COURSE REPORT
Training Workshop on Environmental Impact Assessment for Coastal and Marine Areas

20-23 January 2008
Dubai, UAE

Special Report 2.1- 3
UNU-INWEH
March 2008
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I. INTRODUCTION

Rationale of the course

UNU’s International Network on Water, Environment and Health (UNU-INWEH), with support from the United Nations Environment Programme (UNEP) and Zayed University, held a training workshop on Environmental Impact Assessment for Coastal and Marine Areas from 20-23 January 2008 at Zayed University in Dubai, United Arab Emirates. This training workshop was a capacity development effort offered as part of the UNU-INWEH project: "Strategic Management of Marine Ecosystems in Nakheel Projects" which aims to ensure long-term sustainability of off-shore coastal developments through a focused research and monitoring program.

This training workshop is part of an on-going effort to build the capacity for coastal marine environmental management in the Persian Gulf region, and was aimed at the larger community of coastal-zone practitioners (scientists, NGOs and government policy makers) in that region. The theme selected for this first training workshop, Environmental Impact Assessment (EIA), was based on specific needs identified in this region where coastal development is taking place on a large scale and at a fast pace. Ambitious and complex coastal development projects in several countries of this region entail major land reclamation, transformations of the shape and length of the coast, and potentially major impacts on the water movement patterns in the coastal areas. This approach to off-shore developments is relatively new and creates novel ecosystems whose structure and dynamics are not yet predictable. To understand these systems and respond adequately as they change in response to outside stressors presents a management challenge.

Major construction projects around the world are usually subject to approvals processes that require, among other things, completion of an Environmental Impact Assessment (EIA). Policy on EIA varies substantially among jurisdictions, and in many places, practice does not always live up to legislated policy. The development of effective and appropriate methodologies for conducting EIAs is, therefore, an important topic for consideration, particularly given the special factors that apply when construction is coastal or offshore. It is important to ensure that the assessments are conducted on a timely basis, based on solid science and related to contemporary management approaches. This workshop was a direct effort to address this regional need.

Objectives of the course

The training workshop aimed at providing a solid introduction to the role of EIA in relation to environmental management for sustainable development, and to effective processes and good practices in its application. In that context, the workshop discussed the legal and institutional arrangements and capabilities that need to be in place for ensuring the quality of EIA is acceptable, and considered how the findings from the EIA process are integrated into project planning and decision-making. The training workshop further aimed at providing specific examples of EIA application in marine and coastal environments and for near- and off shore coastal developments.
II. TRAINER AND PARTICIPANTS

About the Principle Trainer

Professor Barry Sadler has over 35 years of experience with EIA, beginning in the early 1970s when the process was first being implemented. He is the author or co-author of more than 200 publications on EIA, resource management and sustainable development. He was the project leader and co-editor of the UNEP EIA Training Resources Manual (see below) and also cooperated with UNU Online Learning as the subject matter expert for the interactive multimedia and video version, which is available as a distance education tool.

Selection of Participants

For this training workshop, two representatives from each of the States bordering the Persian Gulf were invited: Kingdom of Bahrain, State of Kuwait, Qatar, Islamic Republic of Iran, Republic of Iraq, The Sultanate of Oman, Kingdom of Saudi Arabia, United Arab Emirates. From the UAE, 1-2 representatives were invited from each of six emirates; Abu Dhabi, Dubai, Sharjah, Fujairah, Umm Al Quwain, Ras Al Khaimah.

The representatives from Bahrain, Iraq and Kuwait were unable to attend the training workshop for different reasons. However Iraq was represented by one participant who is originally from Iraq but currently studying in the UAE.

The participants included officials and administrators handling EIA, coastal planners, consultants, academicians, and other experts. As the training workshop was broad in scope and provided an introduction to the EIA process and its application, it did not require the participants to have extensive prior knowledge of and exposure to EIA, however it did set a minimum requirement for the participants to have had a some basic experience with EIAs in the region and with coastal environmental management in the broader sense.

The final selection of participants was done in partnership with UNEP ROWA and Nakheel based on their knowledge of suitable candidates.

III. TRAINING COURSE ACTIVITIES

Structure of the course

This training workshop followed the general structure of the UNEP Environmental Impact Assessment Training Resource Manual, Second Edition – Section E - training topics. However the structure was adapted to suit the needs of the project and the participant needs as identified during the pre-course needs analysis. Specific sections were added to focus on marine and coastal topics as they relate to EIA, and to near- and off shore coastal developments in particular. As far as possible examples and methods of EIA application from coastal marine projects in
Dubai and the Gulf Region were used. Some international best practices and case studies were also presented.

The UNEP EIA Training Resource Manual is a tool for trainers who have some basic background experience and understanding of EIA. It is designed to assist them in preparing and delivering training courses that provide an understanding of, and basic capability in the application of EIA. For more information on the UNEP EIA manual please go to: http://www.unep.ch/etb/publications/EIAMan2edition.php

Furthermore, the United Nations University, RMIT (Royal Melbourne Institute of Technology), and the United Nations Environment Programme (UNEP) jointly converted the UNEP EIA manual into an open educational resource at: http://eia.unu.edu/

Group exercises were an integral part of the training, and aimed at getting the participants to apply the different processes of EIA to a hypothetical case study. These interactive exercises provided useful information regarding the differences in EIA processes and application amongst the countries in the region, as well as specific problems with EIAs in the region.

A field trip was organized to Palm Jumeirah on the second day of the training course. This aimed at providing the participants with a real-time example of the scale and complexity of a major near-shore coastal development and an opportunity to discuss different aspects of EIA as it relates to such coastal developments.

Course handouts

The course handouts comprised a hard copy of certain relevant parts of the UNEP EIA manual as described above as well as a cd-rom containing the entire manual electronically. Other handouts included copies of the final programme, the hypothetical case study and some guidelines for group exercises. A cd-rom containing the final report as well as all the PowerPoint presentations used during the training workshop, was sent to all participants shortly after the training workshop.
IV. PROCEEDINGS OF THE COURSE

The final programme of the training workshop is given in Annex 1, the hypothetical case study used for the exercises during this training workshop is given in Annex 3, and the powerpoint presentations are given in Annex 5.

The following section provides a summary of the proceedings of the training workshop.

DAY 1 - Sunday 20 January 2008

Opening and Introduction of participants

The training workshop commenced at 9.00 am on Sunday 20 January 2008. An opening speech was given by Habib El Habr, the Director of UNEP ROWA (Annex 2) followed by a welcome and course orientation by Hanneke Van Lavieren, UNU-INWEH (Presentation 1; Annex 5).

The opening was followed by a presentation of the outcome of the pre-course needs assessment by Hanneke Van Lavieren, UNU-INWEH (Presentation 2; Annex 5). The participants were then asked to introduce themselves, as well as indicate their experience and backgrounds with regard to EIA.

A. Introduction to EIA

EIA and the UAE Barry Sadler

This session focused on identifying to what extent concepts and trends apply to EIA practice in UAE. A good discussion followed concerning specific EIA issues in the UAE, differences in requirements in each of the Emirates, the pace at which EIAs are expected to be done and the fact that economic incentives often win over environmental ones. Some screening and scoping issues were discussed, as well as the fact that baseline studies are often done too late, and the fact that the role of different authorities involved in EIA in the region varied per country, and even for each Emirate.
Types and scales of environmental impact, with particular reference to the coastal and marine zone Barry Sadler

Different aspects of impacts were presented:

- Type and nature
- Uncertainty
- Extent
- Timing
- Magnitude
- Reversibility
- Significance
- Duration

Specific examples of the types (acute and chronic) and scales of impacts in the marine environment were presented (Presentation 3; Annex 5). David Feary

Discussion of regional and local environmental impacts and identification of priority issues Barry Sadler

The participants were asked to identify regional and local impacts and priority issues – these are summarized in table 1.

Table 1. Regional and local environmental priority issues.

<table>
<thead>
<tr>
<th>Activity</th>
<th>Effects</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land reclamation</td>
<td>Sedimentation</td>
<td>Habitat loss, coastal hydrodynamics</td>
</tr>
<tr>
<td>Desalination</td>
<td>Brine, discharge</td>
<td>Coral damage</td>
</tr>
<tr>
<td>Shipping discharge</td>
<td>Ballast Water</td>
<td>Exotics Introduction</td>
</tr>
<tr>
<td>Heavy Industry (steel)</td>
<td>Cooling water, discharge of high temp water</td>
<td>Habitat and organism damage</td>
</tr>
<tr>
<td>Power generation</td>
<td>Use of water, water discharge</td>
<td>Water temperature, on habitat degradation, water pollution</td>
</tr>
<tr>
<td>Land based</td>
<td>Nutrients, pollutants, sediments</td>
<td>Habitat damage and human health</td>
</tr>
<tr>
<td>Dredging</td>
<td>sedimentation</td>
<td>Human health issues, habitat loss, mangrove loss</td>
</tr>
<tr>
<td>Oil</td>
<td>spills</td>
<td>Habitat and organism damage and loss</td>
</tr>
<tr>
<td>Fishing</td>
<td>Unsustainable fishing</td>
<td>Loss of fish populations</td>
</tr>
<tr>
<td>Shark fin export</td>
<td></td>
<td>Depletion sharks</td>
</tr>
<tr>
<td>Tourism</td>
<td>infrastructure</td>
<td>various</td>
</tr>
<tr>
<td>Population increase</td>
<td>Pressure on resources, habitat</td>
<td>various</td>
</tr>
</tbody>
</table>
EIA legal and institutional frameworks and arrangements – procedural good practice

*Barry Sadler*

This session presented EIA legislation and aspects such as clear statement of purpose of EIAs, mandatory compliance and enforcement, prescribed process of steps, public consultation and linkage with decision-making.

