THE BCLME BIODIVERSITY ECOSYSTEM HEALTH & POLLUTION ACTIVITY CENTRE & THE BENEFIT SECRETARIAT

ECOSYSTEM MAPPING & BIODIVERSITY CONSULTATIVE WORKSHOP

26-27 April 2004
Alte Brucke
Swakopmund, Namibia

DRAFT REPORT
18 May 2004

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SECTION A: WORKSHOP PORCEEDINGS

1. Program Agenda

Project code :
1 – Mother Project
2 – Shoreline, coastal and estuarine mapping
3 – Offshore mapping
4 – Inshore and coastal assessment
5 – Estuarine assessment
6 – Offshore assessment
7 – Mariculture classification

PROGRAM AGENDA – DAY 1 MONDAY, 26 APRIL 2004		
Chair: Dr. Mick O'Toole – CTA, BCLME		
Time	**Item**	**Facilitator/Presenter**
08h30	Welcome	Dr. M. O'Toole (BCLME)
08h40	Workshop context	Ms. M. de Lourdes Sardinha (BCLME, Angola)
09h00	Workshop Goal Setting and Agenda	Dr. N. Sweijd (BENEFIT)
09h30	International and other regional Marine Biodiversity Initiatives	Prof. C. Griffiths (UCT, RSA)
10h10	Assessment of Marine GIS Data in Namibia	Ms. V. De Cauwer (GreenMap)
10h30	**Tea/Coffee**	
Chair: Ms. M. de Lourdes Sardinha, Director, BEHP Activity Centre, BCLME		
11h00	Marine Biodiversity Information and Data - Namibia	Dr. L. Voges (MET/MFMR, Namibia)
11h20	Marine Biodiversity Information and Data - Angola	Ms. C. Santos (ANU, Angola)
11h40	Conservation Planning in South Africa	Dr. M. Lombard
12h00	Census of Diversity of Abyssal Marine Life "CeDAMAr"	Prof. Dr. P. M. Arbizu (Univ of Oldenburg, Germany)
12h30	The Darwin Initiative	Prof. M. Gibbons (UWC, RSA)
13h00	**Lunch**	

14h00	**Group Session 1**
	1. Understanding the TORs
	    a) Understanding the scope
	    b) Understanding the Outputs
	2. Brainstorm of data needs and data and information sources
		Five groups will be nominated:
		Facilitators/Rapporteurs: (project group)
		Andy Cockroft (4,5)
		Lizette Voges (4,5)
		Kumbi Kilongo (6)
		Vera De Cauwer (2,3)
		Peter Britz (7)

15h30	**Tea**	
16h00	Reports, problems, questions and answers	Rapporteurs
17h00	Session ends	

19h00	Braai at the Gulls Cry	

PROGRAM AGENDA – DAY 2 TUESDAY, 27 APRIL 2004		
Time	**Item**	**Facilitator/Presenter**
08h30	Status report, summary and re-orientation	N. Sweijd
08h45	Group Session II (1 hour) Workplans for projects: Mapping projects (2,3)*	4 group facilitators/rapporteurs
09h45	Plenary report back	4 X 10 minutes
10h30	**Tea**	
11h00	Group Sessions III (1hour) Workplans for assessment projects and mariculture project (4,5,6,&7)*	4 group facilitators/rapporteurs
12h00	Plenary report back	4 X 10 minutes
12h45	**Lunch**	
14h00	Plenary discussion on workplans (Recommendations and comments)	
15h15	Programme Management options and processes	Prof. P. Britz
15h30	**Tea**	
16h00	Group Session IV (30 minutes)	6 project groups to refine workplans (consider recommendations) suggest management options
16h30	Plenary report back	6 X 5 minutes
17h00	Final remarks and closing	

* Option II: Split according to project groups for both sessions.

2. Executive Summary

1. The meeting held in Swakopmund hosted some 50 delegates from 6 countries.
2. Presentations were given on the status of biodiversity and related research and initiatives in each of the three countries.
3. Protestations on related initiatives in the region were given (The Darwin Initiative, CedMAR and COML).
4. Analyses of the TORs of the BCLME biodiversity projects were made.
5. A need for better definition, specifications and scales emerged as a global problem.
6. The role of the main / mother project was regarded as key to the success. It was recommended that the South African National Biodiversity Strategy and Action Plan (NBSAP): National Biodiversity Assessment (NBA): Marine Component process be expanded for the BCLME.
7. It was agreed that the programme as a whole was over-ambitious with respect to the funding and time frames envisaged.
8. It was recommended that the programme be reconfigured with the main aim of consolidating exiting data and knowledge.
9. It was recommended that the set of seven TORs were reconfigured into four TORS with a large emphasis on standard setting and data acquisition with a relatively reduced field component.
10. A number of more detailed recommendations were also made.

# 1. Report on Proceedings – Day 1: Monday, 26 April 2004

3.1 Introduction

Dr. O'Toole welcomed everyone to the meeting and introduced the workshop programme. The Terms of Reference for all seven biodiversity related projects have been developed, but there is a need to further define and develop them, especially the issues on coastal mapping, GIS and environment. BCLME has some funding available. Dr. Neville Sweijd discussed housekeeping issues before Dr. O'Toole gave a short presentation on the BCLME programme.

Participants introduced themselves and Dr. Sweijd reminded the group that English is a second language to many present so participants were asked to please speak slowly and clearly. The atmosphere had to be relaxed and interactive, with full participation and engagement. Participants were informed that they may utilise the BENEFIT office to make phone calls, check email, etc. Books were available for sale on Namibia's marine environment.

3.2 Presentations & Discussion

3.2.1   **Presentation #1**: Introduction and background to meeting (Dr. O'Toole, CTA, BCLME Programme), (Annex A)

3.2.2   **Presentation #2**: BCLME BEHP Activity Centre and brief project overview (Ms. Maria de Lourdes Sardinha, BCLME, Angola), (Annex B)

3.2.3   **Presentation #3**: Introduction to the BENEFIT Programme (Dr. N. Sweijd, BENEFIT), (Annex C)

Apart from his introduction to those new to BENEFT, Dr Sweijd also noted that there is an assumed disparity in the degree on knowledge with regard to biodiversity in the region and the consequent need that effort will have to be focussed where knowledge is weakest.
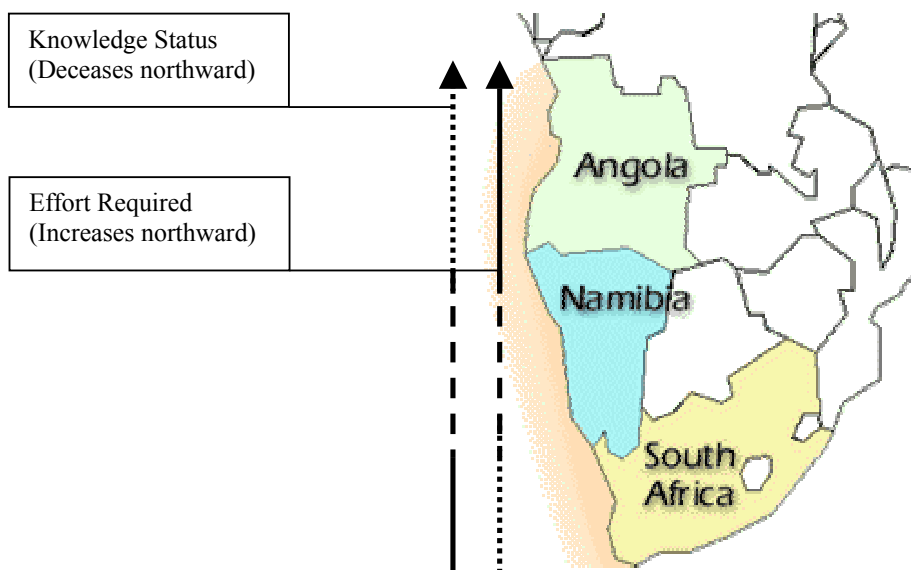
3.2.4 **Presentation #4**: Census of Marine Life [CoML] and Related Biodiversity Initiatives (Prof. C. Griffiths, UCT, RSA), (Annex D)

