



Atelier pour le développement et l'harmonisation
des cartes de vulnérabilité des côtes
de l'Afrique de l'Ouest et du Centre



**Workshop for the
development and harmonization
of coastal oil spill sensitivity maps
in West and Central Africa**

Accra, Ghana, 23 and 24 April 2007



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Executive summary:

Regional workshop for the Development and Harmonization of Environmental Sensitivity Mapping in West and Central Africa

Host and date: Accra, Ghana, 23-24 April 2007 - **Type :** Regional

Organised by:

- International Maritime Organization (IMO)
- International Petroleum Industry Environmental Conservation Association (IPIECA)
- United Nations Industrial Development Organization (UNIDO)

Number of:

- participants: 55 participants
- countries represented: 16 of the 21 countries of the West and Central Africa WACAF region

The **principal objectives** of the Workshop were:

- (a) Increase technical knowledge on Environmental Sensitivity Mapping in the region;
- (b) Assess the existing environmental sensitivity maps in the region;
- (c) Assess the agencies in the region able to provide information and technical knowledge for the development of maps; and
- (d) Develop standard guidelines at regional level for Environmental Sensitivity Mapping.

The **following results** were obtained:

Training session:

- The training was particularly professionally handled and especially well focused to the needs of the audience. Most of delegates were decision makers from industry, ministries in charge of environment and of maritime transport.
- A good balance between technical aspect and global use of sensitivity maps for decision makers was carefully maintained.
- Industry and Government delegates gained a good understanding of the use of maps in oil spill preparedness and response.

Gap analysis / Action Plan

- Cameroun, Ghana, Republic of Guinea Conakry and Mauritania already have oil spill sensitivity maps at national level.
- The local resources and the technical knowledge are available locally in most of the countries.
- A regional centre for the development of Geographic Information System has been developed by the GEF/UNEP Guinea Current Large Marine Ecosystem project and it can provide free support for the other countries.
- Each country developed an action plan and made a short 5 min presentation of the main highlights of their project. This national action plan will be use as basis for next step.

The **highest priorities for action** are to:

- Designate a national authority to supervise/coordinate the development of oil spill coastal sensitivity mapping.
- Integrate sensitivity map into the national oil spill contingency plan:
 - Identify a budget and an organisation to develop the maps
 - Collect the data
 - Develop the maps and identify the most sensitive sites
 - Discuss the priorities for protection at political level and approve a ranked list of most sensitive sites.
- Develop partnership between oil companies and national authorities, and between neighbouring states.
- Use common methodology between west and central African countries to ensure harmonisation in the region.

Key words: coastal sensitivity mapping, sensitive sites, Environmental Sensitivity Index – ESI, coastline type, biological resources, human-use resources, Geographic Information System – GIS, scale, tactical, operational, strategic.

Coordinator for:

- For the Interim Guinea Current Commission (IGCC) Professor Chidi Ibe, Executive Secretary
- For IMO: Mr. Malamine THIAM, Marine Environnement Division IMO
- For the IMO/IPIECA GI WACAF Project: Mr. Philippe DE SUSANNE, Coordinator

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1 INTRODUCTION

This regional workshop for the development and standardization of coastal sensitivity maps in West and Central Africa is organized within the framework of the « GI WACAF » project – Global Initiative for West and Central Africa. This is a program through which IMO, IPIECA and various other partners work together to encourage and facilitate improvement for oil spill preparedness and response measures

The workshop took place from the 23rd to the 24th of April 2007, hosted by the “Interim Guinea Current Commission” (IGCC) with the assistance of the International Maritime Organization (IMO) and the International Petroleum Industry Environment Conservation Association (IPIECA), within the framework of the « GI WACAF » project (Global Initiative for West and Central Africa).

This workshop shows a successful first activity being jointly organized by the Guinea Current Large Marine Ecosystem project, implemented by the United Nations Industrial Development Organization (UNIDO) and the « GI WACAF » project.

2 OBJECTIVES OF THE WORKSHOP

The delegates met with the following objectives:

- To enhance knowledge about coastal oil spill sensitivity mapping in the following areas:
 - Role of mapping in oil spill preparedness and response
 - Methods and techniques for sensitivity mapping,
- To inventory the existing sensitivity maps in the West and Central Africa region;
- To develop national action plans for the implementation of such maps;
- To inventory agencies with mapping expertise;
- To develop regional guidelines for the development of standardized sensitivity maps.

3 PROGRAMME OF THE WORKSHOP

The first day of the workshop was dedicated to:

- Presentations about the underlying principles of the coastal oil spill sensitivity maps, taking into account the **Environmental Sensitivity Index (ESI)**, currently defined by the U.S. Office of Response and Restoration of the NOAA (National Oceanic and Atmospheric Administration) and recognized as an internationally accepted standard,
- Presentations by various delegates of the existing sensitivity mapping projects and/or tools.

The second day was dedicated to:

- The presentation of a general action plan for the development of sensitivity maps
- Presentations on sensitivity mapping tools (e.g. Geographical Information Systems)
- Inventorying existing sensitivity maps and resources in the GI WACAF project region,
- Setting up the outlines of country specific action plans and the development of regional guidelines for the project area

4 LOCATION, DATES, ROLES AND PARTICIPANTS

The workshop took place in the premises of the Interim Guinea Current Commission in the meeting room located on the first floor.

Experts from IMO/IPIECA coordinated the workshop. They were Mr Malamine Thiam (IMO), Mr. Philippe de Susanne (IMO/ IPIECA project) as well as Mr. Jean-Yves Huet, Dr. Lindsay Page-Jones and Mr. Christophe Carrié (IPIECA consultants for the GI WACAF Project).

→ See program of activities in appendix 7.3.

The Interim Guinea Current Commission took charge of the organization of the workshop as well as all associated logistics during the two days (coffee breaks, lunches, equipment for audiovisuals, simultaneous translation, Internet access, provision of a few internet linked computer workstations, printers and photocopiers).