Local EIA requirements – overview and comparison of their application

*Jackie Daair*

The institutional and legal structure and requirements for EIA in the UAE were presented (Presentation 4; Annex 5). A discussion followed on EIA provision and implementation of the region.

The EIA process from start up to completion

*Barry Sadler*

An overview was given of the entire EIA process: screening, scoping, impact analysis, mitigation Reporting, review, decision-making, follow up, public involvement. This was followed by a discussion on the elements of this general approach that are in place or used in the region.

Screening and scoping – the preliminary phase of assessment – application to coastal and marine ecosystems in Gulf region

*Barry Sadler*

This session focused on the needs for and application of the screening and scoping process of EIA, who should be involved in these steps and the needs to identify priorities and consider alternatives. A specific presentation on the use of screening and scoping on coastal and marine projects in the gulf region was given (Presentation 5; Annex 5). *Andrew Bauman and David Feary*

A proposal for a hypothetical near-shore coastal project: *Project Olympia* was presented to the participants for use during the groups exercises (Presentation 6; Annex 5). *Hanneke Van Lavieren*
DAY 2 - Tuesday 22 January 2008

B. EIA methods and tools

Baseline studies – local and international case examples of their use for marine-based project Barry Sadler

A presentation on the use and importance of EIAs, baseline data and environmental monitoring programmes was presented using an example of a coastal development on the east coast of Australia (Presentation 7; Annex 5). David Feary

This presentation was followed by a presentation on an environmental baseline study in the Northern Persian Gulf with a case study from Iran (Presentation 8; Annex 5). Peyman Eghtesadi

Impact analysis – identification, prediction and evaluation steps and methods Barry Sadler

The different aspects of the impact analysis process in EIA were presented. This session highlighted:
- the different categories of impacts (environmental, social, health and economic);
- impact characteristics;
- assessing impact significance;
- significance criteria and environmental standards;
- methods for impact prediction.

A presentation was given on the process of impact analysis – methodologies for assessing coastal and marine environments (Presentation 9; Annex 5). Andrew Bauman

Mitigation and impact management Barry Sadler

This session presented the purpose of and frameworks for mitigation and impact management in EIAs. It highlighted the principles of mitigation including i) enhancing environmental and social benefits of projects, ii) avoidance, minimization, and remediation of, and compensation for adverse effects, and iii) ensuring that residual impacts are within “acceptable” levels.

Field Trip

In the afternoon the participants went on a field visit to Palm Jumeriah. A tour of the development was made on board a boat. This provided the participants with a real-time example of the scale and complexity of a major near-shore coastal development as well as an opportunity to discuss the different issues associated with such structures: pre-, during- and post-construction impacts, monitoring and management needs etc. At the end of the field trip the UNU-INWEH team provided an overview of the monitoring programme to be set up at Palm Jumeirah, as well as the different ecological research studies planned in and around the development. The team explained why this information was needed and how this information could aid in identifying post-development impacts and understanding the dynamics and
ecological change of the structure. As well, they explained how it will provide input to develop the management plan for the development.

DAY 3 - Tuesday 22 January 2008

C. EIA, decision-making and project implementation

EIA report preparation Barry Sadler

This session discussed how to prepare a successful EIA report as well as the basic requirements and elements of such a report. It also presented some common shortcomings of EIA reports.

The main elements of an EIA report are:

- Summary
- Need and aims of the project
- Description of the proposal
- Description of affected environment and community
- Public consultations and views
- Main impacts and their mitigation
- Evaluation of significant residual impacts
- Environmental management plan
- Limitations, uncertainty and gaps in knowledge

A good report should also include:

- Comparative analysis
- Environmental monitoring plan and proposed mitigation measures
- Schedule for implementation
- Surveillance and monitoring of programmes
- Impact management strategy
- Reporting, audit and review procedure
- Any institutional and capacity building requirements
Review of EIA quality *Barry Sadler*

This session presented the different aspects of the review process of EIAs. It discussed aspects such as review procedures, the selection of reviewers, use of public input, review methods and EIA review criteria.

**EIA and decision-making** *Barry Sadler*

This session presented the different aspects of EIA decision-making. Amongst others, the need to balance economic, social and environmental factors while negotiating solutions, and how to weigh the benefits and costs of a project were explained. A discussion of regional experience with EIA decision-making followed.

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### DAY 4. Wednesday 23 January 2008

**D. EIA future directions**

**EIA as a means of assuring environmentally sustainable development; application to CZM** *Barry Sadler*

This session highlighted the use of EIA as a means to attain sustainable management and development of the environment and how this applies to coastal zone management.

**Integrated approaches to project appraisal and CZM – using Australian experience** *Peter Sale*

A presentation was given on an international example of an effective EIA process in Western Australia (Presentation 10; Annex 5).

A discussion followed on how this process could work in developing countries where many of the tools and processes which are available in richer countries, are not available. It was noted however that EIAs have been and still are being done badly in developed countries as well.

**Strategic environmental assessment (SEA)** *Barry Sadler*

In the final session of the training workshop, a short overview was given on what is understood under SEA: its objectives, principles, benefits and how it can be applied. The session explained that SEA will lead to more sustainable decision-making and is more effective in evaluating cumulative effects. The shortcomings of regular EIA for certain projects and locations where there is a need for a more strategic approach to management were discussed. This session also discussed the benefits of SEA including better integration of sectors, more transparency and more participation by stakeholders.

**V. GROUP EXCERCISES**

Five group exercises were an important part of the training workshop. The participants were split into 5 groups and were asked to conduct exercises on several specific aspects of an EIA process.
During these exercises the participants identified the following major problems with applying EIAs in this region:

- time constraints in deployment of mega projects;
- lack of communication and coordination between the different parties/stakeholders;
- lack of public consultations;
- changes in the design of the project (after EIA process has begun);
- lack of or insufficient legal and institutional arrangements to support EIAs;
- lack of social impact assessments;
- the fact that economic incentives often win over the environmental ones;
- lack of integrated management efforts (links to freshwater and terrestrial environments);
- lack of a regional focus for managing the coastal environment;
- lack of or delays in getting baseline data or information.

**Group exercise 1. Conducting scoping of a marine-based project using the hypothetical project.**

The groups were asked to conduct a scoping exercise on the hypothetical project (project Olympia) following the different guiding principles and steps in the scoping process.

**Group exercise 2. Selection and use of methods to analyze the hypothetical project.**

Based on the outcome of their scoping exercise, the groups were asked to conduct an impact analysis and identify the different impact-identification methods they wanted to use in the EIA.

**Group exercise 3. Preparation of EIA report with particular reference to an environmental management plan (EMP) for the hypothetical project.**

The groups were asked to use the outcomes of the previous exercises (scoping, impact analysis) and to prepare an EIA report according to guidelines for such reports as presented in the session at the beginning of the day.

**Group exercise 4. Role playing exercise – review of EIA/ EMP report for the hypothetical marine-based project**

The groups were assigned different roles to represent the actors in a public review of an EIA of Project Olympia. The purpose of this exercise was to subject the proposal to a public hearing
based on the information contained in the “EIA report” which was prepared in the earlier exercise.

Guidelines for role play:

Approach: Each of the existing groups was assigned one of the following roles:

- Hearing body or tribunal
- Developer or proponent of the project
- EIA consultants
- Government EIA review agency
- Coalition of NGO environmental groups
- Coalition of concerned community groups

Each group was asked to draw up its strategy for intervention, including documenting (bullet form) the key points to be made in the presentation to the public hearing.

Public hearing: Basic rules to be followed:

Each party made five minute presentations, followed by brief questions from the panel. This was followed by an open session for comments and questions from the floor. Each group was allowed one question to any other group to ask for clarification or explanation of its position. The Panel then retired for deliberation and issued its ruling.

