International Maritime Organization

International Petroleum Industry Environmental Conservation Association

National workshop on the development of national Oil Spill Vulnerability maps for Cape Verde

Sao Vincente, Republic of Cape Verde,

27 – 30 July 2010

CAPE VERDE

GIWACAF

GLOBAL INITIATIVE FOR WEST AND CENTRAL AFRICA

(GI WACAF)

NOTE

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IMO/IPIECA, 2010: ***Report of the National workshop on the development of national Oil Spill Vulnerability maps for Cape Verde - Sao Vincente, Republic of Cape Verde, 27 – 30 July 2010***

Executive Summary

Place and date: Mindelo, Sao Vincente (Republic of Cape Verde), 27 – 30 july 2010 **Type**: National

Organised by:

- Ministério das Infra-estruturas, Transportaes e Mar / Instituto Marítimo e Portuário
- International Maritime Organization (IMO)
- International Petroleum Industry Environmental Conservation Association (IPIECA)

Number of participants: 24 experts

The principal objectives of the Workshop were as follow:

- Train national experts to the mapping of the coastal vulnerability to oil spill.
- Conduct an analysis of the existing relevant geographic data in country.
- Produce a first set of vulnerability maps (for the coastal area of Barlavento islands).from a Oil Spill Vulnerability GIS
- Develop a methodology to identify the most vulnerable areas in the mapped region.
- Develop an Action Plan to improve and extend the coverage of the vulnerability maps.

The involvement of the participants and the efficient running of the workshop allowed the production of the results as follow:

- Development of tactical and strategical vulnerability maps for Republic of Cape Verde (coastal area of Barlavento islands) with the team of experts (using a Geographic Information System and geographic data provided by the experts).
- Training of national experts on vulnerability mapping (methods and techniques).
- Development of methodology to synthesize the vulnerability and to identify the most vulnerable sites
- Development of an Action Plan to complete the GIS and produce vulnerability maps.

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1 Introduction

The Global Initiative for West and Central Africa (GI WACAF) is a partnership between the International Maritime Organisation (IMO) and the International Petroleum Industry Environment Conservation Association (IPIECA) to enhance the capacity of countries to prepare for and respond to marine oil spills. A key innovative feature is emphasis the promotion of public/private partnership for effective oil spill response making use of existing industry expertise and resources.

The mission is to strengthen the national oil spill response capability in twenty two countries in West and Central Africa through the establishment of local partnership between the oil industries and the national authorities in charge of oil spill preparedness and response at national level.

This program is jointly funded by the International Maritime Organization (IMO) eight Oil Companies members (BP, Chevron, ENI, ExxonMobil, Marathon, PERENCO, Shell and Total) through the International Petroleum Environment Conservation Association (IPIECA).

The scope is to organise workshops, training, seminars and deployment exercises with national authorities in charge of oil spill response, in partnership with local business units.

The GI WACAF is based on an effective management system established six goals of preparedness and key performance indicators to enhance the capacity of countries to prepare for and respond to marine oil spills. These goals cover the requirements of the OPRC 90 convention:

- Goal 1: Legislation: Promote the ratification of the relevant international Convention,
- Goal 2: Contingency plan: Have contingency plan for all the countries of the region,
- Goal 3: Designation of authority: Get clarity in roles and responsibilities for oil spill response,
- Goal 4: Regional agreement: promote exchange and mutual assistance for oil spill response,
- Goal 5: Training: Ensure that training and exercise are developed in each countries on a regular basis,
- Goal 6: National capabilities: support countries in developing their own national response system.

2 Objectives of the national workshop

The objectives of the national workshop, clearly defined from the recommendations of the GIWACAF Regional Workshop held in Cameroun in December 2010, were to begin the development of coastal vulnerability maps to oil spill from GIS tools

- Train a team of in country experts on oil spill vulnerability mapping,
- Initiate the development of sensitivity maps during the workshop:
    - Identify the types of shore and their Environmental Sensitivity Index (ESI),
    - Indentify vulnerable biological resources to oil spill events,
    - Indentify vulnerable human use resources to oil spill events,
    - Develop an “Oil Spill Vulnerability GIS” to manage geographic data and produce maps,
    - Rank the vulnerability information with the objective to identify the most vulnerable sites and resources, and discuss the prioritization of the identified sites.
- Develop an action plan for the continuation and update of the maps and integration into the NOSCP.

3 Program of the workshop

The workshop proposed a dynamic and participatory approach compared to previous workshops to ensure the production of concrete results, even in the short time available, while making the best use of local knowledge of national experts.

The first day was dedicated, in the morning, to the opening ceremony, the presentation of GI WACAF Project and the introduction of the coastal vulnerability mapping whereas the daily afternoon concentrated the presentations on the generic action plan, relationship between National Contingency plan and Coastal Vulnerability maps, and the specific coastal vulnerable maps for each main users.

