this metadata statement. The dataset will be upgraded as priorities, time and resources permit. Further work needs to be undertaken on delineation and ground-truthing of many areas of wildlife distribution/activity.*
CONTACT INFORMATION	
Contact Organisation	*Department of Conservation and Land Management, Marine Conservation Branch*
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METADATA DATE	
Metadata Date	*08/03/2002*
ADDITIONAL METADATA	
Additional Metadata	*For further information refer to:* *i) Lee, S. & Bancroft, K.P. (2001). Review of existing ecological information for the proposed Recherche Archipelago marine conservation reserve. Literature Review MRI/WSC,EUC/SIN,RAR-51/2001. Marine Conservation Branch, Department of Conservation and Land Management, Perth, Western Australia.* *ii) Gales, N. J., B. Haberley, et al. (2000). "Changes in the abundance of New Zealand fur seals, Arctocephalus forsteri, in Western Australia." Wildlife Research 27(2): 165-168.*

APPENDIX IV: METADATA FOR NEW ZEALAND FUR SEALS BREEDING AND HAUL-OUT ISLANDS IN THE RECHERCHE ARCHIPELAGO REGION

DATASET	
Title	***Furseal Breeding and Haul-out Islands of the Recherche Archipelago***
Custodian	*Department of Conservation and Land Management (CALM)*
Jurisdiction	*Western Australia*
DESCRIPTION	
Abstract	*This dataset consists of points representing breeding and haul-out islands for New Zealand furseals within the proposed study area for the proposed Recherche Archipelago marine conservation reserve off the southern coast of Western Australia. The points have been attributed with information relating to wildlife as per the naming standards for standardised models for MIS datasets (T:\144-Marine Conservation Branch\GIS Data\MIS\System\Structure_modules\dataset_models\standard_models.htm).* *The dataset has been developed as part of CALM Marine Conservation Branch's resource assessment to assist in the marine reserve implementation process for the proposed Recherche Archipelago marine conservation reserve. This dataset is complemented by other fauna datasets within the region including sealions, seabirds and whales.* *Points were created and attributed by the following methods;* *i) data was collated from a CALM field survey conducted by N. Gales in 2000 and during a literature review by Kevin Bancroft of the existing ecological information for the Recherche Archipelago.* *ii) a dataset for locations of offshore furseal breeding/haul-out features e.g. islands and rocks were generated and attributed by Kevin Bancroft with the ecological information from the literature review and survey data.* *iii) this dataset was reviewed by CALM regional staff (Klaus Tiedemann) and knowledgable residents (Bernie Haberley and Fud MacKenzie) and modifications/additions were marked up on the hardcopy map.* *iv) the wildlife modifications/additions were incorporated into the dataset by Ben Lamb in Feb 2002 by generating centroids of polygons created from the DOLA coastline dated 28 Feb 2001 and attributing the appropriate points with the wildlife information on the hardcopy map.*
Search Word(s)	
Geographic Extent Name(s)	*Eucla (EUC) and WA South Coast (WSC) IMCRA Regions*

DATA CURRENCY	
Begin Date	*1/10/2001*
End Date	*Ongoing*
DATASET STATUS	
Progress	*In Progress*
Maintenance & Update Frequency	*As required*
ACCESS	
Stored Data Format	*DIGITAL ArcView shapefile, Geographic, Geocentric Datum of Australian 1994 (GDA94).* *NONDIGITAL Paper base maps containing raw information*
Available Format Type	*DIGITAL ArcView 3.2 shapefile*
Access Constraint	*Data available for external use subject to transfer fee and license conditions. Data is not to be distributed without authorisation from CALM. Contact CALM's database administrator for further details.*
DATA QUALITY	
Lineage	***1.*** *Relevant experts/papers/surveys were consulted to delineate locations of wildlife activity. (See attribute SOURCE_A for details).* ***2.*** *The collated information was then input into Arcview by manually digitising on screen or entering the coordinate of the point from the field survey results and attributed accordingly. This was performed by Kevin Bancroft at various input scales.* ***3.*** *Hardcopy maps containing the digitised data along with coastline, broadscale bathymetry (10m, 20m, 50m, 100m, 200m, 500m, 1000m isobaths), and a graticule were produced at approximately 1:350,000. These maps were sent to Bernie Haberley for review and additions in Jan 2002.* ***4.*** *The DOLA coastline dated 28 Feb 2001 was modified to create a set of polygons to represent the mainland, islands and rocks of the region. This was done by clipping the WA coastline dataset to the region and to high or mean high water mark. Using the union function, a multipart shape was created. This was then made into a series of single part shapes using the XTools convert multipart shape functionality. A clean and build algorithm was then run to construct polygons that were topologically consistent. Centroids were generated for the polygons using XTools and any points that had not been marked up on the hardcopy map were deleted. These points were then used as the basis for the additional locations of the furseal breeding or haul-out islands and cut and pasted into the existing dataset created by Kevin Bancroft.* ***5.*** *The attribute table of the combined dataset was setup as per the 'Standardised Models for*