Briefing for each group:

- All to review and remind themselves of the nature of the proposal and the discussion on the EIA in previous sessions
- Panel to be impartial, ensure fair procedure, ask critical questions without taking an adversarial position and make a reasoned judgment on the project application
- Developer to argue a reasoned case for acceptance of the proposal (i.e. accepting there will be some adverse and unavoidable impacts, making commitments to mitigation). Key strategy issue is how far to go in altering plans or adding mitigation measures
- EIA consultant to briefly discuss the main impacts, their likely significance and the mitigation measures recommended. Key strategy issue is how to present the fact there will be major impacts while not undermining the case for the proposal going forward
- Government review body to provide a brief but measured statement of whether the report is sufficient or deficient and to identify any findings with which it disagrees or requires further information or clarification. Key strategy issue is deciding what position it will take in its statement to the public hearing
- Coalition of NGO environmental groups to present its view of the environmental merits of the proposal essentially taking a dissenting position that may include support for other alternatives. Key strategy issue is deciding how to mount an effective argument against the proposal on sound environmental grounds
- Coalition of concerned community groups to present its concerns about the impact of the proposal on their lifestyles and livelihoods and to ensure that it secures as much benefit as possible in compensation and offsets from the proponent. Key strategy issue is how to best present their case at the hearing and gain guarantees from the proponent.

**Group exercise 5. Preparation of a strategy for strengthening and extending EIA in the region, including institutional and professional capacity building requirements**

The groups were asked to prepare a strategy (based on the principles of SEA and CZM as discussed in the morning of this day) for improving the quality and application of EIAs in the region and to identify specific capacity building and institutional requirements.
## ANNEXES

### ANNEX 1

**Final Programme**

<table>
<thead>
<tr>
<th>DAY 1</th>
<th>Sunday 20 January 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.00 a.m.</td>
<td>Registration</td>
</tr>
<tr>
<td>8.45 a.m.</td>
<td>Welcome and course orientation – relationship to UNU and UNEP programme</td>
</tr>
<tr>
<td>9.00 a.m.</td>
<td>Introduction of participants – experience and requirements</td>
</tr>
<tr>
<td>9.30 a.m.</td>
<td>Introduction to EIA – key concepts, process developments and relationships to project design and development</td>
</tr>
<tr>
<td>9.55 a.m.</td>
<td>Discussion – focus on extent to which EIA concepts and trends apply in UAE</td>
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<tr>
<td>10.15 a.m.</td>
<td>Types and scales of environmental impact, with particular reference to coastal and marine zone</td>
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<tr>
<td>10.35 a.m.</td>
<td>Discussion of regional and local impacts and identification of priority issues</td>
</tr>
<tr>
<td>10.50 a.m.</td>
<td>Coffee Break</td>
</tr>
<tr>
<td>11.10 a.m.</td>
<td>EIA legal and institutional frameworks and arrangements – procedural good practice</td>
</tr>
<tr>
<td>11.35 a.m.</td>
<td>Local EIA requirements – overview and comparison of their application</td>
</tr>
<tr>
<td>12.00 p.m.</td>
<td>Discussion – EIA provision and implementation of the region.</td>
</tr>
<tr>
<td>12.30 p.m.</td>
<td>Lunch Break</td>
</tr>
<tr>
<td>1.15 p.m.</td>
<td>The EIA process from start up to completion</td>
</tr>
<tr>
<td>1.45 p.m.</td>
<td>Discussion – what elements of approach are in place or used in the region?</td>
</tr>
<tr>
<td>2.00 p.m.</td>
<td>Screening and scoping – the preliminary phase of assessment – application to coastal and marine ecosystems in Gulf region</td>
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<tr>
<td>2.30 p.m.</td>
<td>Group exercise – conducting scoping a marine-based project using UNU hypothetical case</td>
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<tr>
<td>3.30 p.m.</td>
<td>Presentation and debrief</td>
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</table>
4.00 p.m.  Close

5.00 p.m.- 7.00 p.m.  Reception at Arabian Park Hotel

**DAY 2**  Monday 21 January 2008

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter(s)</th>
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<tbody>
<tr>
<td>8.30 a.m.</td>
<td>Introduction to Day 2 – EIA methods and tools</td>
<td>Barry Sadler, UNU panel</td>
</tr>
<tr>
<td>8.45 a.m.</td>
<td>Baseline studies – local and international case examples of their use for marine-based project EBS in Northern Persian Gulf - Case Study from Iran</td>
<td>Barry Sadler/ David Feary, Example Great barrier reef, Peyman Eghtesadi</td>
</tr>
<tr>
<td>9.15 a.m.</td>
<td>Impact analysis – identification, prediction and evaluation steps and methods</td>
<td>Barry Sadler, comment from Andrew Bauman on tools used for coastal ecosystems</td>
</tr>
<tr>
<td>9.45 a.m.</td>
<td>Group exercise – selection and use of methods to analyse the marine-based project using UNU hypothetical case</td>
<td>All participants, Barry Sadler/ UNU-Panel</td>
</tr>
<tr>
<td>10.30 a.m.</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>10.45 a.m.</td>
<td>Group exercise continued</td>
<td></td>
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<tr>
<td>11.30 a.m.</td>
<td>Presentation and debrief</td>
<td>All participants, UNU panel</td>
</tr>
<tr>
<td>12.00 a.m.</td>
<td>Mitigation and impact management</td>
<td>Barry Sadler</td>
</tr>
<tr>
<td>12.30 p.m.</td>
<td>Lunch Break/ Departure for field trip</td>
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<tr>
<td>12.30 p.m.- 4.00 p.m. approx</td>
<td>Field visit of a marine-based project</td>
<td>Led by UNU experts,</td>
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**DAY 3**  Tuesday 22 January 2008

<table>
<thead>
<tr>
<th>Time</th>
<th>Session</th>
<th>Presenter(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.30 a.m.</td>
<td>Introduction to Day 3 – EIA, decision-making and project implementation</td>
<td>Barry Sadler</td>
</tr>
<tr>
<td>08.45 a.m.</td>
<td>EIA report preparation</td>
<td>Barry Sadler</td>
</tr>
<tr>
<td>09.15 a.m.</td>
<td>Group exercise – preparation of EIA report with particular reference to an environmental management plan (EMP) for the marine-based project using UNU hypothetical case</td>
<td>All participants, Barry Sadler/ Andrew Bauman/David Feary</td>
</tr>
<tr>
<td>10.40 a.m.</td>
<td>Presentation and debrief</td>
<td>All participants, Barry Sadler/UNU panel</td>
</tr>
<tr>
<td>11.00 a.m.</td>
<td>Coffee Break</td>
<td></td>
</tr>
<tr>
<td>11.15 a.m.</td>
<td>Review of EIA quality</td>
<td>Barry Sadler</td>
</tr>
<tr>
<td>11.45 a.m.</td>
<td>EIA and decision-making</td>
<td>Barry Sadler</td>
</tr>
<tr>
<td>12.15 p.m.</td>
<td>Discussion of regional experience with EIA decision-</td>
<td></td>
</tr>
</tbody>
</table>
DAY 4  Wednesday 23 January 2008

8.30 a.m.  Introduction to Day 4 – EIA future directions  
Barry Sadler/ Peter Sale

8.45 a.m.  EIA as a means of assuring environmentally sustainable development; application to CZM  
Barry Sadler/ Peter Sale

9.15 a.m.  Integrated approaches to project appraisal and CZM – using Australian experience  
Barry Sadler/ Peter Sale

9.45 a.m.  Strategic environmental assessment (SEA)  
Barry Sadler

10.15 a.m. Group exercise – preparation of a strategy for strengthening and extending EIA in the region, including institutional and professional capacity building requirements  
All participants

10.30 a.m. Coffee Break

10.45 a.m. Group exercise

12.00 p.m. Presentation and debrief  
All participants, Barry Sadler/ Peter Sale

12.30 p.m. Workshop evaluation  
Hanneke van Lavieren

1.00 p.m. Close of Workshop and presentation of certificates  
Habib El Habr, Walid Saleh, Hanneke Van Lavieren
### ANNEX 2

**List of Participants**

<table>
<thead>
<tr>
<th>Name</th>
<th>Organisation</th>
<th>Title and Address</th>
<th>Country</th>
<th>Email</th>
</tr>
</thead>
</table>
| Abdulkader Mohammed Al-Sari| King Abdul Aziz City for Science and Technology, Natural Resources & Environment Research Institute | Manager, Environment Program at Natural Resources & Environment Research Institute  
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Planning an Environmental Impact Assessment for a Hypothetical New Development on the Dubai/Abu Dhabi border

(with apologies to those who plan and build such developments in the U.A.E.)

Overview
Project Olympia, in the form of the five Olympic Rings, at a scale that will be visible from the outer reaches of the solar system is a strictly hypothetical project that bears no relation to any project existing, planned, or to be planned in the future in Dubai or anywhere else in the region. It is hypothetical. It exists in our collective imaginations, in order to have a ‘real’ task – to plan for an environmental impact assessment for this project, and anticipate the issues/problems/aspects that need to be taken into account in that planning.

While Project Olympia is hypothetical, it exists in the real Gulf region, subject to the real climate and weather, and in an ocean containing the real fauna and flora of this part of the world. It is on a real stretch of coastline that is, in fact, more properly part of Abu Dhabi than Dubai – a real coastline with real ecosystems and real patterns of human use.