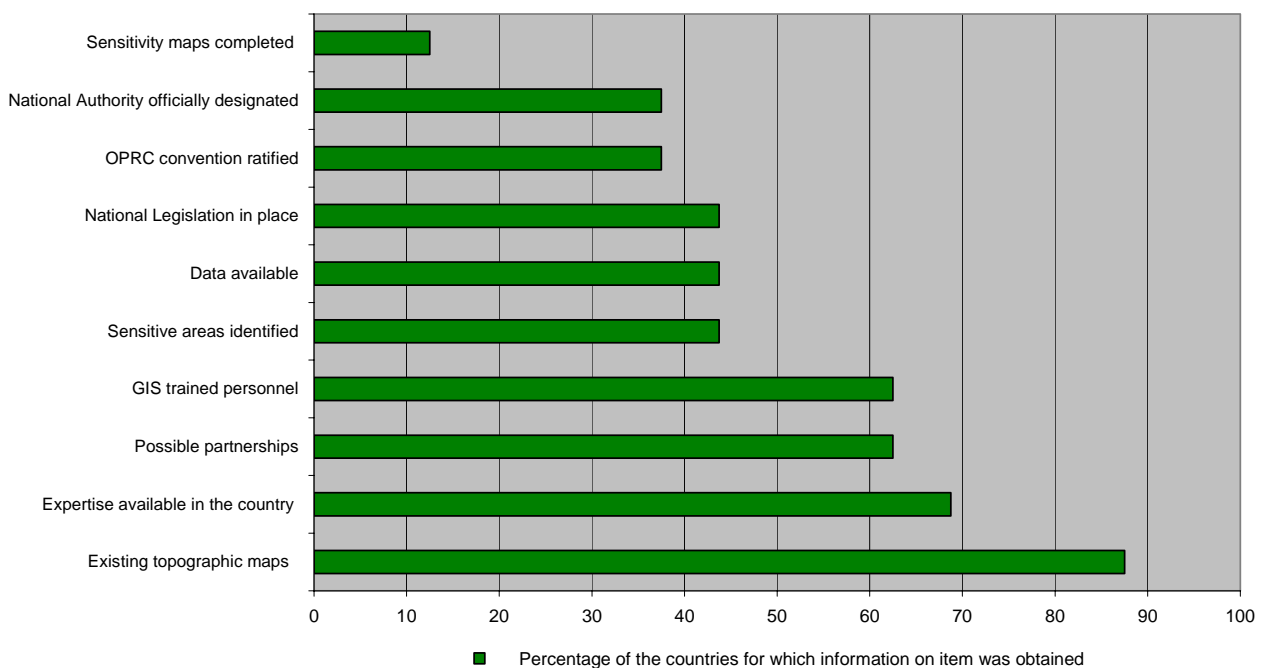
A total number of 55 participants attended the workshop, coming from 16 of the 21 countries in the GI WACAF region. These participants represented government organizations and industry.

→ See list of participants in appendix 7.1

5 RESULTS AND OUTCOMES

A regional view of the status of development of oil spill sensitivity maps is presented shortly below. A more detailed analysis by country is presented in appendix **Error! Reference source not found.**

Analysis of the status of development of oil spill sensitivity mapping in the countries along the coastline of West and Central Africa (Accra – Ghana workshop, April 2007)



Development of sensitivity maps

Among the 21 countries in the GI WACAF Project area, Ghana, Cameroon and Mauritania have already developed sensitivity maps which are integrated in the national plan. In several of the remaining countries, sensitivity maps are under development.

Numerous countries have developed sensitivity maps for other themes (e.g. Ivory Coast for coastal erosion problems). The information in such documents can be used for the development of oil spill sensitivity maps.

In a number of cases, the oil industry has also developed maps, mainly focused on the area of operations.

National competent authority designated and recognized

Although the majority of the countries in the area have designated a national competent authority for oil spill preparedness and response, there is a need for a unique organization identified as the national competent authority to be legally and officially nominated (by decree) in numerous countries.

In order to avoid duplication of efforts (e.g. for acquisition of satellite imagery and the production of maps), the need for cooperation between various government organizations (ministries, etc.) at national level was also identified by the delegates.

The need for centralization of the data was also mentioned, at national level for baseline data, as well as at the West and Central Africa region level once the sensitivity maps will have been completed.

Ratification of the OPRC 90 convention

Although this convention provides the legal background for oil spill preparedness, less than 50% of the countries in the project area have ratified the OPRC 90 convention. The others relevant international conventions (i.e. CLC 92, FUND 92 and Intervention 69) should also be ratified as soon as possible.

National legislation in place

In more than half of the countries, an appropriate national legislation in line with the provisions of the international conventions needs to be implemented, and national oil spill plan needs to be officially approved and implemented.

Other data, available maps and identification of sensitive areas.

Even if few countries have developed sensitivity maps, topographic maps and data on sensitive biological and socio-economic resources are generally available in all the countries.

Geographical Information Systems expertise

More than 60% of the countries have mentioned existing national expertise for the development of GIS, which could be used for the development of the sensitivity maps.

This GIS and mapping expertise will need to be reinforced through specific training sessions and it was recommended that these are carried out at sub-regional level through English speaking and French speaking workshops.

National expertise

In more than 70% of the countries, expertise was identified which could be used for the development of the sensitivity maps. This expertise is available from organizations such as:

- Ministries (Environment, Transport, Petroleum, etc.)
- National geographic institutes, Universities
- Various research institutes (ecology, fisheries, oceanographic, environment, etc.)
- Oil companies and oil industry groups: ACEPA, AOPC, UPEGA, OPTS...

The need for the development of government-industry (and government to government) partnerships were frequently mentioned by delegates in order to facilitate data collection and/or the development of the maps.

6 RECOMMENDATIONS OF THE WORKSHOP

A series of recommendations was developed by the delegates during the workshop in order to provide guidance to the countries in the WACAF region and ensure a standardized development of the oil spill sensitivity maps for West and Central Africa.

