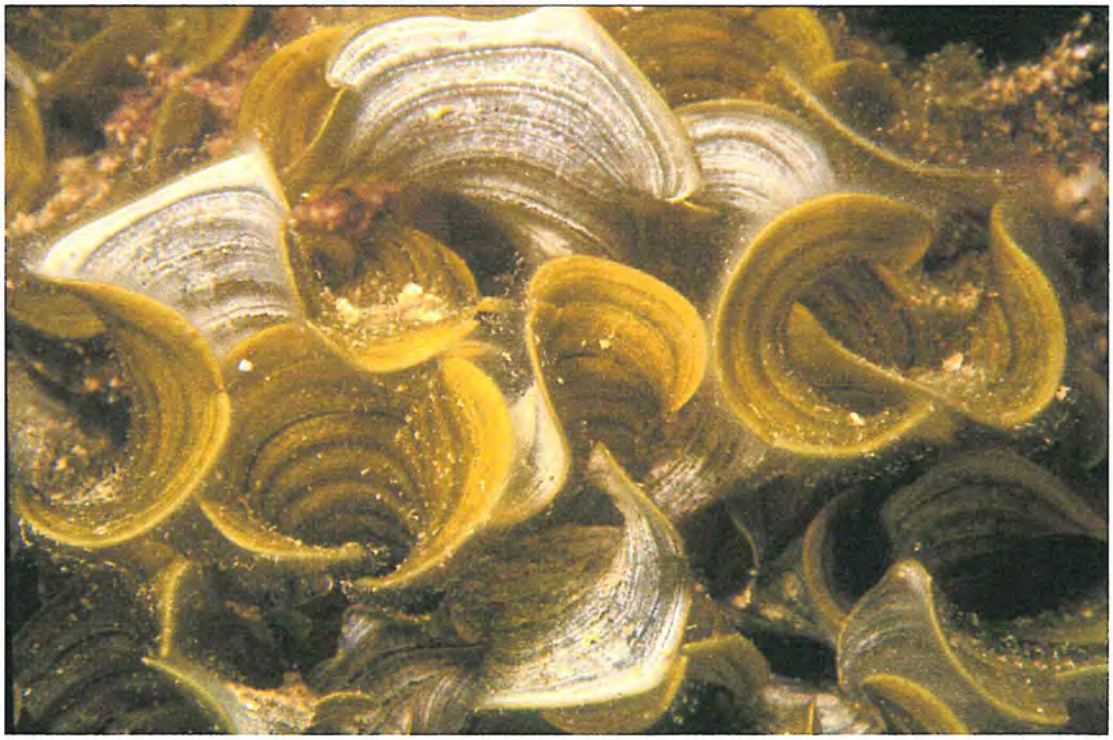
DATABASING WESTERN AUSTRALIA'S MARINE PLANT HERBARIUM SPECIMENS

STAGE 1
FINAL REPORT



Cheryl Parker
January 2004

Coastwest

WESTERN AUSTRALIAN Herbarium

GOVERNMENT OF WESTERN AUSTRALIA

DEPARTMENT OF Conservation AND LAND MANAGEMENT
Conserving the nature of WA

COASTCARE

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Cover photograph: *Padina elegans* Womersley. Photographer: John Huisman. Image © John Huisman. From Huisman, J.M. (2000). Marine Plants of Australia. University of Western Australia Press, Nedlands, Western Australia.

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DATABASING THE STATE'S MARINE PLANT HERBARIUM SPECIMENS

STAGE 1

Introduction

Databasing the State's marine plant herbarium specimens project is a joint venture between the Department of Conservation and Land Management's (CALM), Western Australian Herbarium and Marine Conservation Branch, and CoastWest (State) and CoastCare (Commonwealth). Marine plants include algae and marine flowering plants (seagrasses).

The overall strategy of the WA Herbarium is to support conservation of the State's biota by providing ready access to critical data. The WA Herbarium is the custodian of authoritative names, geographic distribution, rarity and detailed descriptions of plant and fungal taxa. Current names and the known distribution of vascular plants, based on WA Herbarium holdings are available electronically through *FloraBase*. These data provide extensive support to agencies and researchers contributing to conservation of WA's biodiversity.

The WA Herbarium already has an extensive marine plant collection but only information on names etc of the marine angiosperm data is currently accessible. CALM's WA Herbarium and Marine Conservation Branch seek to provide data on WA's marine plants in the same way as that made available for land vascular flora.