Prof. Griffiths summarized the 10 –year CoML programme and explained the role that he is playing as the leader of the one of eight CoML projects in CoML – the Benguela Project. Several phases and studies are envisaged and the BCLME initiative is obviously a complementary initiative to which the CoML would naturally participate. He explained that in particular with regard to invertebrates there are major gaps even in South Africa, which is relatively well studied. He also illustrated that there are new approaches to study biogeography distribution of species, by looking at various scales of distributions.

Questions/Comments:

- The CoML network hopes that institutions and programs all over southern Africa – such as BCLME - will log their data in the OBIS database they established (Ocean Biogeographic Information System).

- The CoML / OBIS organisation also has funds to collect data and fund a person within other institutions to create a database in order to submit their information to the OBIS database.

- The OBIS database requires point records providing information on species, latitude, longitude and authority. Surveys should therefore capture information on the geographical location of the points where the creature was identified.

- It is important to distinguish between diminished species observations or diminished information on species when interpreting census results.

- Relevant websites are mentioned in the presentation (see annex), such as www.coml.org (main page), www.hmapcoml.org (history arm of CoML), www.iobis.org (OBIS), www.fishbase.org, www.species2000.org and www.seapics.com.

3.2.5 **Presentation #5**: Assessment of Marine Data in Namibia with respect to GIS (Ms. V. de Cauwer, GreenMap), (Annex E)

Questions/Comments:

- There is a lot of marine geographical information in Namibia that needs to be consolidated. She stressed the fact that converting the data into one GIS (Geographical Information System) database is an elaborate procedure when working with a heterogenous dataset. End user input is required during this process.

- The data showed during her presentation was generated via the GIS software ArcView, which is one of the most popular GIS softwares used in Namibia.

- She is unaware of any systemically collected biodiversity data for Namibia that includes the recording of longitude/latitude. The mining industry has a lot of information but uses more geophysical data.

3.2.6 **Presentation #6**: Marine Biodiversity Information & Data in Namibia (Dr. L. Voges, MET/MFMR, Namibia), (Annex F)

Dr Voges made a comprehensive presentation illustrating the level of organization and the state of knowledge in Namibia with regard to marine biodiversity. She illustrated that Namibian was party to several international agreements, treaties and conventions and that management was in place to comply with them. She showed that there was a fair degree of endemism in Namibia and that there were some limiting and unique contributing factors that determined the species structures in Namibia (namely the upwelling system). She noted the global context in which information in Namibia formed a part and noted that there were several sources of data in Namibia and were several outstanding needs in Namibia – in particular namely more effort on tax from lower tropic groups.

Questions/Comments:
- The only protected invertebrate is the rock lobster.

3.2.7 **Presentation #7**: Marine Biodiversity Information & Data in Angola (Ms. C. Santos, ANU, Angola), (Annex G)

Ms Santos is currently researching a PhD in Portugal. She was able to spend some time before the workshop researching exiting data that is located in some libraries and databases in Portugal. She described the basic ecotypes along the Angolan coast and outlined the state of knowledge of the biota of the Angolan coast. She noted that the best knowledge was of larger biota (mainly fish) but that several studies has been done o mangroves and other systems along the coast. She pointed out the urgent need for intervention due to sever human pressure on the coast.

3.2.8 **Presentation #8**: Conservation Planning In South Africa (Dr. M. Lombard, NCA, RSA), (Annex H)

Dr Lombard presented the project emanating from the South African National Biodiversity Assessment, which aims to identify spatial priority areas for conservation action and make recommendations about implementation options in the marine component. She has been implementing this project and several other projects that are using GIS and other tools for biodiversity mapping.

She explained the process of defining the parameters of the mapping units both along the shore in terms of regions and zones and in terms of the depth-wise definition of habitat types. She further explained the detailed process of consultation with experts and stakeholders that have resulted in a consensus for these definitions and their use in planning conservation priorities.

3.2.9 **Presentation #9**: Marine Biodiversity in Angola (Mr. N. Luyeye, IIM, Angola), (Annex I)

3.2.10 **Presentation #10**: Census of the Diversity of Abyssal Marine Life (Dr. P.M. Arbizu, Univ of Oldenburg, Germany), (Annex J)

This presentation was an input on an area of the CoML programme that has already sent expiations to the region. The CeDMAR project is focussed in marine life in the abyssal regions, which effectively picks up where the focuses of these efforts finish.

Questions/Comments:
- CeDAMAR does focus on another marine zone/habitat than the ones considered in this meeting : the abyssal plains.
- The DIVA-1 results from the cruise with the RV Meteor in 2000 have been published (see Annex).
- The DIVA-2 expedition in March 2005 will focus on Angola.

3.2.11 **Presentation #11**: The Darwin Initiative (Prof. Mark Gibbons, UWC, RSA), (Annex K)

Questions/Comments:
- The species samples to be analysed depend on those collected in the region as dictated by the BCLME Mother Project (Prof. Gibbons' project will provide UK expertise in biodiversity and taxonomy).
- While the project proposal aims to train taxonomists, it is additionally foreseen to train trainers, students and private consultants in order to contribute to the projects' sustainability.

Dr. Sweijd apologised to those participants who had more information to share, and requested that the afternoon facilitators meet directly following lunch and before the breakout session began.

3.3 Assessment of Terms of Reference

Groups were split up according to the TORs groups and were tasked with assessing the TORs and commenting on them.. The groups were split up as follows:

- 1 group covering Inshore and Coastal Assessment
- 1 group covering Estuarine Assessment
- 1 group covering Mapping (and attended by the Mariculture classification group)
- 1 group covering Offshore Assessment

3.3.1   Group sessions on the Scope and Outputs of the TORs

The first session look at scope and outputs of the TORs and the groups were tasked with analysing these using the following questions as a guide:

1. Is the scope clearly defined?

2. Do you have questions and comments about the scope?
3. Is the scope too broad or too narrow?
4. Does the scope dovetail with the other relevant TORs?
5. What are the assumptions regarding outputs?
6. What data is required to achieve the outputs?
7. What data exists that should be used?
8. What tools are required?
9. Do you have general comments or queries?

3.3.2 Offshore Assessment group (Facilitator-B. O'Connor), (Annex L)

There was some concern expressed that the parameters of the TORS were not well defined and the group recommended the following limits to be placed on the TORs:

- Must include benthos.
- Must include pelagic species.
- A lower size limit must be defined (phyto and zoo plankton excluded).
- Must include large gelatinous plankton.
- Birds, mammals and turtles might be excluded if other dedicated BCLME projects exist.
- A geographic depth limit must be defined: 30m until 200m / EEZ should be accepted.
- Terms such as *community* and *biotope* must be defined.