	the MIS datasets' (L:\MIS\System\Structure_modules\dataset_models\standard_models.htm). The attribute information for the new points was incorporated and other fields were populated as required. ***6.*** *Data datum transformed from AGD84 to GDA94 using the change datum functionality of the extension 'CALM Added Functionality v2000' in Arcview3.2.*
Positional Accuracy	*Due to the nature of the study, positional accuracy should be considered as approximate only as these points represent an island on which the activity takes place. The data has been collected from information provided by experts and a literature review. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, delineation of areas in which the wildlife is distributed may not be comprehensive.* *Positional inaccuracies may also have occurred due to;* *i) the detail of base maps being sufficient for only broad scale delineation of wildlife distribution/activity,* *ii) some information being more precise in it's definition of the extent of location than others.*
Attribute Accuracy	*Due to the nature of the study, attribute accuracy should be considered as approximate only. The data has been collected from anecdotal information provided by experts and a literature review. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, the attributes of the wildlife distribution may not be comprehensive.*
Logical Consistency	*Attribute names have been checked and validated for consistency across all wildlife datasets created for the implementation of the proposed Recherche Archipeligo marine conservation reserve.* *Attribute values have been checked and validated for consistency, and checked for logic in relation to attribute names. All attributes that require values have had values assigned.* *The shapefile has been compiled carefully to avoid overlaps or duplication of points.*
Completeness	*The dataset is complete as at the date of this metadata statement. The dataset will be upgraded as priorities, time and resources permit. Further work needs to be undertaken on delineation and ground-truthing of many areas of wildlife distribution/activity.*
CONTACT INFORMATION	
Contact Organisation	*Department of Conservation and Land Management, Marine Conservation Branch*
Contact Position	*Marine GIS Co-ordinator*
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Mail Address 2	

Suburb or Place or Locality	*Fremantle*
State or Locality 2	*WA*
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Facsimile	*08 9430 5408*
Electronic Mail Address	*rayl@calm.wa.gov.au*
METADATA DATE	
Metadata Date	*25/02/2002*
ADDITIONAL METADATA	
Additional Metadata	*For further information refer to:* *i) Lee, S. & Bancroft, K.P. (2001). Review of existing ecological information for the proposed Recherche Archipelago marine conservation reserve. Literature Review MRI/WSC,EUC/SIN,RAR-51/2001. Marine Conservation Branch, Department of Conservation and Land Management, Perth, Western Australia.* *ii) Gales, N. J., B. Haberley, et al. (2000). "Changes in the abundance of New Zealand fur seals, Arctocephalus forsteri, in Western Australia." Wildlife Research 27(2): 165-168.*

APPENDIX V: METADATA FOR SEABIRD BREEDING ISLANDS IN THE RECHERCHE ARCHIPELAGO REGION

DATASET	
Title	***Seabird Breeding Islands of the Recherche Archipelago***
Custodian	*Department of Conservation and Land Management (CALM)*
Jurisdiction	*Western Australia*
DESCRIPTION	
Abstract	*This dataset consists of points representing breeding islands for seabirds within the proposed study area for the proposed Recherche Archipelago marine conservation reserve off the southern coast of Western Australia. The points have been attributed with information relating to wildlife as per the naming standards for standardised models for MIS datasets (T:\144-Marine Conservation Branch\GIS Data\MIS\System\Structure_modules\dataset_models\standard_models.htm) and the CALM Seabird Breeding Island database.* *The dataset has been developed as part of CALM Marine Conservation Branch's resource assessment to assist in the marine reserve implementation process for the proposed Recherche Archipelago marine conservation reserve. This dataset is complemented by other fauna datasets within the region including sealions, furseals and whales.* *Points were created and attributed by the following methods;* *i) the dataset was extracted from the larger Seabird Breeding Island database held by CALM's Science Division and maintained by Dr Andrew Burbigde.* *ii) this dataset was reviewed by Bernie Haberley and Klaus Tiedemann.*
Search Word(s)	
Geographic Extent Name(s)	*Eucla (EUC) and WA South Coast (WSC) IMCRA Regions*
DATA CURRENCY	
Begin Date	*1/10/2001*
End Date	*Ongoing*
DATASET STATUS	
Progress	*In Progress*