The project is planned to provide on-line information on the state's marine plants via CALM's information system, *FloraBase*.

The aims of the present project, Stage 1, Databasing the State's Marine Plant Herbarium specimens were as follows: -

- Assessment of the quality and quantity of marine plant collections currently housed outside the WA Herbarium (PERTH) and the information they can add to marine plant knowledge.
- Compilation of an electronic database of marine plant specimen collection data and names.
- Development of a strategy to database all available marine plant specimens in collections other than PERTH and compile a WA Marine Plant Census.
- Publication of draft guidelines for making new marine plant collections.

This report presents the achievements of stage 1.

Method

An inventory was carried out of existing marine plant herbarium specimens currently housed outside the WA Herbarium (PERTH). Murdoch University (MURU), University of Western Australia (UWA) and CSIRO collections were assessed for the project. The curators and herbarium collections at each agency were visited and a list of the number of specimens, state of curation and ease of databasing was compiled. Any collection subsets, for example types, spirit collection, images or electronic files were noted.

From the inventory a priority was allocated for databasing collections according to funds and time available. The MURU collection met these criteria and databasing commenced in late September. All specimens were databased at the WA Herbarium. A PERTH barcode sticker was affixed to all specimen sheets with the data added to existing marine plant information in the WA Herbarium's specimen database (WAHERB). Databasing of the MURU collection was completed in early December with name and collection information on 3440 specimens entered. Some editing of name authorities and checking of collection details with curators followed.

Based on the inventory and the databased specimens at MURU and PERTH, a strategy was developed to database all available WA marine plant specimens. A schedule of tasks required to achieve the databasing and maintain and extend a WA Marine Plant Census and specimen database was produced and will be used as a basis for applying for further funding.

A review of available taxonomic information to produce an authoritative list of names of all known Western Australian marine plants was carried out. The Marine Plant Census will form the basis of other information systems, including the specimen database, descriptive information, images and maps. The WA Herbarium already has a comprehensive, up-to-date census for marine angiosperms. Australian Biological Resource Study (ABRS), the funding body for the Australian Marine Algal Name Index (AMANI) was contacted for access to electronic files relevant to WA marine macro algae.

Finally draft guidelines for making new marine plant collections were compiled. The guidelines, presented in Appendix 3, for future marine plant specimen collections by community groups and researchers will ensure that quality information is captured and properly vouchered with databased specimens.

Discussion

Inventory

There are 15 000 marine algae and 3000 seagrass specimens held in agencies outside PERTH not databased.The marine plant database will comprise 21 000 marine algae specimen records and 3328 seagrass specimen records when all material is databased in stages 2 and 3.

Stage 1 of the project allowed for a maximum of 3360 specimens (48 days x 70 specimens/day) to be processed. Clearly there was a need to prioritise the collections for databasing. Based on the information gathered in the inventory report and the project criteria, available time and funds, the following order of priority was determined: -

1. Murdoch (MURU) collection.
2. UWA collection. The curator was not available until, mid December 2003.
3. CSIRO collection. Repair work on mounted specimens needed before databasing.

The standard of curation and quality of label details was consistent between agencies. The older collections are generally not actively curated. 99% of the specimens surveyed have been mounted either on half or standard size herbarium sheets. The CSIRO Marmion Marine Research specimens (ca. 2000) need to have some repair work carried out before databasing.

All collections have adequate collecting information. The more recent specimens have collecting details on Excel and Access databases. These existing databases can be merged with PERTH's Texpress database WAHerb. However it will require a Database Administrator to transfer the Excel/Access files into the Texpress Database used for *FloraBase*. Recent collections also have associated geocode information.

An estimated 6500 specimens have not been fully identified to species level. The older collections at PERTH, MURU and UWA, ca. 17 000 specimens, have not had names actively updated.

All agencies were happy to loan their specimens to PERTH so that they could be databased and were willing to assist with queries from database staff.

The inventory is presented in Appendix 1.

Specimen Database and WA Marine Plant Census

Stage 1 of the project provided funding for the compilation of a WA Marine Plants Census and databasing a maximum of 3360 specimen records. Further funding, through Stage 2 and 3, is needed for the maintenance and extension of the Marine Plant Census and databasing the remaining 14 500 undatabased specimens. A schedule of tasks required to achieve the databasing of all marine plant specimens held at agencies other than PERTH and a comprehensive, up to date, WA Marine Plants Census and specimen database is presented in Appendix 2.