Questions/Comments:
- The bottom limit or "foot" of the slope has to be defined (may depend on the type of intervention as to how you will define slope, or may be defined by data source)
- Extend project from six to at least nine months in duration
- Need to solicit more input from Biodiversity Ecosystem health and Pollution (BEHP) advisory group

3.3.3 Mapping Projects (Facilitator-V. de Cauwer), (Annex M)

The main outcome of this group is that the TORs lack definition (of both terms and scale) leaves these very open to interpretation. It is thus recommended that an initial phase of the project should be to define standards and definitions that could be applied to the projects. It was recommended to use those already defined by the South African project (Dr Lombard) as a starting point.

It was noted that data collation / acquisition was 90% of the effort required. Various sources of data may exist and a large effort would be required to collate and format the data. There are several sources listed in the annex.

Questions/Comments:
- The motherproject could base definitions on those presented by Mandy Lombard in frame of the South-African National Biodiversity Assessment (extend/adapt).

- It should be clearly stated by the project investigators whether it is the purpose to use existing data rather than organising new data collection campaigns (aerial photographs, fieldwork). The Mother Project should be considered initially before the other projects. It may come down to buying the highest resolution of satellite data that is affordable. There aren't enough details to define the precise scale; it is a question of whether the Mother Project's definition details this.

3.3.4 and 3.3.5 Inshore and Estuaries Assessments (Facilitator-L. Voges), *(Annex N-combined presentation).*

The questions raised by this group concurred with the others. It was unclear from the TORs what the definitions, delimitations (of biotopes) and scales of resolution (e.g. taxonomic levels) are required.

Also, it is recommended that physical parameters be recorded concurrently with biodiversity assessments.

Questions/Comments:
- The project could be split into two : the first to collect existing information, do a synthesis, provide feedback to the Mother Project and determine what should follow. The second project would collect additional data during field surveys.
- The data which exists should be collected by a the contractor who conducts the initial study.

(Facilitator-A. Cockroft)
Questions/Comments:
- Establish keys or guides defining the resources used.
- Project negotiation: flexibility will lead to a labour of love, rather than merely working for money. The extra investment may lead to more meaningful work, rather than simply collecting the minimal dataset.
- BCLME should establish clear definitions rather than leave to contractor to do so.

In conclusion, it was agreed from all groups that more definition is required regarding the scale and delimitations of the projects would be required. This should be the role of the central or mother projects (dubbed the MOM project). In order to address this overall view a sub-committee was appointed to address the TORs of the MOM project:

A small working group (N. Luyeye, V. De Cauwer, M. Lombard, M.Gibbons, C. Wainman, S. Hughes), would process the Mother Project in a similar manner to the above.

The meeting adjourned at 17h00.

4. Report on Proceedings – Day 2: Tuesday, 27 April 2004

4.1 Day 2 -Introduction

Dr. Sweijd welcomed the group to the second day of the workshop and reviewed the schedule: a review of the Mother Project would precede the breakout sessions on the work plans..

Schedule:
09h00-Feedback from MOM group
09h30-Discussion on MOM
10h00-Summary of workshop progress and direction
10h30-Tea
11h00-Project groups (workplans)
12h00-Plenary/report back
13h00-Lunch
14h00-Project groups
14h30-Plenary: Presentation on Management Proposal
14h45-Project groups management
15h30-Tea
16h00-Plenary/report back and summary
17h00-Close

4.2 Feedback from MOM - the Mother Project (Presenter: M. Lombard), *Annex O)*

A phased approach was presented, which compiles a status report and assembles the data (= desktop study or rapid exercise) before going into the field:

- The Mother Project needs to define terms and set the standards and formats for all other projects. During the desktop study, the abiotic and biotic groups will collate existing abiotical, respectively biological information. The abiotic group will then translate this into data as defined by the Mother Project and the BAS (best available scale). The products or outputs are then presented at a workshop, with indication of data gaps.

- The next step is an intermediate exercise during which additional data as defined by the workshop is collected. The client (BCLME) will prioritise activities according to their needs and constraints (i.e., budget). This will culminate into an intermediate output (the best one can get with the budget and time frame allotted). This exercise can also piggyback onto other activities by way of co-financing.

- Any remaining questions will be addressed by the BCC (Benguela Current Commission) to determine the need for a more comprehensive exercise.

Questions/Comments:
- The issue of the storage of hard copy data (library) until it is converted into electronic format; as well as the storage of samples.

- The MATT tool could be used to archive data and BENEFIT's existing archive policy to serve as a template
- The final data should be submitted to OBIS who will archive the data permanently and also has a budget for the conversion of information into the desired format
- The issue of data ownership and intellectual copyrights
  - Confirm policies of each country regarding general consumption of governmental data
  - Verify with BCLME regarding the free flow of data, rules of publications, etc. One option is to flag the data that can not be made public with a metadata logging tool (cf. SADCO). This data can be used as intermediate data by the project.
  - Put forward for consideration during the afternoon project management session
- Major foci should be the transboundary areas; the mapping phase should include at least two estuaries and ensure that they collect the best data available (the Angola Defence Mapping Agency has good 1:100,000 scale topographic maps that cover the coast from the Congo to the Kunene and on which estuaries could be identified).
- Angolan information is located at the Lobito Library (original building for marine research – before Luanda), Luanda's IIM Library, the Angolan Museum, as well as at universities. Libraries and institutions in Portugal (Lisbon, Porto) may have the same information, although it may be possible to find unpublished data there. This can be checked and requested via their email services. In South Africa, marine information can be found at the South African Natural History Museum, the SAIAB Institute (SA institute for aquatic biodiversity) and the General Smith Museum.
- Could apply to the tender an obligation to store all data collected in a central repository.

This format of the Mother Project was accepted and approved by the group.

4.3 <u>Group sessions on the Work Plan</u>

The meeting broke up into six groups to consider the proposed Mother Project phased approach and the work plan template for each project. Each group elected a leader, review the issues and provide a rough sketch of activities including budgets and timeframes to achieve synthesis.

Work plan Template
- A series of activities related to the outputs as defined in the TOR's
- A time frame for these activities
- Budgeted travel with justification and costs (use # of person hours and km of travel)
- Equipment requirements (with justification)
- Consumables requirements (software, chemicals, fuel, etc, with justification)
- A remuneration component (where appropriate)

- A team of scientists and role-players (as defined by the TOR)
- A plan to combine activities with other project components

4.4 Report Back on the Work Plan Template

4.4.1 Group #1-Estuaries (Presenter: P. Morant), *(Annex P)*

Questions/Comments:
- Cabinda not included due to difficulty in travel and security concerns—the group can try to cover a representative sample or note on the tender that Cabinda may be considered.
- The idea is to include as many Angolans on the survey groups as possible — for example a core group of mentors and additionally a group of students to cut costs.

4.4.2 Group #2 - Inshore (Presenter: M. Gibbons), *(Annex Q)*

Questions/Comments:
- Salary can be expensive, but there are various ways to cut costs.