Our task is to develop a list of issues to be dealt with in the EIA process, in order to demonstrate that it has been planned to be environmentally sustainable. You will need to consider construction-phase impacts, and post-construction use-phase impacts on the environment. You will also need to consider other projects that may be in place or planned for the region. (If any of you know of a real project that will use the space set aside for Project Olympia, making Olympia impossible, we will have to declare those other projects to be hypothetically non-existent in order for the exercise to proceed.)

Background information
- In this part of the world there is a moderate (~1m) tide, and a moderate to light tidal current flowing from southwest to northeast along the shore. Major cyclonic storms are unknown or rare.
- The existing habitat at the site includes extensive seagrass beds, and some small patches of oyster reef and coral reef. Most of the area is an open, shallow sub-tidal, sandy plain occupied by numerous worms, molluscs and crustaceans that support extensive fish populations
- Existing developments to the northeast include Palm Jebel Ali, Jebel Ali Free Port, Palm Jumeirah
- A major DEWA electricity and desalination plant is planned for somewhere near Palm Jebel Ali
- There are extensive wetlands shoreward of Project Olympia, and a major power plant southwest of it
- Rumors exist of additional offshore developments in the vicinity.
- Project Olympia will be constructed with minimal dredging, instead using rock and soil transferred from inland sites and shaped to the desired form
- Seaward shores are armored using specially molded interlocking cement blocks engineered to withstand 100 year storms. These are installed one at a time by teams of divers that position each one as it is lowered (for our purposes, we will assume that the engineering has been sufficient to ensure that the structures can be built).
- The interconnected lagoons of Olympia have small bridged openings so it is possible to travel by catamaran ferry from one end to the other of this megacomplex. The lagoonal waters will be well-protected from waves, and an ideal location for canoe, kayak, Sea-doo (Personal Water Craft), small sail, water-skiing, kite-skiing, and other water sports.
- Major marinas are located in the outer southern and northern rings, with lift bridges providing access to the open ocean.
- The watersport complex (with two olympic pools, a wave pool for olympic surfing and parasailing, and dock facilities for rowing and sailing competitions) occupies the southern shoreward ring of the project.
- Landscaping includes extensive lawns and gardens at the edge of the lagoons; some public beaches are included in the overall design; water – as pools, streams, fountains, wave pools, and the lagoons themselves – is central to the landscape of Project Olympia.
- The 18 hole golf course located on the northern ring is designed by Jack Nicklaus and Greg Norman, and personally validated by Tiger Woods.
- Villas and Condominium towers will provide waterfront homes for 1,500,000 people; there are shopping and entertainment districts centrally located.
- The project is self-sustaining with its own electricity, desalination, cooling, and sewage treatment facilities.
- 1,000,000 cars are expected to travel to and from the mainland each day.

**Your task**

Working together in small groups, develop a list of issues that you suspect the proponents of Project Olympia will need to consider as they prepare their EIA documents. Once you have a list of issues, try to come up with some suggestions for the types of data that will be needed to provide baseline information, and follow-up information to ensure that the project is having no more than acceptable negative impacts environmentally.
Project Olympia

Visible not just from space, but from the planet Neptune
Dr Habib Elhabr, Director and Regional Representative. Dubai 20 January 2008

On behalf of the Executive Director of UNEP, Achim Steiner, it is my great pleasure to welcome you to the UNU-INWEH - UNEP Training workshop on Environmental Impact Assessment for Coastal marine Areas in the Emirate of Dubai.

I would like to take this opportunity to extend our gratitude to Zayed University for hosting our workshop this week. It is with great pleasure that I am seated at this table with the colleagues from our partner organizations in this important activity and I believe this event demonstrates the importance of developing and enhancing partnerships in our work in order to ensure we can deliver relevant, professional capacity building activities to our stakeholders for this continued collaboration, I, on behalf of UNEP, thank you.

Ladies and Gentlemen,

I would now like to focus on the subject of this week’s course, EIA. The role of EIA is becoming increasingly important. The rapid development being witnessed by the region, particularly in our coastal areas, has, if not adequately managed, the potential to cause widespread damage to both the coastal and marine environment, to the livelihoods of people relying on the natural resources they provide, and in the long term, affecting the ability of the environment to support the human population.

We, in UNEP, have long supported the formal use of Environmental Impact Assessment in all development projects, with a focus on the natural environment; the flora, fauna, water, soil and air, as well as social and economic impacts of development projects. We firmly stand by its three core values; integrity, ensuring the process conforms to agreed standards; utility; ensuring the process provides balanced, credible information for decision-making; and finally sustainability, the focus of the EIA on ensuring environmental safeguards. The recent advances available to scientists in terms of data gathering and analysis techniques, such as Remote Sensing and Geographic Information Systems, have only added to the value of EIA.

Each phase of the assessment process is extremely important, from the initial screening and scoping through impact analysis and identification of mitigation measures for identified impacts. Throughout all of these phases is the role of public participation, ensuring that the process is transparent and that all stakeholders are fully informed and have had the opportunity to air their views regarding the development activities taking place in their local area and the implications on their quality of life.
It is with this important aspect in mind, that we in UNEP’s Regional Office for West Asia have recently been given an opportunity, through funding from the United Nations Development Account, to implement a programme in the region to build capacity in EIA implementation and improve the role of public participation. This 2-year project will build on and implement the work being carried out here this week by UNU-INWEH. It will use the same training resource – the UNEP EIA Training Manual – to provide the training and will work with national governments, building internal capacity, as well as focusing on Civil Society Organizations as a key to public participation. We will be organizing national capacity building workshops with the relevant government agencies and also two sub-regional workshops with Civil Society Organizations, where we will focus on how to review an EIA, how to develop scientifically credible comment and observations on the EIA reports and also how to present them in an effective manner. We have, just last week, held a start up meeting with our national focal points and Civil Society organizations from across the region to elaborate the mechanism of implementation and will be conducting various workshops across the region from June this year. It is an exciting project and has been well received by the participants meeting last week.

Ladies and Gentlemen,

Over the next five days your focus will be on the tools and techniques of using EIA. This should be a valuable experience for all of you working in the environmental protection and development arena. The trainers you will be hearing from during this time are experts in this field and I urge you to make use of their valuable expertise for any additional comments and clarifications you may have.

I would finally like to thank the speakers and all those who contributed in the preparation of this event and the United Arab Emirates for their kind hospitality, and I wish you all every success as well as an enjoyable stay in this vibrant city.

Thank you.
ANNEX 5
Power Point Presentations
Presentation 1

Training Workshop on Environmental Impact Assessment for Coastal and Marine Areas

20-23 January 2008
Zayed University Lecture Hall 1
Dubai, UAE

With kind support by Nakheel PJSC

Objectives

To provide a solid introduction to the role of EIA in relation to environmental management and what is understood internationally to be an effective process and good practice in its application

To identify the legal and institutional arrangements and capabilities that need to be in place for ensuring the quality of EIA is acceptable and the findings are integrated into project planning and decision-making

How does this training relate to the United Nations University International Network on Water, Environment & Health

UNU-INWEH based in Canada is a member of the United Nations University family of organizations and aims to strengthen water management capacity, particularly of developing countries

Two core functions: Capacity development & Policy-science bridging

In Dec 2006 UNU-INWEH commenced a project titled: Strategic Management of Marine Ecosystems in Nakheel Projects

Project Objectives

- Build an effective, sustainable, environmental monitoring program
- Research ecological responses
- Use research results & monitoring data to develop a model of water quality
- Integrate data into marine management plan
- Disseminate knowledge and share experiences at local, regional & global levels
- Use the project for building capacity in the region
- To have benefits beyond management of Nakheel projects - for the UAE and the wider region

Project components

Monitoring
Research
Information Dissemination
Capacity Building
- Annual Training Workshops: aimed at larger community of marine environmental managers in region
- Theme varies and according to need
- Focus on techniques and approaches for sustainable coastal marine management

Rationale for choosing EIA as subject

- Coastal development taking place at rapid pace in Dubai (and wider region)
- Scale and complexity of these developments
- The creation of new and complex ecosystems
- Lack of understanding of effects of these developments
- Lack of capacity in region to monitor and manage these new developments
- Quality and incorrect use and application of EIAs
## Day 1

**AM**
- Introduction to EIA
- Types and scales of Environmental Impact
- Regional and local priority issues
- EIA legal and institutional frameworks
- Local EIA requirements

**PM**
- EIA implementation
- EIA process
- Screening and Scoping (group exercise)

## Day 2

**AM**
- EIA methods and tools
- Baseline studies and EBS in Persian gulf
- Impact Analysis (group exercise)
- Mitigation and impact assessment

**PM**
- Field visit

## Day 3

**AM**
- EIA decision making and project implementation
- EIA report preparation (group exercise)
- Review of EIA quality
- EIA and decision-making

**PM**
- Review EIA an EMP report role play exercise

## Day 4

**AM**
- EIA Future directions
- EIA and sustainable development, and Coastal zone management
- Integrated approaches to project appraisal & CZM - Australian experience
- Strategic Environmental Assessment