Databasing the States Marine plant herbarium specimens project will eventually provide on-line information on the states marine plant flora via CALM's information system, *FloraBase*. The database has the potential to contain a WA Marine Plant Name Census, with 1000 macro algae and marine

angiosperm taxa together with synonymies and literature citations. This authoritative census forms the basis of other information systems, including descriptive information, images, maps and the specimen database.

A marine angiosperm census with literature citations is already available on *FloraBase*. The comprehensive work carried out by Dr Roberta Cowan and Dr John Huisman at Murdoch University in compiling the Australian Marine Algal Name Index (AMANI) is acknowledged as a basis for the WA marine algae census. AMANI is a very significant achievement and one that can be supported and encouraged through further funding of the current project. Australian Biological Resource Study (ABRS), the funding body for the AMANI Project was contacted for permission to incorporate the WA component of AMANI into *FloraBase*. Negotiations are still continuing.

The marine plant specimen database will eventually contain information on 24 500 specimens (21 000 marine algae specimen records and 3328 seagrass specimen records). Stage 1 of the project provided the resources to database the available 3440 specimens in the MURU collection. The databased MURU and PERTH collections now comprise 10 000 marine plant specimen records available in *FloraBase*.

Guidelines for making new marine plant collections

Well-prepared collections are the basis of all marine plant studies. The draft guidelines, Appendix 3, for making new marine plant collections will ensure a standardised approach to future collection and archival of marine plant herbarium specimens as verifiable, permanent record vouchers of marine studies.

These guidelines will be further developed in the subsequent stages of the project.

Summary

The present project, Stage 1, has completed an inventory of the State's marine plant specimen holdings. There are 24 500 specimens in CALM's WA Herbarium, Murdoch University herbarium, University of WA herbarium and CSIRO herbarium.

Specimen details have been captured for 3440 specimens making a total of 10 000 marine plant collection details available in *FloraBase*.

A draft census of WA's marine plants is now available.

A strategy to database the remaining 14 500 specimens has been developed, along with a plan to identify the estimated 6 500 unnamed specimens and check identifications and currency of names of 17 000 specimens.

The project will provide on-line information on the state's marine plant flora via CALM's information system, *FloraBase*.

Eventually the database will be fully supported by an authoritative list of WA's Marine Plants with 1 000 macro-algae and marine flowering plant species, together with references to other sources of information about them. The census forms the basis of other information systems, including maps, images, descriptive information, and the specimen database itself.

Further funding is needed to achieve the databasing of all marine plant specimens, held at agencies other than PERTH, and produce a comprehensive, up-to-date WA Marine Plant Census and specimen database. The specimen database will provide information on 24 500 specimens (21 000 macro algae and 3 500 seagrass records).

The data will provide extensive support to agencies and researchers contributing to the conservation of WA's marine biodiversity. Scientists, community groups and volunteers will be able to access up-to-date authoritative names, descriptions, maps and images of marine plants, adding valuable information to local projects. A prime outcome is the provision of access to reliable current names for marine plants so that data such as distribution, rarity, ecological preferences and management considerations will have a sound plant names basis.

FloraBase is available on CALM's website at http://florabase.calm.wa.gov.au

Acknowledgements

Thanks must go to the curators of the collections at Murdoch University, CSIRO and University of Western Australia for assistance and access to collections. Meriel Falconer and Evelyn McGough provided the expert data entry. Karina Knight helped pack and transport the Murdoch University collection.