It is recommended that the National Competent Authority for oil spill cooperation, preparedness and response:

- Be officially nominated by a legal document (e.g. decree) in each country of the region
- Be responsible for:
 - The supervision of the development of coastal oil spill sensitivity atlas at national level and the coordination at regional level,
 - The production, diffusion and regular updating of the atlas;
- Leads the country towards the ratification and implementation of the relevant international conventions (OPRC 90);
- Designates a national organization responsible for the technical development of the maps;
- Identify the national needs in terms of personnel, resources and training;
- Host the technical national and/or regional workshops for the development of the atlas;
- Promote the use of the Environment Sensitivity Index (ESI) methodology in order to ensure standardization among the countries of the West and Central Africa region and that maps include four themes (see Regional Guidelines):
 - Type of shoreline and ESI sensitivity,
 - Presence of biological resources, sensitive to the effect of oil spills,
 - Presence of socio-economic activities susceptible of being affected by the effect of an oil spill,
 - Identification of logistical and operational resources which might be of use during the response to an oil spill (e.g. location of access points, equipment stockpiles, etc.);
- Ensures that Geographical Information Systems software is used for the development and distribution of sensitivity maps (see Regional Guidelines);
- Identifies financing mechanisms needed to cover costs for data collection, development of the maps, distribution of the atlas and regular updating of the maps;
- Facilitates the collection of the data needed for the development of the maps that are available at national and international levels by putting in place agreements for access to data between government and the industry, the local institutes, the universities, etc. (see Regional Guidelines);

7 APPENDICES

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7.2 OPENING SPEECH OF THE REPRESENTATIVE OF THE IMO

INTERVENTION BY MR. MALAMINE THIAM OF THE

INTERNATIONAL MARITIME ORGANIZATION AT THE OPENING OF UNIDO/IMO FIRST MEETING OF THE TECHNICAL ADVISORY GROUP ON DEVELOPMENT OF SUB-REGIONAL CONTINGENCY PLANS AND SUB-REGIONAL AGREEMENTS FOR CO-OPERATION IN CASES OF MAJOR MARINE POLLUTION INCIDENTS AND OF THE IMO/UNIDO/IPIECA REGIONAL WORKSHOP ON ENVIRONMENTAL SENSITIVITY MAPPING

(ACCRA, GHANA, 23-28 APRIL 2007)

Mr. Chairman, Distinguished Guests, My esteemed colleagues and dear friends, Ladies and Gentlemen,

It is a great honour for me to be with you today at the beginning of these most timely meetings, the first of which aiming at addressing one of the many important issues of contingency planning – Environment sensitivity mapping - and the second at the establishment of a regional agreement on contingency planning in the GCLME region.

I bring to you the greetings and best wishes from the Secretary - General of the International Maritime Organization, Mr. Efthimios Mitropoulos. He has requested me to extend to UNEP, the Global Environment Facility, UNIDO and especially to the Secretariat of the Interim Guinea Current Commission, our partners in the GCLME Project and host for the meeting, his profound gratitude for their kind co-operation and generous support. To our honourable guests, he kindly requested to extend his gratitude for their interest and support to this very important process and reiterates his appeal to them for their continued support.

As I am sure you are all aware, these meetings have been organized at a time when maritime safety and the protection of the marine environment are receiving renewed attention and active support from all countries and this is particularly true in the GCLME region and the West and Central Africa as a whole.

The first UNIDO/IMO/IPIECA event inaugurates the newly established partnership between our three entities and comes as a new positive step in the direction of the already strong partnership between UNIDO and IMO. At this juncture I would like to also extend to all present, greetings and best wishes for a successful week from the General Secretary of the International Petroleum Industry Environmental Conservation Association (IPIECA).

As you will recall, this two-day workshop aims at addressing the technical aspects of Environmental Sensitivity Mapping; assessing the existing environmental sensitivity maps in the region; assessing the agencies in the region able to provide information and technical knowledge for the development of maps; and developing standard guidelines for Environmental Sensitivity Mapping for use by the relevant entities of the region.

With regard to the second event Mr. Chairman, you will note that the Convention for Co-operation in the Protection and development of the marine and coastal environment of the West and Central African region – the Abidjan Convention 1981, states that “the contracting

Parties shall co-operate in taking all necessary measures to respond to pollution emergencies in the Convention area and to reduce or eliminate pollution or threat of pollution resulting there from. To this end, the contracting Parties shall, individually and jointly, develop and promote contingency plans for responding to incidents involving pollution or the threat thereof in the Convention area.”

The Emergency Protocol to the Abidjan Convention provides further details for the scope and provisions of this co-operation.

The purpose of the first Meeting of the Technical Advisory Group is to develop a framework for co-operation between the countries of the Guinea Current Region in cases of major pollution incidents; the idea being to later extend the framework to the whole West and Central Africa Region.

The main objective of this first meeting is to consider and amend as appropriate, two very important draft documents, which together and when adopted by the countries of the region, will provide the basis for all future co-operation and assistance in cases of major marine pollution incidents.

The first document to be considered is the draft sub-regional oil spill contingency plan, which will form the operational background for co-operation between the countries of the region. The proposed draft plan was developed by IMO with due consideration to the relevant international Guidelines and experiences gained from similar regional plans in other parts of the world.

The second document is a sub-regional instrument or agreement, which provides the legal background for future co-operation. This document was developed as a draft document under the Abidjan Convention.

Mr. Chairman, I would like to recall that the second event of this week is a meeting of national and international experts, who have been called together to develop a number of documents from a technical point of view.

When this Meeting ends on Friday, it is the wish of IMO and indeed UNIDO that substantial progress is made in the development of the documents. We invite you to participate in the discussions of the draft documents to also ensure they are in compliance with international regulations and guidelines and, as far as this meeting can agree, they take into consideration your national views and expectations on a framework for co-operation within the region.

Finally Mr. Chairman, it is hoped that at the end of this week, the two events will have achieved fully their goals.

Once again from UNIDO, IMO and IPIECA, welcome to these two events and my best wishes for very fruitful meetings.

I thank you for your kind attention.