4.4.3 Group #3 - Offshore Assessments – (Presenter: B. O'Connor), *(Annex R)*

Questions/Comments:
- The quantity of information is colossal; there is abundant data especially from the fisheries point of view. The Mother Project should determine how to handle the large amount of data.
- There is also fisheries data collected by the Russians over the years. Question is ownership of information.

4.4.4 Group #4 - Offshore Mapping (Presenter: D. Nel), *(Annex S)*

Questions/Comments:
- Should include oxygen data.
- The use of historic data and core samples will contribute to the assembly of a palaeobotanic picture.
- BCLME should play a role in getting data from each visiting ship via the Ministry of Foreign Affairs, e.g. Melville ship, cruises of Brazilians.

4.4.5 Group #5 – Inshore Mapping (Presenter: V. De Cauwer), *(Annex T)*

Questions/Comments:
- There is great need for capacity building/training, particularly in Angola, in terms of data sourcing, data assembly and data processing.
- At the start of the rapid assessment, groups should make a shopping list of the data available, cost, etc. and present it to the Mother Project for approval prior to each activity.

- Suggested output is the creation of two databases containing metadata and actual data (verify this during project management discussion, as to the desired product vs. feasibility).
- Offshore should begin at 30 metres.
- Obtaining remote sensing data – in especially ocean colour products - in the region is in big debate now. Data acquisition should include Angola as well and this at the same resolution as for Namibia and South-Africa (e.g. through NASA).

4.4.6 Group #6 – Aquaculture (Presenter: P. Britz), *(Annex U)*

Questions/Comments:
- Aquaculture development nodes have not been identified yet, but people have an idea of where suitable locations are. Official aquaculture zoning can take a long time; the idea is to begin immediately where able in frame of this project.

4.5 Plenary Discussion: Project Management

Presentation on Management Structure (Presenter: Mr. P. Britz), **(Annex V)**

Complemented by N. Sweijd :
1. The project needs some top individuals to manage the project and guide decisions, perhaps two people, one with technical skills and one with project skills, for example:
    1. Project Leader – Professor or Director, senior scientist with part-time dedication, could be part of the committee chair
    2. Project Manager – MSc, operational node, coordinator and administrator of the project
2. There could be two coordinating/guiding bodies :
    1. The Mother Project (MP) Committee with representatives from each of the 6 projects (projects 2 – 7).
    2. The Mother Project Technical Team or Central Data Assembly Team : permanent group that is dedicated to the technical work, may consists of some people of the MP committee.
3. Complex contract issues (i.e., remuneration for government personnel) are being treated on a case-by-case basis.

4.6 Plenary report back and Summary

A recapitulation of some important issues that arose during the workshop was given by Dr. N. Sweijd.

1. Data Management
- Clarity is needed on intellectual property rights, copyright on the publication of information, etc.
- Depositing the data output : OBIS, SADCO, SABIF (GBIF)
- MATT tool

2. Information Flow

- The Mother Project should set standards to allow an easy information exchange : e.g. the media on which the product is delivered and to whom, the software needed for working with the data, copyright issues, etc.
- Website development for this project is important for public relations purposes, but this wasn't covered in any of the TORs. It is possible to add a few pages to the BENEFIT website and to use it as an administrative tool to avoid being cumbersome. The Mother Project can instruct that metadata be put on the website.
- Repository for hard copies : two options can be considered, a virtual library vs. storage of hard copies; perhaps documents can be scanned in order to make them available for all countries involved.

3. Documentation
- SAIAB
- Museums
 4. A kind of storage depot could be organised for the collection of samples and specimens, such as the General Smith Museum in S.A.
- Foreign samples (or data)

Dr. Sweijd outlined the next steps that will be taken to launch the projects :

- Distribution of the workshop report to all participants
- Update TOR's : BCLME needs to digest and adjust the projects according to the input from the workshop. BCLME makes the final decision about how contracts are awarded (not BENEFIT).
- Implement Stage 1
- May/June 2004 : get Mother Project operational.

4.7 **Closing**

Dr. Sweijd thanked all the participants for their hard work, and stated that the goals of the workshop had been achieved. He hopes that the networks that have started here can be developed further.

The meeting closed at 15h30.

5. RECOMMENDATIONS

Three main recommendations have emerged and a number of specific suggestions were collated in the documentation.

5.1 There is a need for better definition and specification of the terms and parameters and scale in TORs, which the projects should utilize. What is unclear is where the boundary between near shore and offshore is located (depth or distance) and also what parameters would be used to define the units of conservation. In order to alleviate this problem an additional requirement should be set for the "mother" project to create the standards and definitions required for the entire region. This would be a key element for conservation planning.

5.2 While acknowledged in the terms of reference, it was concluded that a very large amount of relevant data already exists in various forms in various locations. It was thus recommended that large data retrieval, archiving and formatting effort be incorporated into the TORs as a primary focus for both the physical and biological projects in order that funds are efficiently used and that effort is not duplicated. It was recommended that fieldwork should only be commissioned when the data retrieval process was at an advanced stage and when data gaps are authoritatively determined.

5.3 The budgetary and time frame limitations considered as well as the fact that duplicate skills would need to be applied to several of the projects (mapping and biological respectively) and thus a need for consolidation emerged which led to the conclusion that a re-configuration should take place. It was recommended that the two mapping projects and the inshore and offshore assessments be melded into two projects – one mapping and one biological assessment.

5.4 Other Recommendations

5.4.1 Mother project must define the limits of range of species for biological assessment – it is recommended that benthos and pelagics (fish and macrozooplankton) be included while groups to be excluded are: phytoplankton, zooplankton (except for large gelatinous plankton); birds, mammals and turtles, as these already have programmes in place.

5.4.2 It is acknowledged that a South African initiative entitled "The National Biodiversity Strategy and Action Plan (NBSAP)" which has a component entitled the "National Biodiversity Assessment (NBA): Marine Component" is underway independently of the BCLME. It is recommended that the standards, definitions and scales defined in this process be investigated for expansion in the BCLME. This is essential in order save a large amount of effort and in order to harmonize efforts.

5.4.3 It is recommended that effort be concentrated in Angola, then Namibia and then South Africa in that order – reflecting the degree of current and collated information and data that exists.

5.4.4   It is recommended that Museums (national custodians of these project outputs) should be brought into the projects.

5.4.5   A data policy and a data management plan must be implemented. This is that there are several parallel initiatives such as the OBIS programme that have similar and complimentary aims and thus they should have a role. Some intellectual property issues might be involved here.

5.4.6   In terms of project management, it was recommended that a project manager be appointed to co-ordinate the various activities and that a central technical pool as well as data management team be appointed (part-time or contracted via the projects).