The second and third days were devoted to the identification of the coastal vulnerability and the identification of the most vulnerable site. A visit on the east shoreline of the Sao Vincente Island was organised during the third daily afternoon to validate, and complete the vulnerability of the coast and its priorities. This visit was not planned initially in the program of the workshop.

The last day was dedicated to the presentation of the results (maps and GIS), the development of an action plan to continue the coastal vulnerability maps and the closing ceremony.

➔ See the programme of the workshop in Appendix 1.

4 Location, dates, roles & participants

The workshop was hosted by the Instituto Marítimo e Portuário of the Ministério das Infra-estruturas, Transportaes e Mar. IMO and IPIECA provided one expert to support the workshop. . The expert in charge of the workshop was:

- Christophe CARRIE, IMO and IPIECA representative.

The Instituto Marítimo e Portuário took care of the general organisation and the host of delegates.

The person in charge of the workshop organisation M. Rosario Lopes Joao, GI WACAF Focal Point.

The workshop took place in the lecture room of the Instituto Marítimo e Portuário at Mindelo. The room was correctly equipped and adapted for the workshop program (video projector, public address system, internet connection.).

The total number of participants is 24 peoples, representing organisms in charge of the environment management, fishing activities, university, oil industries, Non Governmental Organisations.

The participant list is in Appendix 2.

5 Workshop Process

The national workshop on the development of the coastal vulnerability mapping was focused on of the eight Barlavento islands. The 6 steps below were followed :

Step 1: Training of national experts to the mapping of the coastal vulnerability to oil spill,

Step 2: Production of the tactical maps.

Step 3: Development of a method for the synthesis of the vulnerabilities and the identification of the most vulnerable areas in the mapped regions,

Step 4 Development of strategic maps

Step 5 Mapping of the most sensitive sites

Step 6: Definition an Action Plan.

5.1 Opening Ceremony

The opening ceremony took place on the 27 July 2010. The IMO and IPIECA representative thanked the national authority of the Republic of Cape Verde and stressed on the importance of the workshop. He also reminded the objective of IMO, IPIECA and the achievement of the GI WACAF project since it's launch in 2006.

The full speeches texts are in Appendix 3.

5.2 Training of national experts

Presentation of the IMO/IPIECA GI WACAF project
Christophe Carrié, IMO/IPIECA Consultant, presented the GI WACAF project, supported by IMO and IPIECA, the results has obtained since 2006 and plans for the next biennium.

Workshop objectives, of the lecturers and all course participants
Christophe Carrié, Consultant IMO/IPIECA, presented the objectives of the workshop, in the framework of the GI WACAF project.

Coastal vulnerability mapping and international guidelines
Christophe Carrié, Consultant IMO/IPIECA, presented

- The impacts of oil on the type of coast, on the biological and human-use resources,
- The methodology of the coastal vulnerability mapping to oil spill events,
- The methodology for the identification of the most vulnerable sites and interest to achieve a synthesis to identify the most vulnerable sites,
- The relation between maps and the national contingency planning.

Coastal vulnerability maps: Needs & Users
Christophe Carrié, Consultant IMO/IPIECA, presented the different type of users and their mapping needs (decision maker, on scene commander and oil spill response operators).

Development and publication of a coastal vulnerability Atlas

Christophe Carrié, Consultant IMO/IPIECA, presented the mapping principles for coastal sensitivity maps, the format and the interest of an atlas instead of simple maps integrated into the NOSCP, the update of the coastal vulnerability mapping.

Presentation & Assessment of the GIS data collected by participants for this project
In relation to the participants, Christophe Carrié, Consultant IMO/IPIECA, studied the data provided by the participants.

Overview of the action plan to develop the vulnerability maps, attended results and integration into the NOSCP
Christopher Carrie, Consultant IMO / IPIECA, presented an overview of a development coastal vulnerability mapping project, expected results and the implementation into the NOSCP.

GIS structure in relation to the available and relevant data
Christopher Carrie, Consultant IMO / IPIECA, explained

- The role of the GIS in the coastal vulnerability mapping,
- The relevant Data to input into the GIS (geographic, statistical and descriptive data),
- The minimum GIS structure (organisation of the GIS layers and the structure of each GIS layer).

5.3 Working group

Tactical Maps: Identification of the coastal vulnerability to oil spill

The facilitator organised the working session in three working groups for the identification of the vulnerabilities and the development of vulnerability maps (one group per thematic) :

- the vulnerability of the type of coast,
- the vulnerable biological resources,
- the vulnerable human use, logistics & operational resources (including potential sources of pollution).