Source : Malamine Thiam (OMI)

7.3 PROGRAMME OF THE WORKSHOP

DAY 1: Training and Assessment of the existing situation	
09.00	Opening ceremony and Course introduction Registration of participant Presentation of GI WACAF and role in national and regional sensitivity mapping projects Presentation of the objectives of the course, of the lecturers and all course participant
10.30	Coffee break
11h00	Introduction to coastal sensitivity mapping Interest and use of sensitivity mapping, based on a fictional example The impacts of oil spills as the base of sensitivity mapping. Use and benefits of Coastal sensitivity maps for oil spill response and preparedness.
11.30	Environmental Sensitivity Index - ESI (see Appendices 3.3) Assessing the environmental sensitivity of the shoreline is necessary to ensure that oil spill response strategies and techniques for shoreline protection and clean-up are chosen in order to minimize the impact on the environment. The sensitivity is measured according to an international recognized index: the ESI (Environmental Sensitivity Index, maintained by the U.S. Office of Response and Restoration NOAA) which will be described in this part.
12.00	Sensitive biological resources, e.g. Habitats, Species (see Appendices 3.4) The impact of oil on sensitive biological resources can reflect on socio-economic activities (spawning ground example). These habitats must be identified so that they can be protected. Priority for their protection is done according to their specific degree of sensitivity and their importance (richness of the species and ecological value). Mapping these habitats and assessing their sensitivity facilitates the definition of oil spill response strategies.
12.30	Lunch break
13.30	Sensitive Socio-Economic activities (see Appendices 3.5) All socio-economic activities can be more or less affected by an oil spill. The identification of and a classification of these activities facilitates the choice of oil spill response strategies for their protection.
14.00	Mapping principles for coastal sensitivity maps. The importance of producing clear and easy to use cartographic documents.
14.15	Sensitivity mapping for decision makers (see Appendices 3.2) This session develops the standard guidelines for the elaboration of sensitivity maps, aimed at the decision makers. Particularly, various methods to produce strategic maps taking into account Environmental Sensitivity Index, Sensitive biological resources and Sensitive Socio-Economic activities to identify the most sensitive shorelines will be presented. The use and limitation of complex index (aggregating ESI, biological resources and socio-economic activities into one global sensitivity index) will be discussed.
15.00	Towards an operational mapping for responders on site (see Appendices 3.6) Guidelines for the development of operational coastal sensitivity maps dedicated to the oil spill responders on site, as an assistance to the oil spill response operations and as environmental guidelines.
15.30	Coffee break
16.00	Result of inventory of the sensitivity maps in the region Presentation of the state of the sensitivity maps in the WACAF region based on the results of the questionnaire
16.15	Presentation of existing maps Presentation of existing maps from National authorities and oil industry: <ul style="list-style-type: none"> • Mauritania, Cameroun, Angola Nigeria • ACEPA, Assoc. Petr. Prod. Angola • UPEGA, Union Petr. Gabon • AOPC, Assoc. Operators Petr. Gabon
17.00	End of day
After diner	Presentation by OTRA of the mapping projects in Angola (for TEPA and Chevron). GIS format, Paper atlas, web mapping.

DAY 2: Training and development of action plan and guidelines for harmonization	
09.00	<p>Presentation of the implementation of coastal sensitivity mapping project and Action Plan This presentation will be divided in two sections which describe the components of coastal sensitivity mapping: Components of coastal sensitivity mapping:1</p> <ul style="list-style-type: none"> • Personnel and resources required • Presentation of GIS systems as a valuable tool for the regional coastal sensitivity mapping
09.30	<p>Presentation of the implementation of coastal sensitivity mapping project and Action Plan Components of coastal sensitivity mapping 2:</p> <ul style="list-style-type: none"> • Data collection and analysis for the Sensitivity mapping • Diffusion of coastal sensitivity maps (paper atlas, Web-based GIS mapping) <p>This discussion will be illustrated by concrete examples for each thematic of sensitivity maps including the steps of realization and the relation with GIS tools</p>
10.30	Coffee break
11.00	UNEP-WCMC sensitive habitat data along the coast from Nigeria to Angola
11.30	<p>Individual work session Presentation of the detailed questionnaire for the assessment of data and of capabilities for coastal sensitivity mapping.</p>
12.30	Lunch break
13.30	Individual work session continued
15.30	Coffee break
16.00	<p>Recommendations for Sensitivity mapping Presentation of the key points to initiate mapping project and the need for regional harmonization Presentation of the draft of regional guidelines</p>
16.30	GI WACAF input for sensitivity mapping project
16.45	<p>Presentation of certificates Closure of Training Course</p>
17.00	End of day

7.4 SUMMARY OF PRESENTATIONS AND DISCUSSIONS

7.4.1 From Friday 20 to Sunday 22 April

All experts were accommodated at the Airside hotel, located at a 5 minutes walking distance from the premises of the IGCC

- Arrival of J.-Y. Huet on Friday 20 in the evening,
- Arrival of L. Page-Jones, C. Carrié, Ph. De Susanne et M. Thiam on Saturday 21 april in the evening.

Sunday 22 April

- **9h30 to 11h00:** preparation meeting - Ph. De Susanne, J.-Y. Huet, L. Page-Jones et C. Carrié (finalization of workshop program, practical organization of the workshop sessions and review of questionnaires)
- **11h30 to 14h00:** visit of the room used for the workshop at IGCC - M. Thiam, Ph. De Susanne, J.-Y. Huet, L. Page-Jones et C. Carrié (preparation of the room, setting up and test of audio visual equipment for simultaneous projection of English and French presentations, reception of the folders containing supporting documentation for the workshop, printing of the final version of the program)
- **14h00 to 18h00:** finalization of the presentations

7.4.2 Monday 23 April

8h30 - 9h00: arrival and registering of participants.

9h30 - 10h30: the opening ceremony took place within the time allocated in the program:

- Georgina Tackie (Mrs), Marine Consultants, who used to be the regional coordinator for IMO in Abidjan, presided the opening ceremony.
- Dr. Chika Ukwe welcomed all the participants and reminded the assistance of UNIDO to IGCC.
- Prof. Chidi Ibe, Regional Director GCLME / Executive Secretariat of IGCC welcomed all participants to the premises of IGCC.
- Hon. Sophia Horner-Sam, Vice-minister, from the Ministry of Ports and Railways, reminded the importance of the cooperation in matters related to oil spill preparedness and response at regional level,
- M. Thiam (of the IMO) welcomed all participants, in the name if the general secretary of the IMO and reminded the importance of coastal oil spill sensitivity mapping. He then presented the activities of the week following the present workshop (workshop for the discussion of the draft sub-regional oil spill contingency plan).
 - ➔ See opening speech of the representative of the IMO in appendix 2.