Appendix 1

Databasing the State's Marine Plant Herbarium Specimens Project

INVENTORY REPORT

Databasing the State's Marine Plant Herbarium Specimens Project

INVENTORY OF EXISTING MARINE PLANT COLLECTIONS HELD AT MURU, UWA, CSIRO AND PERTH

Cheryl Parker
16 September 2003

Collection	MURU	UWA	CSIRO	PERTH
Specimens to be lodged at PERTH	No Specimens are required for exchange of loans to other scientific institutions.	Yes A proportion of the collection will be lodged at PERTH. The teaching and working collection to remain at UWA.	No	-
Special collections	MURU collection is made up of: - ROCHE specimens. - Original MURU collections. - New additions by M. Borowitzka and J. Huisman.	UWA collection is made up of: - Older collection (ca. 6000). - *Kevin Bancroft collection (ca. 200). - *Gary Kendrick, Capes Region collection, funded by CALM and Environment Australia (ca. 300). - * Nisse Goldberg Recherche Archipelago collection, with CALM and FRD funding (ca. 700). - Perth Metro area survey by student, ID by J. Huisman (ca. 1000). - Pilbara/ Kimberley Survey, by Di Walker (ca. 1000). - Two collections of micro algae on microscope slides (ca. 600), Marion Cambridge from Cockburn Sound and Gary Kendrick from Shark Bay.	CSIRO collection is made up of: - Marmion Research Lab. collection (including H. Kirkman and Womersley specimens) - New additions by Julia Phillips.	PERTH collection is made up of: - R.D. Royce collection (2293 algae, 48 seagrass). - H. Kirkman collection 982 algae, 74 seagrass). - Womersley collection (740 algae).
Number of specimens in collection	Marine algae – ca. 3500 (including some eastern states collections).	Marine algae- ca. 10,000	Marine algae – ca. 1500	Marine algae – 6000 (including some eastern states collections).

Collection	MURU	UWA	CSIRO	PERTH
	Seagrass - very few	Seagrass- ca. 2000	Seagrass – ca. 1000	Seagrass – 328
Actively curated	Yes	Yes	Yes	Yes
Curator(s)	- Michael Borowitzka - John Huisman	- Gary Kendrick - Di Walker	Julia Phillips	Cheryl Parker
Availability for project	Anytime	Preferably after 10/12/03	Contactable anytime	-
Mounted	90%	99% The older collections (ca. 6000) have been heat-sealed in plastic bags.	99% - Extensive repair work required for the Marmion Research Lab. collection. - Some sheets have up to 5 different species/ collections per sheet.	100%
Sheet size(s)	- Some standard size herbarium sheets, but the majority are half size. - Bulky specimens are stored in boxes. - Collection of microscope slides.	- A mixture of standard size and half size herbarium sheets. - Collection of microscope slides (ca. 600).	Old collections have a mixture of standard herbarium and half size sheets. New additions are standard herbarium sheets.	80% of specimens mounted on standard size sheets, 20% on half size.
Space for barcode	Yes The sheets or boxes will accommodate the barcode, however the microscope slide collection will be a problem.	Yes The microscope slide collection will be a problem.	Yes	Yes
Electronic data files	M. Borowitzka to check with R. Cowan, there may be some files	Many of the recent collections (* above) have Excel files. Di Walker's	Marmion Research Lab. collection (ca. 2000) has info.	All in Texpress database.

Collection	MURU	UWA	CSIRO	PERTH
	associated with outward loans. John Huisman has an old Apple Mac program, CLARIS WORKS	Pilbara-Kimberley collection on Access database.	in Excel spreadsheet.	
Collecting information	- Most specimens have good locality information. - Most will have brief notes on depth and littoral zones. - There should be no need to sight collecting books, M. Borowitzka and J. Huisman are happy to answer/search queries.	- Most specimens have clear collection details. - Most will have depth and lat. and long. information. - Microscope slide collection is fully labelled.	- New collections have excellent information including geocode. - Marmion Research Lab. collections have adequate info., however there is a potential problem for some specimens in matching their specimen numbering system with excel spreadsheet info. - J. Phillips is happy to assist with queries.	- Most specimens have adequate collection details.
Identification	- Most of the collection has ID. - The names on specimens are only updated if someone works on a group.	- Most of the collection has been ID. - Older collection ID by Womersley. - Neil Price has ID the green algae, Caulerpa in particular. - J. Huisman has ID more recent specimens.	- Recent collections ID by specialists eg J. Huisman and G. Kendrick. - 63% of Marmion Research Lab. collection ID to species level, 17% to genus only, remaining 20% not ID. - All seagrasses ID by H. Kirkman.	- 15 % of collection unidentified. - 65% of the names will need to be updated.
Type specimens	Not many Isotypes have probably been lodged at PERTH.	? Possibly some in the Womersley specimens.	? Possibly some in the Womersley specimens.	Yes Marine algae – 12 isotypes. Seagrass - 8 holotypes and 7 isotypes.
Spirit collection	Not many and probably won't be databased.	No	No	Yes Marine algae – 208

Collection	MURU	UWA	CSIRO	PERTH
				Seagrass - 8
Images	-	- ca. 300-600 photos (some scanned) available for *FloraBase*.	-	-
Storage conditions	Herbarium is excellent. Specimens are stored on open shelving in family order, then alphabetically under genus. The collection is housed in a ' museum' room with the higher plants and 'stuffed animals'.	- Algal specimens stored in boxes on open shelving in the herbarium room. - Seagrasses in hallway cupboard.	Specimens stored in boxes, according to collector and collection dates.	- Standard herbarium conditions. - Stored in folders on open shelving alphabetically under genus.
Insect damage	Not detected. - All incoming specimens are frozen. Room fumigated annually. - Specimens stored in laboratory more at risk.	There is a high risk of damage by insects. The collection is not stored in ideal conditions.	Not detected. Currently the collection is stored in a room with naphthalene.	Not detected.