6. Participants list

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7. List of Annexes

ANNEX A - *Presentation #1: Introduction and background to meeting (Dr. O'Toole, CTA, BCLME*
> *Programme)*

ANNEX B - *Presentation #2: BCLME BEHP Activity Centre and brief project overview (Ms. Maria de Lourdes Sardinha, BCLME, Angola)*

ANNEX C - *Presentation #3: Introduction to the BENEFIT Programme (Dr. N. Sweijd, BENEFIT)*

ANNEX D - *Presentation #4: Census of Marine Life [CoML] and Related Biodiversity Initiatives (Prof. C. Griffiths, UCT, RSA)*

ANNEX E - *Presentation #5: Assessment of Marine Data in Namibia with respect to GIS (Ms. V. de Cauwer, GreenMap)*

ANNEX F - *Presentation #6: Marine Biodiversity Information & Data in Namibia (Dr. L. Voges, MET/MFMR, Namibia*

ANNEX G - *Presentation #7: Marine Biodiversity Information & Data in Angola (Ms. C. Santos, ANU, Angola)*

ANNEX H - *Presentation #8: Conservation Planning In South Africa (Dr. M. Lombard, NCA, RSA)*

ANNEX I - *Presentation #9: Marine Biodiversity in Angola (Mr. N. Luyeye, IIM, Angola)*

ANNEX J - *Presentation #10: Census of the Diversity of Abyssal Marine Life (Dr. P.M. Arbizu, Univ of Oldenburg, Germany)*

ANNEX K - *Presentation #11: The Darwin Initiative (Prof. Mark Gibbons, UWC, RSA)*

ANNEX L - *Presentation #12: Offshore Assessment group (Facilitator-B. O'Connor)*

ANNEX M - *Presentation #13: Mapping Projects (Facilitator-V. de Cauwer)*

ANNEX N - *Presentation #14: Inshore Assessment/Estuaries Assessments (Facilitator-L. Voges)*

ANNEX N - *Presentation #15: Inshore Assessments/Estuaries (Facilitator-A. Cockroft)*

ANNEX O - *Presentation #16: Feedback on the Mother Project (Presenter: M. Lombard)*
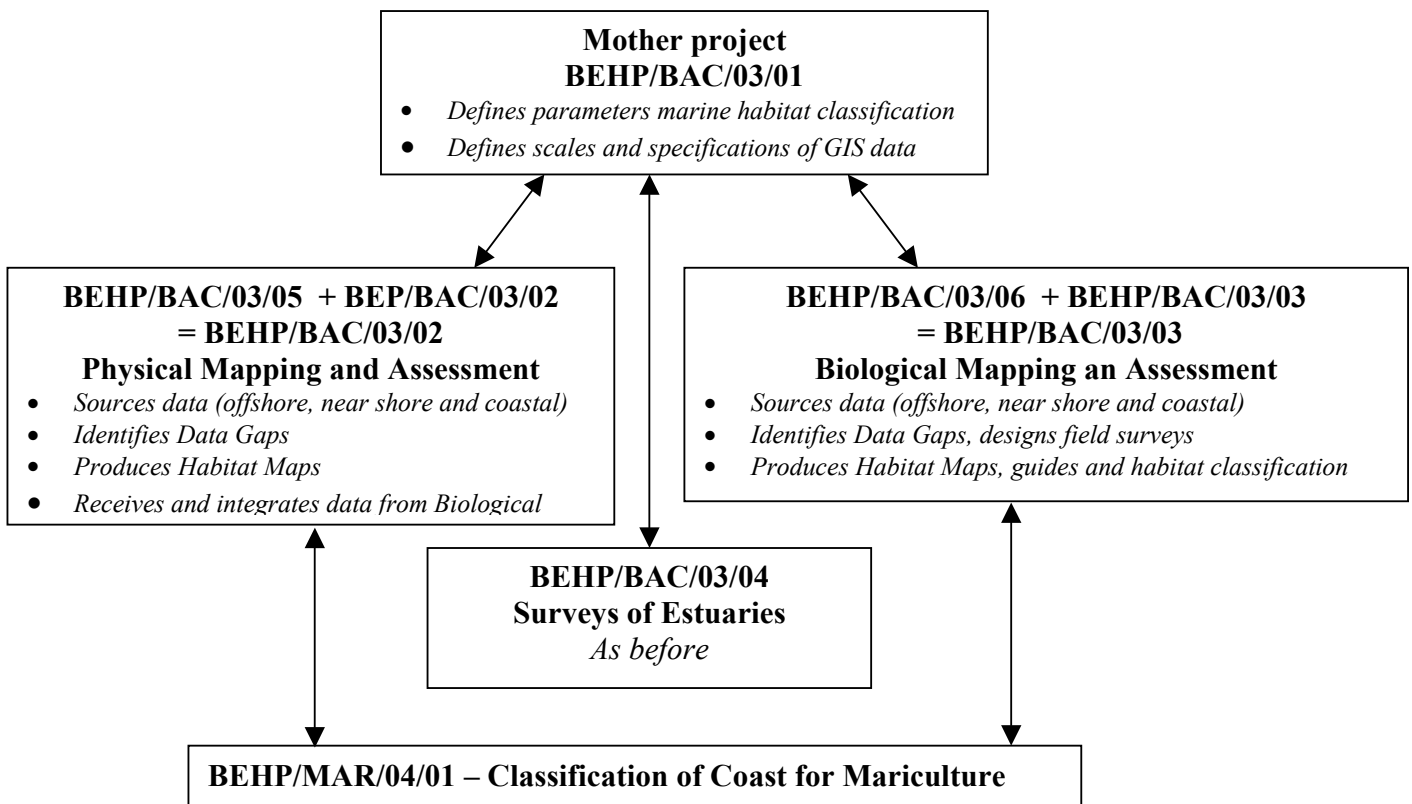
Section B: Post Workshop Recommended Amendments

The outcome of the workshop has, resulted in specific recommendations (among others) for the re-configuration of the set of projects in order to achieve a reasonable output for the BCLME within the budgetary and time constraints.

Following the workshop, some work was done to interpret the recommendations (SECTION A, 5) and incorporate these into a re-worked set of TORs for the suite of projects. This set of recommendations will be presented to the BCLME BEHP Activity Centre for a decision and then, if accepted, will be implemented.

The result effectively reduces the projects down from seven to four with an additional related component comprising one project (mariculture classification). Numbers (codes) have been adapted in order to avoid confusion. The mother project has been left in tact with clearer defined functions in terms of defining and prescribing data standards. The mapping and assessment projects have been consolidated respectively with the estuarine component left in tact. This is because of the very significant political and biological role that the estuaries in the BCLME play as well as the fact that there are ongoing GEF and other estuarine initiatives in the region, which could co-fund this project.

Conceptually these are as follows:

Mother project
BEHP/BAC/03/01

- *Defines parameters marine habitat classification*
- *Defines scales and specifications of GIS data*

BEHP/BAC/03/05 + BEP/BAC/03/02
= BEHP/BAC/03/02
Physical Mapping and Assessment

- *Sources data (offshore, near shore and coastal)*
- *Identifies Data Gaps*
- *Produces Habitat Maps*
- *Receives and integrates data from Biological*

BEHP/BAC/03/06 + BEHP/BAC/03/03
= BEHP/BAC/03/03
Biological Mapping an Assessment

- *Sources data (offshore, near shore and coastal)*
- *Identifies Data Gaps, designs field surveys*
- *Produces Habitat Maps, guides and habitat classification*

BEHP/BAC/03/04
Surveys of Estuaries
As before

BEHP/MAR/04/01 – Classification of Coast for Mariculture

1. Terms of Reference for Project 1:

Terms of Reference for: BCLME Project BEP/BAC/03/01 MARINE BIODIVERSITY STATUS ASSESSMENT AND CONSERVATION PLANNING FOR THE BENGUELA CURRENT

1.1 Background

Benguela Current Large Marine Ecosystem (BCLME Programme is a multi-sectoral regional initiative by Angola, Namibia and South Africa whose objective is to facilitate the integrated management, sustainable development and protection of this unique eastern boundary upwelling ecosystem. It is funded by the Global Environmental Facility (GEF) under its International Water portfolio and is implemented by the United Nations Development Programme (UNDP) with the United Nations Office for Project Services (UNOPS) as executing agency. The three member countries provide further financial and in-kind contributions.