The ceremony was complemented by a group photograph of all participants.

Working sessions were then chaired by Mr. Nnodimele Ethelbert, General Manager, Imo State Environmental Protection Agency (ISEPA), GCLME Regional Centre for Environmental Pollution Monitoring and Assessment.

11h30 - 12h00: Ph de Susanne presented the outlines of the « Global Initiative for West and Central Africa » (GI WACAF)

12h00 - 12h30: J-Y Huet introduced the principle of sensitivity mapping and highlighted their interest for oil spill preparedness and response. The presentation was based on a real case of an incident which occurred in Brazil in 2005.

12h30 - 13h00: L. Page-Jones presented the various types of coastline, their vulnerability to the effects of oil spill and the Environmental Sensitivity Index (ESI), used to classify the types of shoreline according to their sensitivity.

14h45 - 15h15: C. Carrié presented various sensitive biological and socio-economic resources which can be found on the shoreline, the need to take them into account, and ways of mapping them.

15h15 - 15h45: L. Page-Jones presented the interest of a method for identifying the most sensitive areas on the shoreline, and of a summarized mapping for decision makers.

15h45 - 16h15 : J-Y Huet presented examples of tactical maps, designed for use by personnel in charge of field operations, and operational maps designed for use by oil response operators, who will be deploying the equipment and resources.

16h45 : Ph de Susanne presented a regional view of the development of contingency plans in the West and Central Africa region.

The presentations triggered interest from the delegates and, in particular, their questions were related to the following topics:

- Data to be collected for the development of the maps and the degree of detail needed
- The organization of the data in order to produce maps
- The prioritization of data within a theme (type of shoreline, biological resources, etc.)
- The prioritization of themes (between type of shorelines, biological resources, socio-economic resources),
- Methods for the definition of the most sensitive areas,
- The cooperation between government and industry for the development of maps (is the industry willing to make available the data needed for the development of the maps at national level?)

M. Thiam insisted on the necessity that the inventory of available data, expertise and resources is done in close cooperation between government and industry, before the development of a national coastal sensitivity mapping atlas is initiated, in order to avoid duplication of efforts in the collection of data, mapping works and field visits. He also outlined the interest in developing cooperation between government and industry for the development of the maps, and more generally for contingency planning in the region.

16h50 - 18h10: several delegates presented sensitivity mapping projects:

Ghana	D. S. Amlalo Director, field operations, Environmental protection agency	Environmental Sensitivity Mapping In Ghana
EXXON	Wolfgang J. Konkell ExxonMobil Biomedical Sciences, Inc	ExxonMobil Marine Oil Spill Modeling System for West Africa
Angola	Maria Martins (ACEPA)	Coastal Sensitivity Mapping Oil Industry in Angola
Côte d'Ivoire	Niagne Martin Dibi, Point Focal de la Convention d'Abidjan, Ministère de l'Environnement et des Eaux et Forêts	Implementation of a Geographical Information System for sensitive areas on the coastline of Ivory Coast
Togo	TENOU Yawo Jonky, Ingénieur en Gestion de l'Eau et de l'Environnement, Spécialiste en Gestion des Risques Naturels	Actions taken for the mapping of environmentally sensitive areas in Togo
Cameroun	Samuel Billong Bisseck HSE Manager, Total E&P Cameroun	Presentation of the coastal sensitivity atlas of Total E&P Cameroon

7.4.3 Tuesday 24 April

9h00 - 10h30: L. Page-Jones presented the various types of sensitivity maps, depending on their intended use, as well as the general method for the development of sensitivity maps.

11h00 - 11h30: C. Carrié presented the Geographical Information Systems– GIS, and their advantages for the development of maps. The presentation was based on a real-time demonstration of the creation of sensitivity maps for Northern Angola, using ArcView software (installed on laptop computers).

11h30 - 12h00: C. Carrié presented the various ways of publishing sensitivity maps (as paper atlas, as electronic documents (PDF format) or as integrated in interactive mapping Internet web sites).

A number of questions were asked, in particular on the following aspects:

- The possible assistance to governments of IMO and IPIECA for the development of sensitivity atlases and the role that IMO – UNIDO – IPIECA can play in West and Central Africa for the promotion and assistance for the development of sensitivity maps (financial, assistance? Technical assistance?).
Mr Thiam, representing IMO, answers that each country should send their requests for assistance to the Secretary-General of IMO, with copy to the Secretary General of IPIECA. Each request will be taken into account and studied on a case by case basis.
Ph. De Suzanne, representing IPIECA, adds that IPIECA is ready to support oil spill sensitivity mapping initiatives in the countries and reminds the delegates of the possibility for bilateral cooperation.
- The cost for the acquisition of data (in particular satellite imagery such as IKONOS or QUICKBIRD), when aerial helicopter surveys of the shoreline might be the preferred route and could be organized jointly with the oil industry. It was also noted that the industry often has satellite imagery.

12h00 - 12h30: Ph de Susanne presented two questionnaires for the delegates to fill in:

- «Level of the development of sensitivity maps in West and Central Africa – Gap Analysis. »
- «Action Plan for the development of Oil Spill Sensitivity mapping. »

14h00 - 15h30: Filling of questionnaires by the delegates.

15h30 - 16h30: Round table by delegates and discussion on the feedback for the two days.

- Possibility to set up a regional GIS for West and Central Africa which could be maintained by the GIS regional centre located in Lagos
- The delegates insist on the need for a standardized GIS between countries and if possible with the oil industry.
- The representative of UNIDO mentions the existence of mapping projects being currently implemented at GCLME level and that further contacts have been made with the U.S. Army Corps of Engineers for the set up of a crisis management system.

17h00 - 17h30: Proposal of initial recommendations for sensitivity mapping and the harmonization at regional level.