**PM**
- Evaluation
- 13 pm closure of workshop

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**Reception**

At 17.30 – 20 pm
at the Arabian Park Hotel pool area

**Welcome!**
Needs Assessment Summary

Outcome participant
pre-course questionnaire

(14 responses)

Respondents work at:
- Universities (professors and students)
- Ministries of Environment and planning
- National oceanography/marine centres
- Environment & Development Dep. at Municipalities
- Consultant Agencies
- Regional Organizations (coastal/marine)
- Environmental NGOs

1. Undertaking screening or providing advice/input
   never - nearly always – 40% often
2. Identification of key stakeholders
   never - nearly always – 50 % sometimes
3. Setting overall terms of reference for EIA
   never – nearly always – 70 % sometimes
4. Undertaking impact analysis or technical studies
   never- nearly always – 60 % sometimes
5. Identifying mitigation measures
   never – nearly always – 80 % sometimes
6. Preparing an impact mitigation or environmental management plan
   never – often - 60 never
7. Writing part, or all, of an EIA report
   never – often – 50 % sometimes
8. Reviewing an EIA report for compliance or technical adequacy
   never – nearly always – 50 % often
9. Reviewing an EIA report for compliance or technical adequacy
   never – nearly always – 50 % often
10. Providing information to decision makers
    sometimes- nearly always – 80 % sometimes

Additional Information

What parts of the EIA process do you work with in detail and why?

- None
- Project design (sampling and interpretation)
- Monitoring and drafting EMP
- Data review
- Impact analysis and prediction
- Stakeholder consultation review of plans
- Review national legislation
- Drafting EIA report
- Review Screening forms
- Review EIA report for compliance and adequacy
- Grant environmental licenses
**Additional Information**

Which types of problems do you have to deal with in your role in the EIA process?

- Insufficient information
- Bad quality of data and information
- Incomplete EIA reports
- Lack of awareness
- No clear policy on EIAs
- Incompatibility EIAs in region
- Time constraints in building mega projects
- Lack of communication/coordination relevant actors
- Change in design project during ongoing EIA

**Additional Information**

In what skills or knowledge do you feel that you most need training?

- The entire EIA process
- Baseline studies
- Impacts prediction
- EIA matrix
- Screening and scoping
- EIA review
- Coastal and marine environments and management
- EIA design and interpretation according to international standards
Types and scales of environmental impact

David Feary

- Habitat loss is a major factor in declining populations, biodiversity loss and disruption of ecosystem services
- Almost ½ land surface modified by disturbances
  - 20% of global bird populations extinct
- Disturbances
  - Extinction of herbivores and predators, habitat transformation, introduced exotic species, climate change

Impact type

- **Acute** – these are short term impacts on the community (i.e. ship grounding)
- **Chronic** – impacts that act continuously over long periods of time (i.e. waste water pollution)

Effects of impact

- Each impact may have different effects on the marine communities
  - Acute stressors may affect highly habitat associated fauna
    - Individuals unable to move away from stress
  - Chronic stressors may affect whole communities, as stressors have long term effect
    - All fauna (and habitat) affected and may cause significant change in community

Acute vs chronic impacts

- Palm Island development along Dubai coastline
  - Acute stress: infauna smothered by increase in sand and sediment with island development
    - Immediate loss of benthic infauna
    - Gradual redevelopment of community after dredging stops
Acute vs chronic impacts

- Palm Island development along Dubai coastline
  - Acute stress: infauna smothered by increase in sand and sediment with island development
    - Immediate loss of benthic infauna
    - Gradual redevelopment of community after dredging stops
  - Chronic stress: high level of sediment collects on corals with development
    - Constant resuspension of sediment with water movement increases sediment cover
    - Corals slowly lose health with increased sediment deposition
    - Change in community (loss of diversity)

Scales of impact

- Impacts may occur at different spatial scales, from local to national, international or global effects

Examples

- Local – Development
- National – Fishing
- International – Climate change

Local scale impact – Harbour development

National scale impact – Commercial fishing

Global scale impact – Climate change

Modified from Reefbase 2006
• 20% of coral reefs destroyed
• 24% are in imminent danger
• 26% under long term danger of collapsing
(Source: Wilkinson 2004)

Scales of impact
- Global
- National
- Local

Impact type
- Acute
- Chronic

Spatial scale of impact
- No bleaching
- Low bleaching
- Medium bleaching
- High bleaching
- Severity unknown

 Modified from ReefBase 2005
Local EIA Requirements in the UAE

Jackie Daair
Manager, HSE Division
Dome International LLC

Regulatory Bodies

Federal

Ministry of Environment & Water
Federal Environmental Authority

Local Authorities

Competent Authority responsible for the implementation of Federal Law No 24 of 1999 Concerning Protection & Development of the Environment and also responsible for Impact Assessment of Projects
- Ajman: Ajman Municipality
- Dubai: Dubai Municipality, Environment Department
- Fujairah: Fujairah Municipality
- Sharjah: Environment & Protected Areas Authority
- Ras Al Khaimah: Environmental Protection & Industrial Development Commission
- Umm Al Quwain: UAQ Municipality

Overview of Requirements

Federal Regulation for the Assessment of Environmental Effects of Installations, 2002

This Regulation requires that an environmental impact assessment be carried out for certain projects before a license to develop/operate the project is issued by the Competent Authority.

The procedures for applying for an Environmental License and the information requirements are specified in the Regulation.

Environment Agency Abu Dhabi

Environmental Permit for New Project (PER)

If EIA is deemed necessary, a TOR must be submitted for approval prior to undertaking the EIA.

EIA Report

EIA Consultants must be registered with EAD
ADNOC Group Companies:

Health, Safety & Environmental Impact Assessment (HSEIA) required for all projects in line with ADNOC Codes of Practice (COP).

Phased HSEIA approach:

Phase 1  FEED
Phase 2  EPC
Phase 3  Operation
Phase 4  Decommissioning

HSEIA Verification by 3rd Parties

DUBAI

Overall Responsibility: Dubai Municipality

Other Authorities:

- Jebel Ali Free Zone Authority: EHS Dept
- Dubai Industrial City: MAQAYEES

EIA consultants are required to be registered & approved.

Dubai Municipality

Environmental Protection & Safety Section (EPSS)

TG no 4
Preparation of Environmental Impact Statements for New Industrial Premises

TG no 53
Environmental Impact Assessment Procedures

Ports, Customs and Free Zone Corporation

EIA Guidelines

Scope of Work to be submitted to EHS for approval prior to commencement of the EIA study.

EIA report must be in required format.

Draft EIA submitted by EHS to EPSS for comments/approval

DUBAI INDUSTRIAL CITY

All projects required to submit an EIA report to MAQAYEES in the designated format.

No Scope of Work required.

EIA reports must then be submitted to EPSS, DM for approval.

FUJAIRAH MUNICIPALITY

Environmental Permit Application for Project Construction
### RAS AL KHAIMAH
- Environmental Protection & Industrial Development Commission (EPIDC)
  - Environmental Statement Form for Obtaining Environmental License for Projects
  - Guidelines for EIA Studies

- Ras Al Khaimah Freezone Authority
  - Registration of Consultants

### SHARJAH
- Environment & Protected Areas Authority
  - Sharjah Municipality Environmental Protection Section
    - Application Form
    - Environmental Guidelines for various industries

### UMM AL QUWAIN MUNICIPALITY
- Currently referring to FEA

### SPECIFIC REQUIREMENTS
- Detailed Marine Environmental Baseline Surveys including:
  - Fish & invertebrates
  - Benthic survey – habitat, benthic communities, epiflora, benthic sediment sampling for infaunal analysis
  - Water quality analysis
  - Sediment analysis
  - Seasonal variations

- Hydrodynamic Modeling
  - In order to assess impacts of discharges, dredging, reclamation

### REVIEW PROCESS
- Draft reports are reviewed / commented on by specialists in the relevant authorities
- Comments incorporated into the final report
- Project proponent required to commit to implementing recommendations.
Screening and Scoping

Applications to Coastal and Marine Ecosystems in the Gulf

Andrew Bauman and David Feary
United Nations University
20 January 2008

Screening Overview

- **FIRST** step of the EIA process
- **IDENTIFIES** proposals that require a full EIA
- **PRELIMINARY** determination of the expected environmental impact
- **SCREENING TIME** Depends on type of proposal, environmental setting and scale
- Four major outcomes from Screening
- Establishes basis for Scoping
- Efficient, transparent and robust

Screening Criteria and Scale for Coastal and Marine Ecosystems in the Gulf

Coastal and Marine Criteria:
- Character of receiving area (e.g. dugong feeding grounds)
- Potential impact of proposal (e.g. fishing grounds)
- Resilience of natural and human environments to cope with change
- Confidence of prediction of impacts
- Presence of planning, policy framework and other decision-making processes (e.g. management plans)
- Degree of public interest (e.g. loss of public beach areas)

Screening Coastal and Marine Scale:
- Small-scale: Installation of mooring buoys or digging holes in the sand
- Medium-scale: Construction flood defense walls, jetties
- Large-scale: Construction of mega-structures through dredging and land reclamation

Scoping report

1. Describes the proposed activity and contains any feasible and reasonable alternatives to the proposed work
2. Describes the property and the environment that may be affected by the activity
3. Describes how biological, social, economic and cultural aspects of the environment may be impacted by the activity
4. Holds details of the public participation process undertaken
5. Specifies the methodology to be used to assess the potential impacts, and the specialists or specialist reports that are required
Describes the proposed activity and contains any feasible and reasonable alternatives to the proposed work.