Figures quoted, on numbers of specimens, in above table are all estimations from the curators of the respective agencies.

Appendix 2

Databasing the State's Marine Plant Herbarium Specimens Project

STRATEGY REQUIRED TO COMPLETE A WA MARINE PLANT CENSUS AND SPECIMEN DATABASE

Strategy required to complete a WA Marine Plant Census and specimen database

CHERYL PARKER
7 November 2003

A schedule of tasks required to achieve the databasing of all marine plant specimens held at agencies other than PERTH and a comprehensive, up to date, WA Marine Plants Census and specimen database is presented in Table 1.

Table 1. Schedule of tasks required to complete a WA Marine Plant Census and specimen database.

	Task	Labour	Days	Cost
1	Database remaining 14 500 specimens	Database operator (L 2.3) $216/day	207	$44 783
2	Identification of an estimated 6500 unnamed specimens (see table 3)	Research Scientist (L5.1) $297/day	433	$128 601
3	Updating non current names on 17 000 specimens (see table 4)	Technical Officer (L2.1) $205/day	400	$82 000
4	Name verification of available images	Research Scientist (L5.1) $297/day	30	$8910
5	Compile taxonomic descriptions	Technical Officer (L3.1) $232	200	$46 452
6	Work on *FloraBase* front end page	Senior Technical Officer (L4.3) $282/day	5	$1410
7	Ongoing maintenance of *FloraBase* marine plant information	Technical Officer (L3.1) 0.25FTE	ongoing	$11,613 (first year)

The tasks presented in Table 1 are essential to producing and maintaining a reliable, up to date source of information on current names, geographic distributions, descriptions and representative image of all WA marine plant taxa.

Tasks explained in more detail:

Task 1. Database remaining 14 500 specimens
Specimens, held at agencies outside PERTH, not included in the database funding for Stage 1 of the project, can been seen in Table 2.

Table 2. Remaining marine plant specimens to be databased

	Number of specimens in collection	Number of specimens databased (24/12/03)	Number of specimens to be databased (24/12/03)
CSIRO	2500	0	2500
MURU	3500	3500	0
PERTH	6328	6328	0
UWA	12000	0	12000
TOTAL	24328	9828	**14500**

A database operator (L2.3) will require 207 days (at 70 specimens/day) to complete the databasing task.

Task 2. Identification of an estimated 6500 unnamed specimens
To accurately represent the marine plants of WA all specimens should be identified to at least genus, but preferably species level. Marine Plant specimens requiring identification/determination by a specialist are presented in Table 3.

Table 3. Estimate of marine plant specimens requiring identification

	Total number of specimens in collection	Number of specimens fully identified	Specimens identified to Genus only	Specimens with no identification
CSIRO	2500	1750	350	400
MURU	3500	1870*	1530*	<100*
PERTH	6328	4933	1040	355
UWA	12000	9400**	2000**	600**
TOTAL	24328	17953	**4920**	**1455**

* Estimated figures only, based on current databased specimens.
** The UWA collection is approximately twice the size of PERTH and estimations for UWA are approximately double that of the figures for the PERTH collection.

A specialist (L5.1) will require 433 days (at 15 specimens/day) to complete the names identification task.

Task 3. Updating non current names on 17 000 specimens

All agencies including PERTH have older marine plant collections that have not had names actively curated and updated according to current taxonomic opinion. Table 4 summarises these collections.

Table 4. Marine plant specimens requiring name validation (updating).

	Number of specimens
CSIRO	2000
MURU	3500
PERTH	6000
UWA	6000
TOTAL	**17 000**

A Technical Officer (L2.1) will require 400 days (approx. 2 years) to complete the validation task.

Task 4. Name verification of available images
CALM's on-line information system, *FloraBase* includes images where available. The Marine Plant Collection inventory identified a possible 600 images that could be used in *FloraBase*.

A specialist (L5.1) will require 30 days (at 20 specimens/day) to complete the verification task.