Note. *These recommendations are included in the Regional Guidelines document which will be sent to delegates in the coming weeks.*

7.4.4 Friday 27 April

The workshop for the development and standardization of coastal oil spill sensitivity maps in West and Central Africa was officially closed on Friday 27 April at the same time as the workshop of the technical group for the development of sub regional oil spill contingency plans and sub regional cooperation agreements in case of major marine pollution (from 25 to 27 April). The closing ceremony took place in the presence of:

- Dr. Chika Ukwe of UNIDO at IGCC.
- M. Thiam of IMO
- Prof. Chidi Ibe, Regional Director GCLME / Executive Secretary IGCC
- P. Azuma, Director General of Maritime Authority of Ghana
- Mrs. Solange Loubamono, representing the Prime Minister of the Republic of Gabon.

7.5 OUTCOME OF THE QUESTIONNAIRES

This section presents a summary of the outcomes of the two questionnaires:

- «Level of the development of sensitivity maps in West and Central Africa – Gap Analysis. »
- «Action Plan for the development of Oil Spill Sensitivity mapping. »

General summary per country

Angola

- The Ministry of Petroleum (MinPet) is the national authority responsible for contingency planning. Unfortunately the delegation from Angola who attended the present workshop did not include any representative from the ministry of Petroleum. It was therefore indicated that the answers to the questionnaires would have to be sent to MinPet for review and finalization.
- The National Oil spill Contingency Plan was finalized in 2000. To this day its approval by the national assembly is still pending.
- The OPRC 90 convention is in the process of being ratified. However, Angola has implemented national legislation and regulations for oil spill contingency planning.
- The delegation from Angola at the present workshop reported the existence of a project for the development of operational oil spill sensitivity maps as well as a GIS on the coastal sensitivities.
- The delegation also reported the existence of organizations with expertise for the development of maps, of personnel trained to the use of GIS and of available data (at the National Geodesic Institute, at the Ministry of National Research, at the “Agostino Neto” university and in oil companies).

Benin

- The authority responsible for oil spill contingency planning has not yet been designated.
- The OPRC 90 and Fund 92 conventions are in the process of being ratified et Benin has implemented a national legislation for oil spill contingency planning.
- The national organizations likely to be involved in the response to oil spills organized themselves by forming a working group and would like to receive training
- The geographical institute has expertise for the technical development of the sensitivity maps. Data and resources for implementation are available and the personnel is trained. A request for assistance is however envisaged concerning the methodology.

Cameroon

- The « Comité de Pilotage et de Suivi du Pipeline » was not represented in the workshop. It was therefore not possible to confirm that this organization was officially designated as national competent authority.

- OPRC 90 is in the process of being ratified and Cameroon has implemented a national legislation for oil spill contingency planning.
- The national authorities are involved in oil spill response and preparedness. However, they are not organised into a working committee to develop the national oil spill contingency plan.
- Sensitivity maps were developed and sensitive areas identified in the « Plan de Lutte contre les Déversements Accidentels d'Hydrocarbure (PLDAH). This plan was developed within the framework of the Chad-Cameroon pipeline project by the « Comité de Pilotage et de Suivi de Pipeline (CPSP) ». This plan has not yet been approved officially. The representatives of the local oil industry have also developed sensitivity maps, based on the use of a GIS.
- Expertise, data and GIS trained personnel (both in the public and private sectors – e.g. local oil industry) are available in the country for the development of maps.

Republic of Congo

- It was reported that the national competent authority for oil spill contingency planning has not yet been officially designated. The “marine marchande” has been playing an active role for several years in oil spill preparedness. Following a national workshop in August 2006, a national action plan was developed. This action plan is currently being implemented. The national authority is in charge of the development of sensitivity maps and want to:
 - Setup and supervise a project committee,
 - Use a contractor to finalize the maps
- OPRC 90 was ratified and the country has implemented a national legislation for oil spill preparedness and response.
- The commitment of the national authorities for the development of the national oil spill contingency plan could be increased.
- Expertise for the development of the maps exists in the country, but data are only partially available and personnel are not trained to the use of GIS.

Democratic Republic of Congo

- An Inter-ministerial Commission (Ministry of Environment, Ministry of Transport, Ministry of Petroleum, Ministry of Industry, Ministry of Finance,...) was recently created to develop an implementation plan for the contingency plan.
- OPRC 90 has not yet been ratified and ensuing national legislation has not been developed as yet.
- Sensitivity maps have been developed to manage the risk due to global climate change and these maps can serve as a basis for the development of environmental sensitivity maps.
- Organizations with relevant expertise for the development of the maps exist in country (universities, study centre in Kinshasa), data are partially available and some personnel are trained to the use of GIS. Partnerships should be considered for the development of the maps.

Ivory Coast

- The Ministry of Environment (Ministère de l'Environnement et des Eaux et Forêts) is officially designated as the national authority in charge of contingency planning and would be responsible for the coastal oil spill sensitivity mapping project. A national oil spill preparedness and response centre has been set up as an operational structure within the Ministry of Environment. The national legislation for the implementation of the plan is pending official signature.
- OPRC 90 has been ratified. The Fund 92 still has to be ratified. The national legislation for oil spill contingency planning is in place.
- Maps about the general sensitivity of the shoreline have been developed and could be used as the basis for oil spill sensitivity maps.
- Some organizations have the expertise for the development of the sensitivity maps, data are partially available and personnel are trained to the use of GIS. Needs for assistance were expressed in respect of two aspects: raising the awareness of authorities to the necessity of development of the maps and technical orientation for the development of the maps through national workshops.

Equatorial Guinea

- The Ministry of Environment and Fisheries has taken the leadership in the field of oil spill response but is not yet officially designated. The Ministry works in partnership with the Ministry of Transport, the Ministry of Petroleum, the National Defense, the oil companies and the NGOs. A need for raising awareness of the national authorities was expressed and a national seminar is planned in that respect.
- OPRC 90 has not been ratified
- The country has available documentation for the identification of sensitive areas. These documents can be used as the basis for the development of the sensitivity maps.
- There is expertise available in country (Ministries, universities, national institute for protected areas) and data are partially available for use by the Ministry of Environment and Fisheries.

Gabon

- The national authority in charge of contingency planning is officially designated. This allowed the development of a national oil spill contingency plan, which is currently pending validation. The development of the plan was done by a working group comprising of the Ministries of Environment, Petroleum, Transport, the national oil spill response centre and the government department in charge of the Merchant Navy (Marine Marchande).
- OPRC 90 and the MARPOL convention have been ratified
- Coastal oil spill sensitivity maps are being developed:
 - A project committee for the development of the maps is in place and is responsible for defining an action plan for their completion;
 - Sensitivity maps exist for the areas of operation of the oil companies.