The working group based their work on the data collected during the workshop: geographic data and report provided by participants, photo-interpretation from Google Earth Very High Resolution Image. Each group was composed of various experts providing the required skills and expertise to identify the vulnerability for each respective topic and. Each group had also one GIS expert equipped with a computer having the ArcGis 9.3 software. During the working session the three groups in parallel digitalised the relevant data into the GIS with the support of the facilitator.

With the financial support of the general Directorate of the Environment, all participants were invited to visit the east coastline of Sao Vincente Island to validate and update the coastal vulnerability defined during the working session. With the support of the IMO/IPIECA facilitator, the vulnerability of the type of coast, the vulnerable activities and the priority of protection defined were discussed and validated.

Identification of the methodology for integration of the three types of sensitivity

Following an introductive presentation from the facilitator, the participants identified the most appropriate methodology to integrate the three types of sensitivity.

Development of strategic maps

Participants displayed the GIS data for the three types of vulnerability, and ranked the most vulnerable site where the vulnerability was higher.

Mapping of the most sensitive sites

Mapping the most vulnerable sites: In a second stage as a result of this integration, the participants identified of the most vulnerable sites.

5.4 Development of the general action plan

The participants developed a general action plan for the continuation and the update of the maps and their integration into the NOSCP.

5.5 Closing ceremony

The closing ceremony took place the 30 July 2010. Closing speech of M. José Figueiredo of the Instituto Marítimo e Portuário, who thanked all participants for the quality of work done during these four days, IMO and IPIECA for their support, and finally declared the workshop closed.

Closing speech of the IMO / IPIECA representative reminding participant of the importance of the coastal vulnerability maps development continuation and its integration into the NOSCP. IMO / IPIECA representative thanked also the Republic of Cape Verde, the Instituto Marítimo e Portuário for the workshop organisation and their hospitality.

Presentation of certificates to participants and USB drives with workshops supports and maps developed.

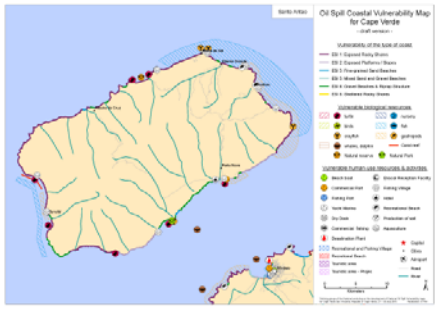
The full speeches texts are in Appendix 3.

6 Results obtained

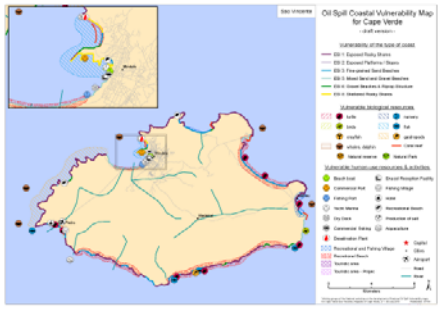
6.1 Production of tactical maps for the Barlavento islands

The participating national experts based the production of the maps on the relevant data provided by IMP, Ministry of Environment and other organisation during the workshop. When documents were not available the participating expert's inputted information directly. The following action were conducted:

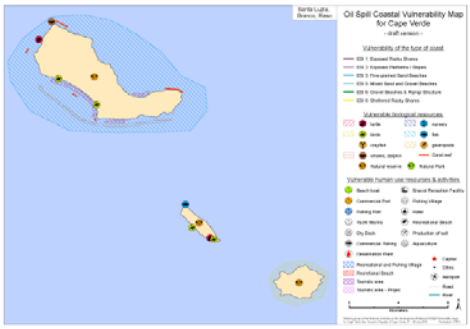
- Establish a GIS from ArcGis 9.3 containing all the relevant GIS layers (SHAPEFILE Format) in WGS84 datum and organised in different folders, (see annex 6)
- input the baseline data provided by experts in GIS (roads, coastline, city, place names, administrative boundaries),
- identify the vulnerability: the type of coast, biological resources, human-uses resources.
- produce the tactical maps. Each maps displayed the three themes of the coastal vulnerability, (see annex 6 and below)



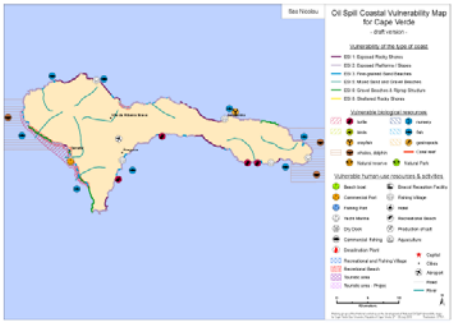
Santo Antonio (type of coast, biological and human use