The Benguela Current Ecosystem is a productive ecosystem that is bounded by warm water of tropical origin at both the northern and southern boundaries. A wide range of extractive activities occurs within the system, including fishing, mining, petroleum exploration and production. Water quality is compromised by coastal developments for industry, agriculture, tourism and urban development. The BCLME strategic plan requires, amongst others, the following outputs:
a) Undertake a regional assessment of status of most vulnerable species and habitats;
b) Collate baseline data across all marine habitats (estuaries, shoreline, shallow sub-tidal and offshore)
c) Develop a regional biodiversity conservation plan.
d) Design monitoring programme to update

1.2 Objectives

The objectives of the **Project BEP/BAC/03/01** are to produce a strategic planning tool to improve biodiversity conservation by providing advice on protection of sensitive areas and vulnerable species and appropriate marine protected areas of transboundary importance.

This study will integrate the results derived from the field habitat mapping and the biological surveys with a consideration of the threats and current impacts.

1.3 Scope of Project BEP/BAC/03/01

The contractor will be expected *inter alia* to undertake the following:

- Define the parameters and the definitions and scale of these parameters for a suite of ecological units (spatial and biological) to be utilized by this project and the suite of associated projects.
- Develop a biodiversity classification system which identifies biodiversity units: (habitats, biotopes, key focal species, spawning and nursery areas and important ecological processes)
- Incorporate data about: i. Habitat distribution and extent; ii. Species/biotope distribution and abundance; iii Charismatic or vulnerable species survey data; iv: Sensitive vulnerable habitat distribution and extent; v. Important processes, such as spawning, nursery and feeding grounds, Upwelling areas and area; vi. Suggest standardised data collection procedures suitable for incorporation in a GIS format and use with tools such as C-plan and COMPARE.
- Ensure that information on the spatial distribution of intertidal, shallow-water and offshore habitats, and historic, ongoing and planned habitat uses in the BCLME that will be collected by BEHP/BAC/03/02 are in the required format for input to the GIS model.
- Ensure that information on species, communities and biotopes of intertidal, shallow-water and offshore habitats in the BCLME that will be collected by BEHP/BAC/03/03 are in the required format for input to the GIS model.
- Ensure that information on species, communities and biotopes of estuarine habitats in the BCLME that will be collected by BEHP/BAC/03/04 are in the required format for input to the GIS model.
- Set conservation targets for the biodiversity units, (e.g. 10-40% of representative habitats as sanctuary areas)
- Identify the main threats to biodiversity, such as trawling bycatch, urban runoff, habitat disturbance, and incorporate into the GIS database.
- Develop a GIS-based planning tool collating information on the distribution of ALL intertidal, shallow-water, estuarine and offshore habitats, their species, communities and biotopes, and historic, ongoing and planned habitat uses in the BCLME

1.4 Outputs Required:
- A set of defined parameters for data collation and research (physical, biological and GIS), for ecosystem health.
- A set of common indicators of Ecosystem health
- A GIS-based assessment of biodiversity in the BCLME.
- Identification of sensitive areas and vulnerable species.
- Recommendations for Marine Protected Area network, including transboundary areas throughout the Benguela region.
- Identification of key threats to biodiversity, which will allow remedial management actions
- A conservation planning tool.

1.5 Timetable:

The project will start in November 2004 and completed not later than March 2007.

The interim deliverables include:

- Plan of GIS database, with a description of required inputs and their formats (after 6 months). This information will then be used by BEHP/BAC/03/02 and BEP/BAC/03/03 in the collation and collection of their information.
- Final instructions to BEP/BAC/03/02 and BEP/BAC/03/03 on where to focus their effort will be given after 6 months.
- Integration of data from BEP/BAC/03/02 and BEP/BAC/03/03 into the database starting in January 2006.
- *Interim progress report (after 6, 1 year and 18 months)*
- *Present Draft Report to BEHP (2 years)*
- *Review of Draft Report to BEHP*
- *Final Report and submission of paper (s) – March 2007.*

1.6 Capacity Building and Training

- Capacity building and training is a high priority in the BCLME Programme. Potential contractors tendering for this project should indicate how capacity building and training will be addressed.

2. Terms of Reference for project 2:

Terms of Reference for: BCLME Project BEP/BAC/03/02. IDENTIFICATION & COLLATION OF RELEVANT PHYSICAL DATA AND MAPPING OF THE BCLME SHORELINE, SHALLOW WATER, ESTUARINE AND OFFSHORE HABITATS AND BIOTA.

2.1 Background

The BCLME region spans four marine biogeographic provinces: cold-temperate, warm-temperate, subtropical, and tropical. It supports an inherently diverse marine biota, which is further increased by the wide array of habitats that can be found within its boundaries. This biodiversity (species, communities, habitats and ecosystems) affords a number of valuable services to humankind, including the provision of food and potential biomedical resources. The coastal marine environment also provides recreational and economic opportunities. Although the habitats of intertidal, shallow water and estuarine marine environments tend to support a greater biotic diversity than regions further offshore, these same environments are under greatest threat from humankind, owing to their accessibility. These threats include uncontrolled recreation, resource extraction (living and non-living resources), development and pollution.

The offshore continental shelf of the BCLME region is under severe threat from fishing, and mineral and petroleum exploration, mining and extraction. It is important for us to identify habitats that are of significance from a biodiversity point of view (such as fish spawning and nursery areas, as well as the areas associated with vulnerable endemic species), in order to ensure that the activities of mining, fishing and petroleum operations do not impinge on these habitats, and that offshore marine protected areas are developed in a regional context. Such planning decisions can only happen if we have the necessary tools on which to base them, and this project provides one way in which these data can be obtained

Any attempt to manage marine biodiversity in a sustainable manner requires good, standardized, baseline information across the BCLME region. The first step in the compilation of any such data needs to be an assessment of the distribution of habitats across the region, against which measures of biotic diversity can be matched. In this way, rare, endemic and vulnerable species, communities and biotopes can be recognised, and appropriate measures of protection can be implemented around them.

Unfortunately, our understanding of the habitat mix to be found along the length of the shoreline of the BCLME region is fragmented. Also, our understanding of the topography and habitat mix to be found across the length and width of the continental shelf in the BCLME region is fragmented. This is either due to the fact that much of the relevant data are "owned" by private (fishing, mineral or petroleum) companies, else they are locked away in obscure geological journals and unpublished fisheries reports. These diverse data need to be matched and collated, and placed into a GIS system that can be interrogated.

2.2 Objectives

The objective of the **Project BEHP/BAC/03/02** is to map the bottom topography and the distribution of offshore habitats in the BCLME region as well as the distribution of shoreline, shallow water and estuarine habitats in the BCLME region, and to provide an indication of general habitat health.