Maintenance & Update Frequency	*As required*
ACCESS	
Stored Data Format	*DIGITAL ArcView shapefile, Geographic, Geocentric Datum of Australian 1994 (GDA94).* *NONDIGITAL Paper base maps containing raw information*
Available Format Type	*DIGITAL ArcView 3.2 shapefile*
Access Constraint	*Data available for external use subject to transfer fee and license conditions. Data is not to be distributed without authorisation from CALM. Contact CALM's database administrator for further details.*
DATA QUALITY	
Lineage	***1.*** *Seabird breeding islands in the region, and associated attributes were extracted from CALM's seabird breeding island database (seabird-breeding-islands_wa_01061999_amg50_agd84). A link to the original database is maintained in the field INTERNAL_I which contains the seabird breeding island's record id number.* ***2.*** *The location of these nesting points were adjusted by Kevin Bancroft from the original published latitude/longitudes, so as to match the position of the relevant islands.* ***3.*** *Attribute data was checked for logical consistency, and adjusted where necessary.* ***4.*** *New ID added to each record in the attribute table.* ***5.*** *Hardcopy maps containing the digitised data along with a study area boundary, coastline, broadscale bathymetry (10m, 20m, 50m, 100m, 200m isobaths) and a graticule were produced at 1:350,000. These maps were sent to CALM regional staff for review, and additions.* ***6.*** *Maps were reviewed by CALM regional staff (Klaus Tiedemann) and Bernie Haberley for additions/alterations to be made.* ***7.*** *Data was passed to contract staff (Ben Lamb) for updating based on information contained in review maps. No modifications were made during the review process.* ***8***. *Data datum transformed from AGD84 to GDA94 using the change datum functionality of the extension 'CALM Added Functionality v2000' in Arcview3.2.*
Positional Accuracy	*Due to the nature of the study, positional accuracy should be considered as approximate only as these points represent an island where the activity takes place. The data has been collected from information provided by experts and a literature review. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, delineation of areas in which the wildlife is distributed may not be comprehensive.* *Positional inaccuracies may also have occurred due to;* *i) the detail of base maps being sufficient for only broad scale delineation of wildlife*

	distribution/activity, *ii) some information being more precise in it's definition of the extent of location than others.*
Attribute Accuracy	*Due to the nature of the study, attribute accuracy should be considered as approximate only. The data has been collected from anecdotal information provided by experts and a literature review. Resource and time constraints prevented more detailed survey work being undertaken. While every endeavour has been made to faithfully record information, the attributes of the wildlife distribution may not be comprehensive.*
Logical Consistency	*Attribute names have been checked and validated for consistency across all wildlife datasets created for the implementation of the proposed Recherche Archipeligo marine conservation reserve.* *Attribute values have been checked and validated for consistency, and checked for logic in relation to attribute names. All attributes that require values have had values assigned.* *The shapefile has been compiled carefully to avoid overlaps or duplication of points.*
Completeness	*The dataset is complete as at the date of this metadata statement. The dataset will be upgraded as priorities, time and resources permit. Further work needs to be undertaken on delineation and ground-truthing of many areas of wildlife distribution/activity.*
CONTACT INFORMATION	
Contact Organisation	*Department of Conservation and Land Management, Marine Conservation Branch*
Contact Position	*Marine GIS Co-ordinator*
Mail Address 1	*47 Henry Street*
Mail Address 2	
Suburb or Place or Locality	*Fremantle*
State or Locality 2	*WA*
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Postcode	*6160*
Telephone	*08 9336 0109*
Facsimile	*08 9430 5408*

Electronic Mail Address	*rayl@calm.wa.gov.au*
METADATA DATE	
Metadata Date	*08/03//2002*
ADDITIONAL METADATA	
Additional Metadata	*For further information refer to:* *Lee, S. & Bancroft, K.P. (2001). Review of existing ecological information for the proposed Recherche Archipelago marine conservation reserve. Literature Review MRI/WSC,EUC/SIN,RAR-51/2001. Marine Conservation Branch, Department of Conservation and Land Manaegment, Perth, Western Australia.*