Task 5. Compile taxonomic descriptions
FloraBase incorporates a plant description database. A short taxonomic description for each species of marine plants can be compiled. This can be complimented at some stage, by descriptions of all genera, families or divisions.

A Technical Officer (L3.1) will require 200 days (approx. one year) to compile the descriptions.

Task 6. Work on *FloraBase* front end page
Work on CALM's on-line information system, *FloraBase* is required to amalgamate the Marine Plant Names Census and the specimen database.

A Senior Technical Officer (L4.3) will require 5 days to add a marine plant 'page' with cross reference to names details and individual specimen records.

Task 7. Ongoing maintenance of *FloraBase* marine plant information
To continue to provide a reliable, up-to-date and readily accessible source on information on the states marine plants, *FloraBase* will require ongoing updates and validation of information.

Appendix 3

Databasing the State's Marine Plant Herbarium Specimens Project

DRAFT GUIDELINES FOR MARINE PLANT SPECIMEN COLLECTION

Databasing the State's Marine Plant Herbarium Specimens Project

Draft Guidelines for Marine Plant Specimen Collection

CHERYL PARKER
December 2003

Guidelines for future marine plant specimen collections by amateurs and researches are essential to ensure that quality information is captured and properly vouchered with databased herbarium specimens. These guidelines will ensure a standardised approach to future collections so that there will be increased knowledge of marine flora available to all users.

Databasing the State's Marine Plant project Stage 2 and 3 will provide the funding to develop these guidelines further.

1. HOW TO COLLECT AND DOCUMENT MARINE PLANTS

This guide deals with the special requirements of collecting and documenting marine plant species.

1.1 COLLECTING

A licence is required to collect marine plants. Contact your local CALM office for an application form. It would be courteous to advise the relevant authority in your collecting area of your intentions.

1.2 SELECTING MATERIAL FOR COLLECTION

A whole plant, or a number of plants can be collected if they are small. If the plant is large collect a part of the plant that is representative of the species in that locality. If the specimen is in some way different, for example colour or height variation or different reproductive stage, this should be noted.

If collecting for a herbarium specimen it should be a sample that represents an entire population. Specimens should be complete and fertile where possible. Specimens need to be up to 30cm long if using a full size-mounting sheet, which measures 42x26cm. A number of small plants can be collected to make a single herbarium specimen.

When collecting seagrass the following should be considered: -

- Collect a fertile specimen sometimes more as some seagrass are dioecious.
- Collect nodes of the rhizome with roots and leaves.
- Choose specimens that have not been grazed.

When collecting macro-algae: -

- Collect a fertile specimen.
- Include the basal holdfast if possible.
- Some species may be epiphytes and should be collected together with the host.
- Whole specimens can be collected, as the majority of species will fit a herbarium sheet.

1.3 LABELLING

Every specimen should have a tag attached with the collector's initials and a collecting number written in pencil, for example 'CMP123'. This will enable the collector to re-find the collection in their notes and link it to a collection subset such as a photograph or DNA sample.

The following guidelines should be considered when allocating a collecting number: -

- The number should preferably be sequential and unique to each collection. The number can be a single series numbering system that continues year after year, or numbering can start each year, in this case the year should be included CMP123/03.
- To avoid confusion use only Arabic numerals.
- Collections of very small plants, of the same species, collected from the same locality, at the same time can be regarded as one collection and so have the same number.
- Duplicate specimens collected at the same time and same locality should have the same collecting number.
- A specimen recollected from the same plant at a different time should have a new number.
- Specimens of the same species collected at different localities should have different numbers

2. RECORDING DATA

A specimen has little scientific value unless detailed notes are recorded at the time of collection. The notes should include the collector's name, date and locality together with any information about the specimen that would not be evident from the pressed specimen. These notes can be recorded in the Field Data Sheet of a collecting book. Alternatively, the WA Herbarium has developed a software program to capture field data, *MAX*.

Electronic Capture of Data – *MAX*

MAX is a species-editing program for windows. It enables the collector to enter specimen data directly into the computer, to create their own database or print labels. Collecting information entered into the *MAX* program can be downloaded into the WA Herbarium's specimen database, WAHerb. *MAX* also incorporates a census of WA marine plant names that is updated regularly.