2.3 Scope of Project BEHP/BAC/03/02:

The contractor will be expected *inter alia* to undertake the following:
- Identify sources of possible data regarding offshore bottom topography and habitat distribution as well as existing data regarding shoreline, shallow water and estuarine habitat distribution
- Obtain data regarding bottom topography and habitat distribution from industry and management (oil, mining, fisheries)
- Synthesize existing data into format GIS required by BEP/BAC/03/01
- Define and indicate general status of habitat health for each record
- Identify aerial gaps in habitat coverage
- Design and execute appropriate surveys in order to fill in the data gaps (using a mix of remote methods and backed up by ground-truthing where necessary) and / or by using cruises of opportunity.
- Synthesise information on the spatial distribution of ongoing and planned (when knowable) habitat use (fishing and mariculture, mining, oil/gas exploration and extraction, storm-water drains, sewerage and industrial outfalls, harbours etc) in the BCLME

2.4 Outputs Required:
- Data output (defined by BEHP/BAC/03/01)
- Maps of offshore, shoreline, shallow subtidal and estuarine habitats in entire BCLME region, in GIS format required by BEHP/BAC/03/01, with an assessment of habitat health

2.5 Timetable

The project will start in September 2004and it will be completed not later than December 2005. The deliverables include:
- Interim progress report (Months 3 and 6)
- GIS database by March 2005
- Assessment of habitat health

2.6 Capacity Building and Training:

- Capacity building and training is a high priority in the BCLME Programme. Potential contractors tendering for this project should indicate how capacity building and training will be addressed.

2.7 Recommended Approach:

- Geographical / spatial approach with emphasis on Angola
- GIS approach bearing in mind data limitations.
- Broad consultation and where possible engage local officials in survey process.

3. Terms of Reference for project 3:

Terms of Reference for: BCLME Project BEHP/BAC/03/03 IDENTIFICATION OF COMMUNITIES, BIOTOPES AND SPECIES IN THE OFFSHORE AREAS AND ALONG THE SHORELINE AND IN THE SHALLOW SUBTIDAL AREAS IN BCLME REGION.

3.1 Background

Benguela Current Large Marine Ecosystem (BCLME Programme is a multi-sectoral regional initiative by Angola, Namibia and South Africa whose objective is to facilitate the integrated management, sustainable development and protection of this unique eastern boundary upwelling ecosystem. It is funded by the Global Environmental Facility (GEF) under its International Water portfolio and is implemented by the United Nations Development Programme (UNDP) with the United Nations Office for Project Services (UNOPS) as executing agency. The three member countries provide further financial and in-kind contributions.

The BCLME region spans four marine biogeographic provinces: cold-temperate, warm-temperate, subtropical, and tropical. It supports an inherently diverse marine biota, which is further increased by the wide array of habitats that can be found within its boundaries. This biodiversity (species, communities, habitats and ecosystems) affords a number of valuable services to humankind, including the provision of food and potential biomedical resources. The coastal marine environment also provides recreational and economic opportunities. Although intertidal and shallow water marine environments tend to support a greater biotic diversity than regions further offshore, these same environments are under greatest threat from humankind, owing to their accessibility. These threats include uncontrolled recreation, resource extraction (living and non-living resources), development and pollution. Whilst the tropical bioegographic province may be restricted to Angola, the others span national boundaries, and there is therefore an inter-play between the biota of nation states.

The offshore area of the BCLME is subject to resource extraction: beit of sustainable, living resources or fisheries (at various scales of intensity), as well as non-living resources such as oil, gas and minerals. Because this part of the BCLME contributes significantly to the GDP of both Namibia and Angola, and to a lesser extent to that of South Africa as well, the potential for conflict between the biotic needs of the environment (including biodiversity) and national economies is high. Clearly, the offshore areas of the BCLME are far more dynamic than those closer inshore, and the processes and biota can be truly considered as transboundary – so what happens to (e.g.) a habitat within the boundaries of one member state has the potential to influence the

resources within another. It should also be realized that the offshore areas of the BCLME are also utilized by global populations of highly migratory species (including mammals and birds), and that the region therefore has a global responsibility to manage these whilst present within our boundaries. The offshore region of the BCLME is here defined as extending from the subtidal (~30 m depth) to the edge of the EEZ. It is under the influence of the Benguela Current, the Angola Current and the Guinea Current. These waters have different physical characteristics and support ecosystems that function in inherently different ways, and which support different biological assemblages and communities. The diversity of offshore waters (both benthic and pelagic) is likely to be high, and will be influenced, at the local scale, by the underlying topography, which in turn reflects the mix of benthic (or demersal) habitats.

Any attempt to manage offshore and biodiversity in a sustainable manner requires good, standardized, baseline information across the BCLME region. This information will ensure that rare, endemic and vulnerable species, communities and biotopes can be recognised, and appropriate measures of protection can be implemented around them. Such information will also allow the identification of opportunities that might arise through the discovery of new resources

While our knowledge and understanding of the species, communities and biotopes in the offshore areas of the BCLME may be better than that of nearshore environments (intertidal and shallow subtidal areas), in both cases it is not consistent, and this precludes any attempt at regional management of biodiversity. Of critical importance is the fact that an undetermined amount of data and information pertaining to the coastal and offshore biodiversity of the BCLME region is either already published and accessible or likely to be residing in various locations both within the region and in foreign databases and libraries, particularly in the case of Angola. The task that is proposed here aims to redress this imbalance in knowledge, to identify and seek existing and historical data, collate this information for GIS mapping, provide information on the distribution of species, communities and biotopes within the intertidal and shallow subtidal region of the BCLME and identify and design specific field surveys to address data gaps.

3.2 Objectives

The general objective of the Project **BEHP/BAC/03/03** is to re-assess the distribution of communities, biotopes and species in the offshore, intertidal and shallow subtidal areas of the BCLME.

3.3 Scope of Project BEHP/BAC/03/03

The contractor will be expected *inter alia* to undertake the following:
- Identify sources of and synthesise existing data on the species, communities and biotopes in the offshore, intertidal and shallow subtidal areas of the BCLME region.

- Prepare these data in such as way that they can be utlized for GIS mapping by the compenent project: BEHP/BAC/03/08a.
- Identify gaps in the existing data and design and execute appropriate quantitative field surveys of selected intertidal and shallow subtidal habitats in the BCLME region (based on the output of BEHP/BAC/03/01) in order to identify species, communities and biotopes present.

3.4 Outputs Required:
- Data on species, communities and biotopes of intertidal and shallow subtidal region of the BCLME in format required by BEHP/BAC/03/01and BEHP/BAC/03/02.
- The establishment of a biological database in collaboration with the OBIS programme co-ordinated by the CoML programme's Africa Branch.
- The compilation and subsequent centralization of guides, keys and other taxonomic literature used in the identification of offshore species.

3.5 Timetable:

The project will start in March 2005 and completed not later than December 2006.

4. Terms of Reference for Project 4

Terms of Reference for: BCLME Project BEHP/BAC/03/04 BASELINE SURVEYING OF SPECIES AND BIODIVERSITY IN ESTUARIES HABITATS

4.1 Background

Benguela Current Large Marine Ecosystem (BCLME Programme is a multi-sectoral regional initiative by Angola, Namibia and South Africa whose objective is to facilitate the integrated management, sustainable development and protection of this unique eastern boundary upwelling ecosystem. It is funded by the Global Environmental Facility (GEF) under its International Water portfolio and is implemented by the United Nations Development Programme (UNDP) with the United Nations Office for Project Services (UNOPS) as executing agency. The three member countries provide further financial and in-kind contributions.