- Organizations with the relevant expertise exist in country, data are partially available and the personnel are trained for the use of GIS. Partnerships are possible with various national organizations (Department of Geography of the university, Mapping Institute (Institut de Cartographie), Tropical Research Institute, National Centre for Oceanographic Research)

Ghana

- The Environment Protection Agency is the national competent authority and is officially designated as such. It has developed partnerships with fifteen organizations for the development of the oil spill contingency plan and has benefited of the technical support of IMO, UNIDO and IPIECA.
- OPRC 90 is in the process of being ratified and national legislation is pending validation.
- Sensitivity maps have been developed. An action plan is foreseen to:
 - Update the maps (inclusion of tourist activities and of coastal areas submitted to erosion);
 - Develop operational maps for specific sensitive areas
 - Assess identified sensitive areas in more detail.
- Expertise exists in country for the development of sensitivity maps, data are available and personnel are trained to the use of GIS.

Guinea-Bissau

- No national competent authority has been so far designated. The Ministry of Natural resources and environment has been active in the field of oil spill contingency planning.
- No national oil spill contingency plan has been developed and no conventions have been ratified. However, authorities are aware of the issue, especially in relation to the development of exploration activities.
- Coastal oil spill sensitivity maps have not been developed but resources exist (existing maps, data available, organizations with expertise, personnel trained to the use of GIS and possible partnerships with IUCN).

Republic of Guinea

- It was reported that the Ministry of Environment would be responsible of the development of coastal oil spill sensitivity maps in cooperation with the Ministry in charge of the Merchant Navy (Marine Marchande), who is in charge of the national oil spill contingency plan. An inter-ministerial group in charge of the maps must be set up in order to ensure perfect sharing of the efforts.
- OPRC 90 is ratified and a national legislation is being developed.
- Resources are available in country: National Geographic Institute, National Research Centre who have already developed some sensitivity maps.

Liberia

- The Environment Protection Agency is the national competent authority for the development of sensitivity maps and is officially designated. The agency works in partnership with various organizations with the framework of a committee.
- OPRC 90 is ratified and a national legislation is being developed.
- Sensitivity maps are not yet developed
- Organizations with relevant expertise for the development of coastal sensitivity maps exist. Some data are available and personnel are trained to the use of GIS (UNEP Office, United Mission, Environment Protection Agency - EPA).

Nigeria

- NOSDRA is the national competent authority and is officially designated as such. Partners involved in the response to oil spills have started to get organized within a committee: Ministries of Environment, Department of Petroleum, Ministries of State, Emergency Response Department, oil companies and Maritime Authorities.
- The national plan has been developed, and following the national workshop of December 2006, it was updated.
- The ratification of international conventions is planned (OPRC 90 in the process) and a national oil spill preparedness and response legislation is in place.
- Sensitivity maps are being developed. Following the December 2006 national workshop, an official request for technical assistance was issued by NOSDRA to IMO and IPIECA with the objective to train the national expert for the development of sensitivity maps and the decision makers to the use of these maps for oil spill preparedness and response. The workshop can be organized in 2007, as soon as the national authorities have confirmed the dates.
- Logistical resources (GIS, Data) are available in country as well as organizations with relevant expertise for the development of the sensitivity maps. In particular the regional centre for the GCLME project.

Sao Tomé e Príncipe

- Activities of oil exploration and production are currently being developed in the country, which calls for the implementation of a national oil spill contingency plan.
- No national competent authority has been identified so far, and conventions are not ratified.
- Sensitivity maps are not developed but data exist and they are available for the development of the maps.
- The country requires assistance for the ratification of the conventions and the training of personnel for the development of coastal oil spill sensitivity maps

Sierra Leone

- Maritime Affairs are in charge of the national oil spill contingency plan, but have not been officially designated. A first version of the plan was drafted in 1004, and IMO provided assistance for the revision of the plan through a national workshop in December 2006. The objective is now to set up a working group
- OPRC 90 is being ratified and a national oil spill preparedness and response legislation is being developed.
- Oil spill sensitivity maps have not been developed. However maps were developed for Integrated Coastal Zone management purposes by the university, which includes the identification of areas sensitive to coastal erosion,
- The country has organizations with relevant expertise for the development of sensitivity maps (Department of Mapping at the University)

Republic of Togo

- The Ministry of Environment has recently taken the leadership in the field of oil spill preparedness, cooperation and response, but has not been officially designated. The Ministry of Environment is organizing a national workshop in July 2007 in order to meet with all parties which might be involved.
- An action plan for the development of the national oil spill contingency plan, including the development of sensitivity maps will be defined.
- The country has organizations with relevant expertise for the development of sensitivity maps, data are available and personnel are trained to the use of GIS. Partnerships are possible and need to be reinforced.

Detailed results of the questionnaires per country

➔ Refer to the tables in following pages.

Countries	Authority in charge of contingency planning		Legislation in place regarding contingency planning				Existing environmental sensitivity maps	
	Existing national authority ?	Officially designated	OPRC 90 has been ratified	Other national legislation	Decreases in place?	Oil spill sensitivity maps ?	Has any organisation in the country developed sensitivity maps ?	
Angola	YES	YES	In process	In place	In place (N 8/05 - Ministry of Petroleum)	In process	YES	
Benin	YES	NO	In process	In place		Maps not developed	Might be	
Cameroun	YES	NO	YES	In place	In place (Environmental framework law- 1996)	Maps developed	YES	
Congo	YES	NO	YES	In place		Maps not developed	YES	
Cote d'Ivoire	YES	YES	YES	In place	In place	Maps not developed	YES	
Gabon	YES	YES	YES	In place	In place (decree for Oil Spill Preparedness Response)	In process	Might be	
Ghana	YES	YES	In process	In process		Maps developed	YES	
Guinea Bissau	YES	NO	NO	NO		Maps not developed	YES	
Republic of Guinea	YES	NO	YES	In process		Maps not developed	Don't know	
Equatorial Guinea	YES	NO	NO			Maps not developed	Don't know	
Liberia	YES	YES	YES	In process		Maps not developed	Don't know	
Nigeria	YES	YES	In process	In place		In process	Might be	
Democratic Republic of the Congo	NO	NO	In process	In process		In process	YES	
Sao Tome	NO	NO	NO	NO		Maps not developed	Don't know	
Sierra Leone	YES	NO	In process	In process	Not in place	Maps not developed	Might be	
Togo	YES	NO	NO	NO		Maps not developed	YES	