Describes the property and the environment that may be affected by the activity.

Describes how biological, social, economic and cultural aspects of the environment may be impacted by the activities.

Holds details of the public participation process undertaken.

Specifies the methodology to be used to assess the potential impacts and the specialists or specialist reports that are required.
Project Olympia
Items to consider for EIA purposes

- The existing habitat at the site includes extensive seagrass beds, and some small patches of oyster reef and coral reef. Most of the area is an open sandy plain occupied by numerous worms, molluscs and crustaceans that support extensive fish populations
- Existing developments to the northeast include Palm Jebel Ali, Jebel Ali Free Port, Palm Jumeirah
- A major DEWA plant is planned for somewhere near Palm Jebel Ali
- There are extensive wetlands shoreward of Olympia, and a major power plant southwest of it
- Rumors exist of additional offshore developments in the vicinity

- Project Olympia will be constructed with minimal dredging, instead using rock and soil transferred from inland sites and shaped to the desired form
- Seaward shores are armored using specially molded interlocking cement blocks engineered to withstand 100 year storms
- The interconnected lagoons of Olympia have small bridged openings so it is possible to travel by catamaran ferry from one end to the other of this megacomplex
- Major marinas are located in the outer southern and northern rings
- The watersport complex (with two olympic pools, a wave pool for olympic surfing and parasailing, and dock facilities for rowing and sailing competitions) occupies the southern shoreward ring of the project

- Landscaping includes extensive lawns and gardens at the edge of the lagoons; some public beaches are included in the overall design; water – as pools, streams, fountains, wave pools, and the lagoons themselves – is central to the landscape of Project Olympia
- The 18 hole golf course located on the northern ring is designed by Jack Nicklaus and Greg Norman, and personally validated by Tiger Woods
- Villas and Condominium towers will provide waterfront homes for 1,500,000 people; there are shopping and entertainment districts centrally located
- The project is self-sustaining with its own electricity, desalination, cooling, and sewage treatment facilities
- 1,000,000 cars are expected to travel to and from the mainland each day
Claydon Point, East Coast Australia

A case study in the use and importance of Environmental Impact Assessments and Environmental Monitoring Programs

David Feary

Case
- Increased portage needed in busy port area (coal exporting)
- Dredging of area proposed to lengthen and deepen boating channel
- Larger, deeper boats

Capital works
- Port expansion involved the dredging of approx 9 mil m3 of material
- Deepened channel from 1.8m to 14.9m, widen channel by 10m
- Work adjacent to the terminal berths and departure path
- Also included disposal of material at offshore location (5km north of port)

Pre-dredging baseline survey
- One month prior to the dredging
- Surveyed ‘impact’ and ‘control’ areas
- Formed basis of understanding whether development had adverse effect and the size of that effect on coral communities

Survey of area
- Surrounding ports were areas of live coral containing highly diverse fish and invertebrate communities
- Within port area were large patches of seagrass and algae which may have been important habitat for dugong
- Local people use the area outside the harbour for diving, swimming and boating

Environmental Impact Assessment
- Dredging and disposal of sediments
  - May cause sediment plumes to become suspended within water column
  - Tidal currents may cause plumes to migrate away from point of generation
Increased sedimentation

- Increased turbidity and decreased light attenuation (reduced light penetration)
- Photosynthetic organisms affected (i.e. corals)
- Depositional footprint may be affected, with higher amounts of sediment being deposited, smothering benthic marine biota

Monitoring program

- Routine monitoring program throughout dredging operation (6 months) and Post-dredge habitat survey
  - Relationship between dredging and the formation, migration and dispersion of sediment plumes
  - Response of coral reef communities to changes in sedimentation

Monitoring program: what did it examine?

- Diversity and abundance of benthic communities and fishes
- Percentage coral bleaching and mortality
- Rates of sediment deposition on corals (measured in mm)

Study design

- Important to understand what we are trying to investigate
  - Detect dredging effects
  - Comparing abundance, diversity and health of coral communities between impact and control areas
- Important to have before data in both impact and control areas so changes in impact areas apparent

Decline in coral cover over 6 month period: due to sediment deposition

Changes in abundance of two contrasting butterflyfishes

<table>
<thead>
<tr>
<th>MONTHS</th>
<th>C. baronessa</th>
<th>C. vagabundus</th>
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<tbody>
<tr>
<td>Baseline</td>
<td>100</td>
<td>50</td>
</tr>
<tr>
<td>1</td>
<td>90</td>
<td>40</td>
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<td>5</td>
<td>50</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>40</td>
<td>0</td>
</tr>
</tbody>
</table>

Baseline 1st 2nd 3rd 4th 5th 6th

PERCENT COVER

Changes in abundance of two contrasting butterflyfishes

Mean no. per 40m²

% HARD CORAL COVER
Post dredge survey

- Change in coral abundance, with higher loss of plating coral species
- Chronic disturbance in impacted area as sediment becomes resuspended
- Area will be affected by resuspended sediments for months to years
- Will lead to significant loss of coral communities in long term

Development and environmental protection

- Importance of pre-disturbance surveys
- Must be followed by subsequent repeated surveys
- Use of control sites for comparing results
- Mitigation of disturbances may be needed
- Chronic disturbances have to be taken into account (i.e. sediment resuspension)
The South Pars gas field is the world’s largest single gas reservoir. It is located across the Iranian-Qatari border line in the Persian Gulf, about 100 km south off the Iranian coast.

The completed onshore and offshore facility will consist of:
- 2 two bottom-founded unmanned production platforms;
- two 32" pipelines to the shore, each approximately 100 km in length, with two 4" piggy-back MEG return lines;
- gas treatment at an onshore processing facility with a capacity of 2.0 Bcf per day;
- the exportation of the Project’s products via domestic pipeline (for the lean gas only), by tankers and by road (for the other products).
Baseline Conditions

• Physical Conditions:
  – Geography and Topography: below Iranian standards
  – Geology/Tectonics
  – Landscape
  – Meteorology: Northwest to westerly winds predominate
  – Ambient Air Quality

Baseline Conditions (Continued):

• Physical Conditions (Continued):
  – Surface Water: nothing except a spring
  – Groundwater: A study in 1998 and analytical results from 2003 showed that the aquifer is anoxic and brackish, with the salinity significantly increasing toward the sea; faecal coliforms: a general problem
  – Sea Water: data on this ‘pollutant trap’ is limited
  – Soil: A total of 21 soil samples from the terrain of Phases 2 & 3 were investigated, with 18 to a depth of 0.1 m and three from depths of between 2 and 5.5 m. Overall, only slight soil development is noted; and mostly the samples comprise virgin soil. Due to the high sand content, the soil is sensitive to deposition of pollutants and acidification by NOx and SO2.

Baseline Conditions (Continued):

• Biological Conditions:
  – Study Area: mountains & mangroves most sensitive, the Bidkhoun spring and Nayband area (MPA)
  – Landuse: camps used for goat and agriculture: poor fauna & flora
  – Onshore Fauna & Flora: Golden Eagles and Griffon Vultures as well as mammals (hyenas), More than 1000 goats; The protected Nay Band area includes rocky shores. The beach of the Nay Band area is a nesting area for turtles. Sea grass and plants which can grow on salty soils cover the coastal plain, surrounded by bushes and trees. The Nay Band Mangrove is associated with extensive salt marshes and is developing on brackish water. The fauna consists of many sharks or young fishes and crabs. A large number of birds can be observed around the coastal zone as flamingos, herons, terns, waders and many others.
  – Offshore Flora and Fauna: several sensitive and of high ecological value habitats occur. The Gulf is characterized by the presence of coral reefs in depths from 2 to 10 meters. The sandy beaches are used by two turtles species as nesting areas and internally there are lagoonal structures with mangroves surrounded by mud flats.
  – Historical and Cultural Sites
  – Noise
  – Socio-Economic Situation
Significant Impacts during Construction Phase

- Land Acquisition: low
- Air Quality: low
  - dust generation from transportation and construction activities
  - pollutant emissions from vehicles and machines
- Water Bodies: low
- Soil: low
- Onshore Fauna and Flora: low
- Offshore Fauna and Flora: low
- National Parks, Wildlife Sanctuaries and Other Protected Areas; medium: medium
- Historical and Cultural Sites
- Traffic Aspects: no effect
- Noise Aspects: low
- Occupational Health: low
- Solid Waste/Waste Water: low
- Landscape: low

Significant Impacts during Operation Phase

- Air Quality: application of variant methods to obtain 1000 mg/m³ of SO₂ (half of world standards); medium effect
- Water Bodies: surface water: no effect for flood

  - Ground Water: low
  - Seawater, Offshore Fauna & Flora (low): expected from pipeline hydrotesting, routine effluent discharges and small spills and leaks from the platforms and supporting vessels
  - Sea Water near the shore line: The coastal sea water near the existing sea water outfall for Phases 2 & 3 is obviously polluted. Considering that the synergistic effect from this and all other effects to the marine environment from other industrial activities in the area, accumulation of pollutants may represent a serious threat to the sensitive habitats located in the Gulf of Oman. It is strongly recommended to construct an underwater outfall for the discharge of all effluents of all Pars phases at a diffusion site located at least 10 m deep. Impact of effluents: medium

- Soil: low
- Onshore Fauna and Flora: no effect except mangroves affected by SO₂
- Noise Aspects: low
- Occupational Health: low
- Solid Waste/Waste Water: low
- Landscape: low
Mitigation and Compensation:
- CLAUS process for reducing the SO2
- Dismantling of the dam between open sea and mangrove area and replacing it by an open steel bridge building will essentially improve the ecological value of this habitat.