Estuaries are inherently productive ecosystems. They not only support unique endemic biological communities, but they also act as vital refuges for large numbers of migratory birds and they provide nursery areas for many marine fishes. But estuaries are not only sites of great biological value, they also provide opportunities for regional empowerment, through activities such as tourism and mariculture. By virtue of their productivity, accessibility and position, estuarine environments are under particular threat within the BCLME (and elsewhere) from urban development and pollution, and (living and non-living) resource extraction. Although this is especially true in Angola, where pressure on the coastal environment is high, the alteration of river catchments (agriculture, impoundments and urban development) in South Africa and Namibia threatens the continued integrity of estuaries there too.

Given the enormous transboundary value of estuaries and their associated floodplains, saltmarshes and mangroves – it is critical that any attempt to manage coastal biodiversity in a sustainable manner requires good, standardized, baseline information across the BCLME region. In this way, rare, endemic and vulnerable species, communities and biotopes can be recognised, and appropriate measures of protection can be implemented around them. Such information will also allow the identification of opportunities that might arise through the discovery of new resources.

Unfortunately, our understanding and knowledge of the species, communities and biotopes in the estuarine areas of the BCLME is not consistent, and this precludes any attempt at regional management of biodiversity. The task that is proposed here aims to redress this imbalance in knowledge, and to provide information on the distribution or species, communities and biotopes within the estuaries of the BCLME.

4.2 Objectives

The general objective of the Project **BEHP/BAC/03/04** is to assess the biodiversity in estuarine areas along the coastline of BCLME countries.

4.3 Scope of Project BEHP/BAC/03/04:

The contractor will be expected *inter alia* to undertake the following:
- Identify and synthesise existing data on the species, communities and biotopes in the estuarine areas (including associated floodplains, saltmarshes and mangroves) of the BCLME region
- On the advise of BEHP/BAC/03/01, conduct quantitative field surveys of selected estuarine with emphasis on Angola, (including associated floodplains, saltmarshes and mangroves) habitats in the BCLME region, identifying species, communities and biotopes present.

4.4 Outputs Required:

- Data on species, communities and biotopes of estuarine areas (including associated floodplains, saltmarshes and mangroves) in the BCLME in format required by BEHP/BAC/03/01
- The establishment of a reference collection of species recovered during surveys, for deposition in relevant, national museums.
- The compilation and subsequent centralization of guides, keys and other taxonomic literature used in the identification of species recovered during surveys

4.5 Timetable:

The project will start in January 2005 and completed not later than June 2006.

4.6 Capacity Building and Training:

- Capacity building and training is a high priority in the BCLME Programme. Potential contractors tendering for this project should indicate how capacity building and training will be addressed.

5. Terms of Reference for: BCLME Project BEHP/MAR/04/01
Classification of Coastline for Aquaculture Development

5.1 Background

Benguela Current Large Marine Ecosystem (BCLME Programme is a multi-sectoral regional initiative by Angola, Namibia and South Africa whose objective is to facilitate the integrated management, sustainable development and protection of this unique eastern boundary upwelling ecosystem. It is funded by the Global Environmental Facility (GEF) under its International Water portfolio and is implemented by the United Nations Development Programme (UNDP) with the United Nations Office for Project Services (UNOPS) as executing agency. The three member countries provide further financial and in-kind contributions.

SADC Protocol on Fisheries calls for States to promote private sector participation in aquaculture through access arrangements to designated areas and provide or facilitate the necessary support services. Considerable pressure on limited coastal space resources has resulted in competition between various activities, which may be in mutual conflict. Aquaculture is one of the activities that has evoked extensive debate pertaining to the location of facilities on the coast. Several legal conflicts between competing users have resulted, causing delays in development and consuming substantial resources in attempt to resolve issues that might not have arisen, had local authorities the information and tools with which to plan appropriately. Conflicts are not limited to competing development approaches and incompatible coastal zone activities, but also result conservation concerns relating to the proximity of aquaculture facilities to sensitive areas and marine protected areas (and sometimes within them).

Along the southern African coast (in the BCLME domain), suitable locations for aquaculture, in terms of many criteria, are relatively limited. One pro-active approach to dealing with this challenge is to identify locations along the coast that might serve as aquaculture development nodes. Such nodes could serve not only to improve the efficiency of Integrated Coastal Zone Management (ICZM) and planning (zoning), but also could help facilitate appropriate government entities engagement with the development and promotion of the aquaculture industry. The identification of such nodes could also assist the development of aquaculture proposals and applications from investors by pre-determining not only where aquaculture applications would be precluded/encouraged but also which species (groups) might be considered appropriate or unsuitable in the various zones in the region.

5.2 Objectives

The specific objectives of project BEHP/MAR/04/01 are to classify the whole BCLME coastline for aquaculture development through identification of potential aquaculture sites/nodes, by developing a ranking system of suitability for aquaculture and by providing information to governments and aquaculture investors.

5.3 Scope of Project LMR/MC/03/02:

The contractor will be expected *inter alia* to undertake the following:
- Analysis of the BCLME coastline in order to identify potential suitable aquaculture localities.
- Identify possible aquaculture nodes (in consultation with project BEHP/BAC/03/01 and BEHP/BAC/03/02).
- Identify existing infrastructure.
- Incorporate data into classification pertaining to infrastructure, labour sources, socio-economic considerations and ambient/seasonal environmental parameters (such as wind, air temperature, seawater temperature, salinity and others).
- Produce a resource or database, publicly accessible and continuously updated would serve well all parties involved in the regulation and promotion of aquaculture in the BCLME.
- Prepare GIS maps for input into projects BEHP/BAC/03/01 and BEHP/BAC/03/02.

5.4 Outputs Required:

- Report that identifies the proposed aquaculture zones and contains all the associated relevant biological, physical and socio-economic data.
- Publicly accessible geographical database, including information in BCLME website.
- Guide for BCLME coastal zone managers.
- Guide to potential commercial aquaculture applicants.
- Information seminars conducted in ea.ch country.
- Make available information to potential practitioners and investors.

5.5 Timetable:

- The project will start in January 2005 and completed not later than December 2006. The deliverables include:
- GIS database by June 2006
- Guide for managers and investors by September 2006
- Final report including salient points of the above by September 2006

5.6 Capacity Building and Training:

- Capacity building and training is a high priority in the BCLME Programme. Potential contractors tendering for this project should indicate how capacity building and training will be addressed.

5.7 Criteria for Participation:

Potential contractors would be expected to include nationals of the BCLME countries. Demonstrable capacity:
- To undertake the work and project management, *inter alia*
- Track record in GIS applications

- A team to include, among others, an expert in aquaculture and coastal zone development

5.7 Recommended Approach:

- Geographical / spatial approach with emphasis on Angola
- GIS approach bearing in mind data limitations
- Broad consultation and where possible engage local officials in survey process.
- A team approach is encouraged.

5.8 Additional Requirements:

Liaison with relevant Ministries and governments' departments (eg., Environment, Surveyor General).