Find out more about *MAX* at http://www.calm.wa.gov.au/science/max

2.1 USING THE DATA SHEET

Using the field data sheet either in a collecting book or *MAX*:

- Avoids confusion, at a later date, between specimens and corresponding field information by assigning a unique collecting number.
- Provides a logical series of prompts so important field notes can be recorded at the time of collection.
- The notes provide valuable biological information for inclusion in a database.
- Ensure greater consistency of records made by different collectors.

An example of a field data sheet is presented in Figure 1.

The completion of as much as possible of a field data sheet for each collection is most important. A specimen is still useful even if we only have a precise locality but is infinitely more useful if we know more about the habitat and the way it grows. When this label information is stored in the WA Herbarium's specimen database it is linked to the names database (the Census of WA Marine Plants), a species description database and an image database. These will assist with identification and biological information. All of these databases are accessed through *FloraBase*.

FloraBase

CALM's information system *FloraBase* is a state-wide electronic flora. *FloraBase* integrates a number of datasets into a single easy-to-use website. The datasets relate to all know WA marine plants and include: -

- A complete and up-to-date **Census of WA Marine Plants** with relevant literature citations.
- The **specimen database** with label details of preserved herbarium specimens.
- A **plant description database** where every known species in WA has a brief description

FloraBase allows researchers to communicate the results of their science to a wide range of users involved in conservation – ecologists, educators, decision makers and members of the community.

FloraBase is available on CALM's website: http://florabase.calm.wa.gov.au

Figure. 1 Field Data Sheet

HERBARIUM PERTH- FIELD DATA SHEET FOR DOCUMENTING PLANT COLLECTIONS

Phyllum .....

Family .....

Scientific name.....

Common name.....

Determined by: .....

Field identification number .....

Colour: .....

Form: .....

.....

Height: .....m **Width**: .....m

Colour: red / green / brown .....

Density: common / frequent / occasional / rare cover value % .....

.....

.....

Assoc. assemblage: .....

.....

.....

Depth: .....m

Habitat description: .....

.....

.....

Substratum: limestone reef / granitic boulder / sand / mud/ other .....

.....

State: **WA** **Lat**. .....°...../...../.....''S **Long**.....°...../...../.....''E

GPS / Man. Datum: WGS84 / ADG84 / GDA94

Precise locality:.....

.....

.....

Collector:..... **No**..... **Date**: ... /...../200.....

Voucher for:..... **Photo** Y / N **Exp. Number** ...

Extra notes: (pto if necessary)

2.2 GUIDE TO COMPLETING FIELD DATA SHEET

2.2.1 Identification

The name field has two headings:

- **Scientific name**: This field can be filled in at the time of collection, however is more usually left until a critical examination of the specimen has been carried out to determine the identification. This should be a current valid Latin name. It should also include who determined the identity of the specimen. The name and determinavit are captured in the database.
- **Field identification/common name**: This field allows the collector to put a temporary identification to the specimen. This information is captured in the 'other notes field' on the WAHerb database.

2.2.2 Description

This should include any notes on colour, shape and size of the plant and any other features that can't be seen from the pressed and dried specimen. This is particularly important for larger plants where whole specimens may not be collected. Plant description notes can include:

- **Form**: Describe the growth form/morphology of the plant.
- **Height/width**: Give an approximate measurement in metres e.g. 0.25m, 1.0m
- **Colour**: The colour in marine algae can deteriorate quickly when exposed to sunlight.

In this section alternative terms are given as prompts, circle one only.

MAX users should enter this information into the 'Plant description' field

2.2.3 Population Characteristics

Population density records the whole population of the species being collected at a site. If the population is small, individual plant numbers can be recorded. If there are to many use approximate area covered.

In this section alternative terms are given as prompts, circle one only.

MAX users should enter this information into the 'Frequency' field

2.2.4 Site and Habitat Description

This section describes the immediate area surrounding the plant collected.

- **Associated assemblage**: Describe the habitat in relation to other plants in the close vicinity. Include host plant or animals where applicable.

- Make a list of the more common species growing at the collection site.

MAX users should enter Associated assemblage information into the 'Vegetation' field

- **Depth**: Measurement in metres e.g. 0.25m, 1.0m if the specimen is collected in the sub tidal zone.
- **Habitat description**: Describe the topography of the collection site and if relevant, the position from the shore.
- **Substratum** - limestone reef / granitic boulder / sand / mud / other.

MAX users should enter this information into the 'Site Description' field.

2.2.5 Location

A detailed description of the collection locality is needed as well as the latitude and longitude.