Monitoring:
- During construction phase: performance of regular construction site audits to reduce environmental impacts and health risk to the workers and the realization of the proposed monitoring actions
- Operation phase: ambient air quality and the observation of the quality of the different waste effluents which are being discharged to the sea.

Conclusion and Recommendations

Overall Conclusion
- Most severe impacts of the Project are linked to air emissions respectively the ground level concentrations of NOx and SO2 and to the marine environment.
- Under consideration of the recommended mitigation measures including an improved CLAUS process and a well designed sea water outfall, these impacts would be reduced to be low and acceptable according to the considered environmental standards. If the mitigation and monitoring measures summarized in the Environmental Social Management Plan (ESMP) will be considered without any exception it may be concluded from the findings of this study in summary, that the proposed Project - South Pars Gas Field Development Phase 9 & 10 - can be designed, constructed, commissioned and operated without significant adverse effects on the environment.

Recommendations
- The Safety Concept shall be updated during the detail engineering.
- The preparation of an overall EIA regarding the impacts of the entire PSEEZ on the environment is recommended. This includes the establishing of an emission inventory of the PSEEZ what would allow to get a grip on the air pollution by all the different phases. It has to be kept in mind that 20 even more phases are in planning.
- The future aim should be to install an overall monitoring network for the PSEEZ, in particular for the monitoring of the overall ambient air quality.
- In order to minimize the influence on Bidkhoun village, the noise level generated by each of the following South Pars development phases should not exceed the noise emission of Phases 9&10.
Recommendations

- It is recommended to perform a detailed Socio-Economic Study in order to describe the existing socio-economic situation in detail and to assess the impacts of the Project (and the other Phases) sufficiently. Such a study should include but not limited:
  - Evaluating present studies on socio-economy and consulting communities and people living in the region
  - Investigating social environment/socio-economic details in the PSEE Zone in terms of sex ratio (male and female population), ratio of adult people and children, literacy rate, occupation rate and job situation, educational facilities, medical facilities, communication facilities, existing infrastructure, e.g. transportation facilities, drinking water facilities, water supply, electricity, sewerage, housing, roadnet etc. • Estimating infrastructural changes and effects on local places of work in future
  - Assessing impacts of the activities in the PSEE Zone on local fishery (e.g. restrictions due to off-shore pipelines and pollution of the seawater near the coast), agriculture and industries

Recommendations

- Considering changes in the social structure of the population due to the realization of a new industrial district (especially in Assaluyeh, Nahkle Tagh, Bidkoun, Shirinou)
  - Assessing the present situation of recreational activities and considering future trends. Determining what forms and types of recreation activities are existent in the area at present and what possibilities for recreation should be there in future.
  - Performing of baseline studies to air, soil and groundwater quality and to noise shall be conducted. Also, the marine environment in the vicinity of the sea water outfall shall be investigated, as well as an onshore coastal survey and a survey of the onshore Flora/Fauna shall be performed.
  - Baseline study in order to investigate exact location of turtles nests and nesting period in the Nay Band Area.

Recommendations

- In order to mitigate impacts on the sensible mangrove area with its high ecological value and to ensure a sustainable development of this area, the Consultant recommends to elaborate a management plan for the mangrove area. This management plan will indicate protection measures of the mangroves, especially regarding the high future pressure on nature by people (employees and workers with their families) expected to spend their leisure time there. It is envisaged to define sensible zones of the mangrove area where protection measures will be taken, and non-sensible zones with accessibility to the public (functional zones).
  - Another aspect of the management plan will be to define measures to improve the ecological value of the mangrove area. Mangroves are world wide threatened habitats and are protected according to global international conventions. Another aspect of the management plan for the mangroves will focus on increasing of environmental awareness of the public to ensure the long-term protection of this area.

Love is the pearl; I am the diver and the sea is the winery
I am getting under but don’t know if ever come up

Hafez (Iranian Poet)
Impact Analysis

"Methodologies for assessing marine and coastal ecosystems"

Andrew Bauman
January 21, 2008

Overview

- Impact analysis: identification, prediction and evaluation
- Ecological Monitoring
  - What is it?
  - Why do we monitor?
  - Goals of monitoring
  - What we’ll be monitoring?
- Ecological Monitoring Methods Utilized

Impact Analysis

- Identification – to specify the impacts associated with each phase of the project and the activities undertaken;
- Prediction – to forecast the nature, magnitude, extent and duration of the main impacts; and
- Evaluation – to determine the significance of residual impacts i.e. after taking into account how mitigation will reduce a predicted impact

What is Ecological Monitoring?

Ecological Monitoring:
is the systematic observation, measurement and calculation of the condition of an ecosystem or population and species over time. This includes both biological and physical monitoring.

Why do we monitor?

- To assess the conditions of the natural environment by providing reliable information on the status and trends of organisms within the ecosystem.
- To understand and determine the factors causing the observed patterns.
- To forecast or predict with some accuracy future ecological trends.
- To set priorities and identify populations, species and ecosystems at risk.
- To develop environmental policies and plan for environmental protection measures as well as the control of the effectiveness.

What we will be monitoring?

<table>
<thead>
<tr>
<th>Biological</th>
<th>Physical</th>
<th>Chemical</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.) Fish</td>
<td>1.) Currents</td>
<td>1.) Water quality:</td>
</tr>
<tr>
<td>2.) Benthic Inverts (i.e. corals)</td>
<td>2.) Depth, bathymetry and reef profiles</td>
<td>- suite of common indicators, and</td>
</tr>
<tr>
<td>3.) Phyto- and Zooplankton</td>
<td>3.) Temperature</td>
<td>- trace contaminants</td>
</tr>
<tr>
<td>4.) Seagrasses</td>
<td>4.) Salinity</td>
<td>- heavy metals</td>
</tr>
<tr>
<td>5.) Macro-Algae</td>
<td>5.) Visibility</td>
<td>- chemical tracers</td>
</tr>
<tr>
<td></td>
<td>6.) Sediment transport</td>
<td></td>
</tr>
<tr>
<td></td>
<td>7.) Tides</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.) Winds</td>
<td></td>
</tr>
</tbody>
</table>
**Ecological Sampling Design**

**Hierarchical Sampling Program:**
- Will incorporate physical, chemical, microbiological and ecological data.
- Will include a broad suite of variables monitored at certain key sites, and few variables monitored at auxiliary sites.
- Certain variables sampled nearly continuously (i.e. water temperature) and others at frequencies down to bi-annually (i.e. sediment depth).
- Will include sites closely situated in key locations within the NMP's and more sparsely in surrounding waters.