National technical resources											
Countries	Competent organisation to develop sensitivity maps	Personnel trained in GIS development	Number of people trained in GIS	Type of GIS software used	Partnership possibilities	Availability of geographic data in the country	Existing topographic maps	Scale of topographic maps	Is all the shoreline covered?	Aerial photos and satellite images	Nature
Angola	YES	YES		Arcview	YES	Available	YES	1/250.000	YES	Available	
Benin	YES	NO			Don't know	Available	YES		YES		
Cameroun	Don't know	Yes (TOTAL E&P personnel)		Arcview		Available	Ne sait pas		YES	Available	
Congo	YES	NO			YES	Partially available	YES	Various scales	YES	Available	
Cote d'Ivoire	YES	YES		Arcview / Mapinfo	YES	Partially available	YES	Various scales	YES	Available (need a contract)	SPOT, Landsat
Gabon	YES	YES Not all the personnel			YES	Partially available	YES	1/50.000 à 1/200.000	YES	Partially available (all the shoreline is not covered / most recent data : 1992 (Libreville & Port-Gentil))	SPOT
Ghana	YES	YES	30 (in various organizations)	Arcview 8.3	YES	Available	YES	1/50.000	YES	Available	
Guinea Bissau	YES	YES	2	Arcview / Mapinfo / other (not specified)	YES	Available	YES	1/25.000	YES	Available	Landsat
Republic of Guinea	Don't know	NO			YES	Partially available	YES		YES	Not available	NO
Equatorial Guinea	YES	NO			YES	Partially available					
Liberia	Might be	YES	6	Arcview / other (not specified)	YES	Partially available	YES	- 1/25.000 - 1/50.000 - 1/200.000	YES (scale of 1/50.000)	Available (GIS department of UHEP & UHMIL)	QuickBird & Landsat
Nigeria	YES	YES	more than 40	Arcview	YES	Partially available	YES		YES	Available (contact: Dr Robert Boirofice, NASRDA, Gowki Abija)	Landsat
Democratic Republic of the Congo	YES	YES	1 (Expert BABOLONGO of CICG/RDC)			Partially available	YES	1/1000.000	YES	Don't know	
Sao Tome	Don't know	NO				Available	YES		YES	Not available	
Sierra Leone	Might be	NO				Available	NO				
Togo	YES	YES	Capacity to be reinforced	Arcview / Mapinfo	YES	Partially available	YES	1/200.000 (to be checked) + Nautical charts	YES	Available (to be updated)	Images SPOT (not covered all the shoreline)

Countries	Identification of sensitive sites requiring protection			Commitment and willingness of National Authority		Committees & workgroup	
	Sensitive sites identified	Sensitive sites prioritized	Type of sensitive sites identified	Level of commitment	Need of further assistance to raise commitment	Organisations structured into committees or workgroup	Committees or workgroups require any training or workshops
Angola	YES	Contact : Ministry of Urbanism & Environment		High level	YES	NO	YES
Benin	In process			High level	YES	NO	YES
Cameroun	YES			High level	YES	NO	YES
Congo	In process			Average level	YES	NO	
Cote d'Ivoire	NO			High level	YES	NO	
Gabon	In process	Should be identified		High level	YES	YES	NO
Ghana	YES	YES		High level		YES	YES
Guinea Bissau	YES	YES		Average level	YES	NO	YES
Republic of Guinea	In process	NO	- High interest area for birds - Nesting area for marlin turtles	Average level	YES	YES	YES
Equatorial Guinea	YES			Not sufficient support	YES	YES	YES
Liberia	In process	NO		Average level	YES	YES	YES
Nigeria	In process			High level	YES	NO	YES
Democratic Republic of the Congo	YES		- Mangrove marin park - Recreational beach - Fishing village - Mangrove hotels	High level			
Sao Tome	YES						
Sierra Leone	NO			High level	YES	YES	YES
Togo	NO			High level	YES	YES	NO

7.6 LIST OF ABBREVIATIONS AND ACRONYMS USED IN THE REPORT

- ACEPA : Associação das Companhias de Exploração e Produção de Angola
- AOPC : Association des opérateurs pétroliers du Congo
- CICG : Commission Intérimaire du Courant de Guinée
- CLC 92 : International Convention on Civil Liability for oil pollution damage
- ESI : Indice de Vulnérabilité Environnementale – Environmental Sensitivity Index
- FUND 92 : Convention : International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage (FUND 92)
- GCLME : Guinea Current Large Marine Ecosystem
- GEM-CG : Grand Écosystème Marin du Courant de Guinée
- GI WACAF : IMO / IPIECA Global Initiative Project for the West and Central Africa region
- IGCC : Interim Guinea Current Commission
- IPIECA : International Petroleum Industry Environment Conservation Association
- ISEPA : Imo State Environmental Protection Agency
- IT : Internet Technologies
- ITOPF : International Tanker Owners Pollution Federation Limited
- IUCN : International Union for the Protection of Nature - World Conservation Union
- NOAA : National Oceanic and Atmospheric Administration
- NTIC : Nouvelles Technologies de l'information et de la communication
- IMO : International Maritime Organization (IMO)
- NGO : Non Governmental Organization (NGO)
- UNIDO : United Nations Industrial Development Organization
- OPTS : Oil Producers Trade Section of the Lagos Chamber of Commerce and Industry (Nigeria)
- UNEP : United Nations Environment Programme
- GIS : Geographical Information System
- UPEGA : Union Pétrolière Gabonaise

7.7 PHOTOS OF THE WORKSHOP



Opening ceremony



Meeting room at the IGCC



Meeting room at the IGCC



Bilingual Presentation English – French using two screens and simultaneous translation

7.8 SOURCES AND REFERENCES

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