- **State: WA Latitude and Longitude**: This should be recorded using a Global Positioning System (GPS). Degrees (°), minutes (') and seconds (") is preferred. Accuracy to seconds is important as 60" = 1km.
- **GPS/Man**: Indicate if a GPS unit was used or if the latitude and longitude was calculated from a map etc.
- **Datum**: GDA94 is Australia's new coordinate system and should be used in preference to any others. CALM's *FloraBase* systems encourage the use of GDA94. Older systems WGS84 or AGD84 can still be used as long as this reference datum is clearly sighted.
- **Precise locality**: The description should enable any person to revisit the collection site. If the locality is not a well known one, the distance and direction from a better-known landmark should be given.

MAX users should enter the full locality information in the 'Locality' field. The 'Nearest named place' field relates only to calculating the geocode and does not print out on the label.

2.2.6 Collector details

- **Collector**: Enter initial(s) first then the surname in full eg. C M Parker.
- **Number**: The number should preferably be sequential and unique to each collection. The number can be a single series numbering system that continues year after year, or numbering can start each year, in this case the year should be included CMP123/03. The same number is also written on a tag attached to the specimen.
- **Date**: Use Arabic numerals for DD/MM/YY

2.2.7 Voucher Specimen

Note if the specimen is a voucher for a photograph, particular area survey, special project etc.

2.2.8 Photo
The file roll number and the exposure number(s) should be entered into this field.

3. FURTHER READING

Fuhrer, B., Christianson, I.G., Clayton, M.N. & Allender, B.M. (1981). *Seaweeds of Australia.* Reed, Sydney.

Huisman, J.M. (2000). *Marine Plants of Australia.* University of Western Australia Press, Nedlands, Western Australia.

Womersley, H.B.S. (1984). *The Marine Benthic Flora of southern Australia Part 1.* Government Printer, South Australia

Appendix 4

Databasing the State's Marine Plant Herbarium Specimens Project

FINANCIAL REPORT

FINANCIAL REPORT

Cheryl Parker
31 December 2003

The accompanying financial statement for Databasing the State's Marine Plant Herbarium Specimens Project represents financial transactions for the period 01 September 2003 - 24 December 2003 and the financial position as at 24 December 2003.

MARINE PLANT PROJECT (MPP)
CoastCare/Coastwatch (SWALE)
CALM Trust Fund – LWV

Financial Statement September to December 2003

	Expenditure	**Revenue**	**Balance**
Opening Balance, September 2003			$24,750.00 ... .ex GST
Receipts			
Interest Received		8.79	**24,758.79**
Expenditure			
Salary and Overheads	23,892.32		
Travel/Accommodation	0		
Vehicle Running costs	57.68		
Consumables	808.79		
Total Expenditure	**24,758.79**		0.00
Balance of Funds as at 31 December 2003			**$0.00**

The statement of financial transactions should be read in conjunction with the accompanying notes.

1. PROJECT FUNDING SOURCE

The primary objective of Stage 1 of the project is to provide the community with the capacity to access information on the state's marine plants. A secondary objective is to provide draft guidelines for the capture of new data

on marine plants. The project was funded by Coastwest/Coastcare and CALM Consolidated Revenue funding: -

CoastWest/CoastCare	$24 758.79
CALM	$6 950

2. OUTPUTS FOR STAGE 1

Information about the project outputs and expenses is set out below: -

Output 1: Inventory of existing marine plant herbarium specimens in external collections with assessments of their quality, quantity, accuracy of label data, identification and accessibility to database staff. All relevant costs fell within budget.

Output 2: Review of available taxonomic information and compilation of an authoritative list of names of all known Western Australian marine plants: a Marine Plant Census. Negotiations are continuing with ABRS for the WA component of the AMANI database. All costs for the initial stage of negotiations will fall within budget. Further funding through Stage 2 and 3 is needed to extend and maintain the census and incorporate the relevant electronic files into *FloraBase*.

Output 3: Development of a strategy to database all available WA marine plant herbarium specimens. All costs fell within budget.

Output 4: Database of high priority collections according to funds and time available. The biggest expense incurred in databasing the Murdoch University collection, other than labour costs, was for PERTH bar code stickers and for specimen transport/storage boxes.

Output 5: Draft guidelines for specimen collecting and handling in collaboration with potential user groups. All cost fell within budget. Further funding through Stage 2 and 3 of the project is needed to employ an algologist to complete these guidelines.

Output 6: Final Report for Stage 1. All costs fell within budget.