**Marine and Coastal Methodologies**
- Transects (Fish, Corals)
- Quadrats (Corals, Other Invertebrates)
- Plankton tows (Phyto- and Zooplankton)
- Sediment Characterization
- Coral Recruitment Titles
- Hydrodynamic modeling

**Transects**
- **Transect**: is a path along which one records and/or counts occurrences of the phenomenon of study (e.g. fish, corals) in the process of estimating population densities and abundances.
- Transects include: Belt Transect, Line Transect, Line Intercept, Point Intercept, Video, Chain Intercept, etc...
- **Information obtained**: 1) Quantity abundance, 2) Community composition
- **Monitoring level**: 1) Community, 2) Management, 3) Research – Medium Scale

**Permanent Photo Quadrats**
- **Quadrat**: is a frame of any shape however typically square (e.g. 0.25 m²) used to collect quantitative data.
- Involves taking still photographs of a defined area through time. Useful in determining temporal change in macrobenthos communities. Are suitable for small-scale questions and to follow fate of individual colonies or organisms.
- **Information obtained**: 1) Biological condition, 2) Growth, 3) Mortality, 4) Recruitment, 5) Percent cover, species diversity, relative abundance, density and size
- **Monitoring level**: 1) Research – Fine Scale

**Recruitment Titles**
- **Involves placing terracotta or ceramic tiles onto the reef. Tiles are collected at specific time intervals and newly settled coral recruits are identified.**
- **Information obtained**: 1) Abundance of new corals settling on reef (identified to genus and species), 2) Growth of coral recruits, 3) Mortality of coral recruits
- **Monitoring level**: 1) Management, 2) Research – Fine Scale
Scientific Questions → Answers

1) Ecological Community Descriptions
   - Abundance and density counts (i.e. Belt Transect Fish)

2) How local circulation has changed as a result of the Palm
   - Analyzing historical data
   - In situ oceanographic equipment
   - Calibrating existing models (e.g. Delft) to current patterns

3) Properties that influence the microbial communities
   - Nutrient Input
   - Sediment Load
An effective EIA process
a Western Australia example

Peter F. Sale
International Network on Water, Environment & Health
United Nations University

The Project

- Woodside Energy Ltd (Australia’s largest oil and gas production company)
- Leases held for the Browse Basin gas deposits
- These are well off-shore, near to and under Scott Reef
- Woodside proposes extracting and processing the gas on site, for export to Asia

At the edge of the continental shelf
~ 60 km x 30 km in size
over 200 km from the Australian mainland
North and South Scott Reef separated by deep channel
Small sand cay on South Scott Reef
Scott Reef lies within a special management zone permitting fishing by Indonesians using traditional methods. Scott Reef is heavily overfished and more effective management could be a useful offset.

The Woodside proposal
- To drill the three gas deposits and transfer the gas to Scott Reef by submarine pipelines
- To construct a processing plant on Scott Reef
- To export product directly from Scott Reef to Asia
- This development requires EIA

Australian EIA Process
- Federal Government process covering developments on federal lands and waters
- State Government process governing state land and waters
- Because of the small sand cay on Scott Reef, this project requires both State and Federal approval
- The two levels of government cooperate so that some of the process is combined, but two approvals are still required
- No construction can proceed before approval

Scott Reef Proposal
Federal Issues
- "action requires approval from Minister for Environment and Heritage if the action has, will have, or is likely to have a significant impact on a matter of national environmental significance"
- "Significant impact": one which is "important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts."

Scott Reef
Environmental value
- One of only three shelf-edge atolls in Indo-Pacific
- High diversity fauna distinct from that on coastal reefs in Western Australia
- May be important stepping stone maintaining genetic integrity for fauna along that coastline
- Migratory/endangered species use it
- Large in size, and therefore supporting large populations of many species
Scott Reef Proposal

State Issues
- State concerns are primarily likely to be with the impacts on threatened species (turtles and seabirds) that use the sand cay, and on direct impacts on the benthic communities on those parts of South Scott Reef that are State waters.
- Modest impacts – total destruction of <5% of a benthic community – are tolerable in both State and Federal law
- Principle of “ecological best practice” is used, rather than adherence to minimal acceptable levels of impact

Scott Reef Proposal

The approval process
Complicated – I am not giving full detail
1. Submit Federal Referral, detailing nature of planned project
2. Minister denies, or approves and indicates the level of EIS scrutiny required (denial can be appealed)
3. Submit detailed draft EIS to Federal Environment Department
4. Minister approves draft for publication and public comment
5. Respond to public comment in final EIS
6. EIS is reviewed, perhaps with additional public comment
7. Minister either approves or denies the project

The devil is in the detail
- Both State and Federal laws proceed from assumption that any degradation of environment is undesirable, so that benefits of a project must be substantial, and/or there must be offsets to justify any level of environmental degradation
- The EIS/Scoping Document is expected to be scientifically robust, and vigorous public scrutiny is encouraged/expected
- Construction does not commence until the approvals are secured (penalties are severe)

The devil is in the detail
- Woodside has already spent several years preparing the case for Scott Reef
- The Referral documents have been submitted and approval to proceed with preparation of the EIS/Scoping Document has been received
- Woodside has invested several million dollars in research by independent bodies – WAM and AIMS – to build database of sufficient rigor to support the EIS
- Scott Reef is now scientifically the best known of the shelf-edge reefs of WA
The devil is in the detail

- Woodside supported oceanographic and genetic work to explore linkage of the Scott Reef populations to those on other shelf-edge or inshore reefs, and therefore its biogeographic importance.
- They established independent panel of experts to evaluate, criticize, and in other ways help ensure a scientifically sound EIS/Scoping Document will eventuate.
- Woodside is also exploring other options, because there is no guarantee that this project will be approved. Jobs and GDP do not guarantee that projects proceed.

Why the system works

- The legislation is strongly and carefully written
- It provides flexibility depending on the nature of particular proposals, and opportunity for appeal
- Public scrutiny is central to the process (preliminary documents from Scott Reef project are all on the web)
- Penalties for noncompliance are severe
- The EIA process operates within a community that values environmental quality and holds governments and developers accountable

Scott Reef is a typical coral reef. It has some complex coral development, but most of it is habitats a lot like what exists here in the Gulf. Impacts of the development will be on these 'lesser' habitats, but that still requires rigorous EIA.
ANNEX 6

SUMMARY REPORT OF EVALUATION QUESTIONNAIRES

Dubai, UAE 20-23 January 2008
An Evaluation Questionnaire was circulated to participants at the end of the course, with the results summarised below. A copy of the questionnaire is attached below.

The Most Useful Parts of the Course:
Through the review of the evaluation questionnaires, it was apparent that most found the group exercises – especially the role play and public debate – as most useful and interesting parts of the course. Respondents also highlighted that the presentations on specific coastal development and EIA case studies and on coastal monitoring were very valuable additions to the course. Some found the explanation of specific steps in the EIA process (screening, scoping, impact analysis, review etc) as most useful, as well as the last session on the future of EIA and SEA. Moreover, respondents highlighted that during the workshop they were able to network, exchange information and discuss EIA amongst each other which was found useful. Overall, the course content was useful and highlighted the key tools for the EIA process and the specific presentations were a valuable addition.

The Least Useful Parts of the Course:
Most respondents said that the entire course was useful. It was felt by some that too much was covered in a short time, and the course became slightly monotonous by having the same trainer and too much lecturing. Some mentioned the last session on the future of EIA and SEA was too short and they did not fully understand it. The fieldtrip was mentioned by a few as the least useful part of the course.

Difficulties in Applying:
Regarding the application of this workshop, there was some variance in response – most mentioned however that the concept of SEA was still not clear and was done too quickly.

The Overall Feelings about the Course:
It has been stated by almost all of the participants that their overall feeling about the course was excellent, well prepared, useful, and very productive. It was mentioned that the course was comprehensive and they appreciated the regional focus of the course and to hear the different perspectives and examples from the countries. They also noted that the selection of participants was very good.

Other Comments:
In addition to the above comments, the need for more case studies was emphasised and for more colour in presentations of lectures, as well as more examples to visualize what the theory is about. Some found the lectures too monotonous and asked for more variation. Some asked for more regional focus with identification of regional priorities. Finally some mentioned the need for better handouts- and for these to correspond to the lectures.
Suggestions for training workshops on other environmental issues:

<table>
<thead>
<tr>
<th>Integrated Coastal Management</th>
<th>Water Quality Monitoring methods</th>
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<tbody>
<tr>
<td>Strategic environmental assessment</td>
<td>Specific details of process of EIA</td>
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<tr>
<td>Land use planning</td>
<td>Environmental impacts of different industrial sectors</td>
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<td>Stakeholder consultation and interviews</td>
<td>Hazardous waste</td>
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<tr>
<td>Environmental issues in the UAE</td>
<td>Risk assessment</td>
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<tr>
<td>Integrated ecosystem analysis/management</td>
<td>Environmental management plans for construction</td>
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<td>Air emissions monitoring</td>
<td>Social impact assessment</td>
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<td>Sustainable resource management</td>
<td>Environmental economy</td>
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<td>Environmental baseline audits</td>
<td>Marine pollution and acceptable limits</td>
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<td>Monitoring and data collection methodologies</td>
<td>Marine protection methods</td>
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<tr>
<td>Protected Areas and Management</td>
<td>GIS methods and use</td>
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<td>Monitoring and data collection methodologies</td>
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</table>
EVALUATION QUESTIONNAIRE

This course evaluation will help us to develop a more effective course for future participants. In part 1, please provide your overall views on the course; in part 2, please comment on and rate the elements of the course on a scale of 1-4. Thank you.

Part 1:

The most useful parts of the course were:

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The least useful parts of the course were:

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I will have difficulty applying:

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My overall feelings about the course are:

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Any Other Comments

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Part 2:

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<th>1 - Poor</th>
<th>2 - Adequate</th>
<th>3 - Good</th>
<th>4 - Excellent</th>
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<tr>
<td>Organisation of the course</td>
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<td>Length of course</td>
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<td>Content</td>
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<td>Preparatory Work</td>
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<td>Exercises</td>
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<td>Handouts</td>
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<td>Facilities</td>
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<td>Overall benefit from the course</td>
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Part 3
Please list suggestions for training workshops on other environmental issues:

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