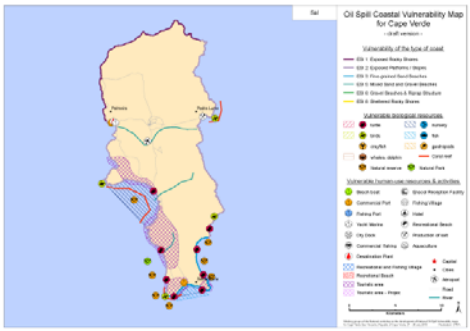
Sao Vincente (type of coast, biological and human use)



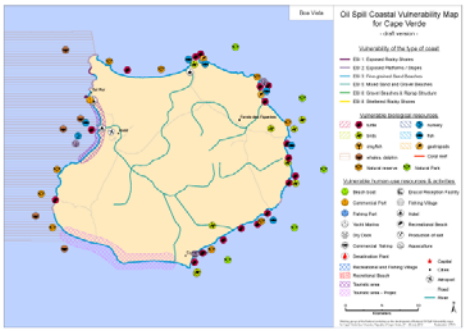
Santa Luzia, Branco, Raso (type of coast, biological and human use)



Sao Nicolau (type of coast, biological and human use)



Sal (type of coast, biological and human use)



Boa vista (type of coast, biological and human use)

6.2 Identification of the method for synthesis of the vulnerabilities

Synthesis of the vulnerability of the type of coast

Method : Simplification of the ESI classification (composed by 10 classes) into 3 classes:

Value of the vulnerability	Grouping of the ESI classes
Low vulnerability	ESI 1 & 2
Medium vulnerability	ESI 3 – 4 – 5 – 6 – 7
High vulnerability	ESI 8 – 9 – 10

Mapping : the synthesis mapping representation of the vulnerability of the type coast used a line for the shoreline.

Only the Medium and High vulnerability are used for the identification of the most vulnerable sites.

Synthesis of the vulnerable biological resources

Method: Classification of the biological resources and protected areas in the three classes

Value of the vulnerability	Type of biological resources and protected area
Low vulnerability	Other area
Medium vulnerability	Natural park, site with high concentration of crayfish, site with Marine Mammals
High vulnerability	natural reserve, coral reef, site with high concentration of bird, site with high concentration of turtle

Mapping: the synthesis mapping representation of the vulnerable biological resources depends on the spatial extent of these resources (point or polygon).

Only the Medium and High vulnerability are used for the identification of the most vulnerable sites.

Synthesis of the vulnerable human-use resources and activities

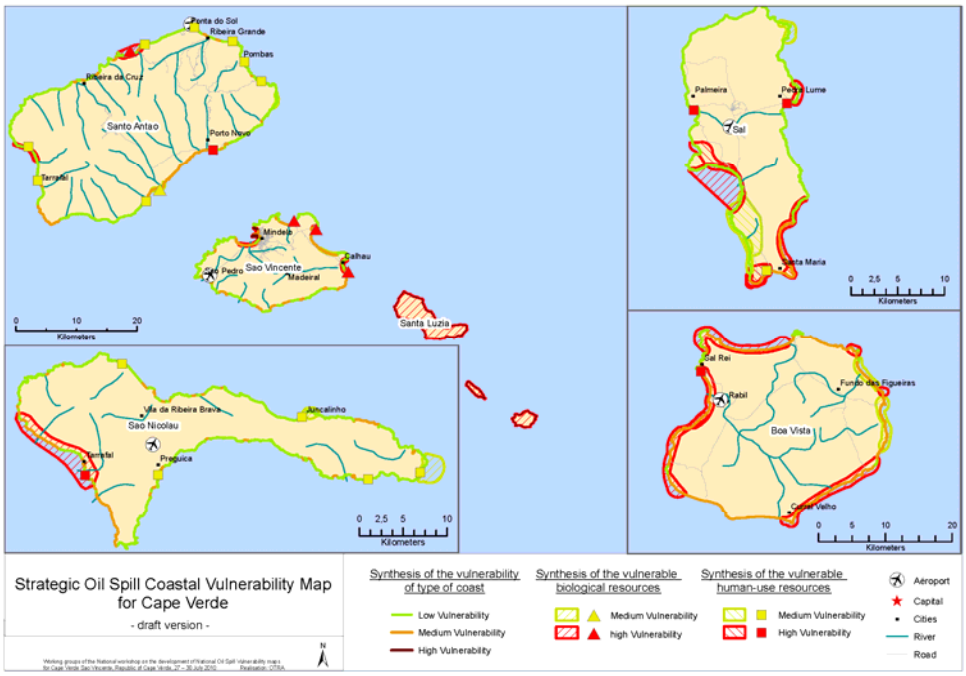
Method: Classification of the biological resources and protected area in the three classes

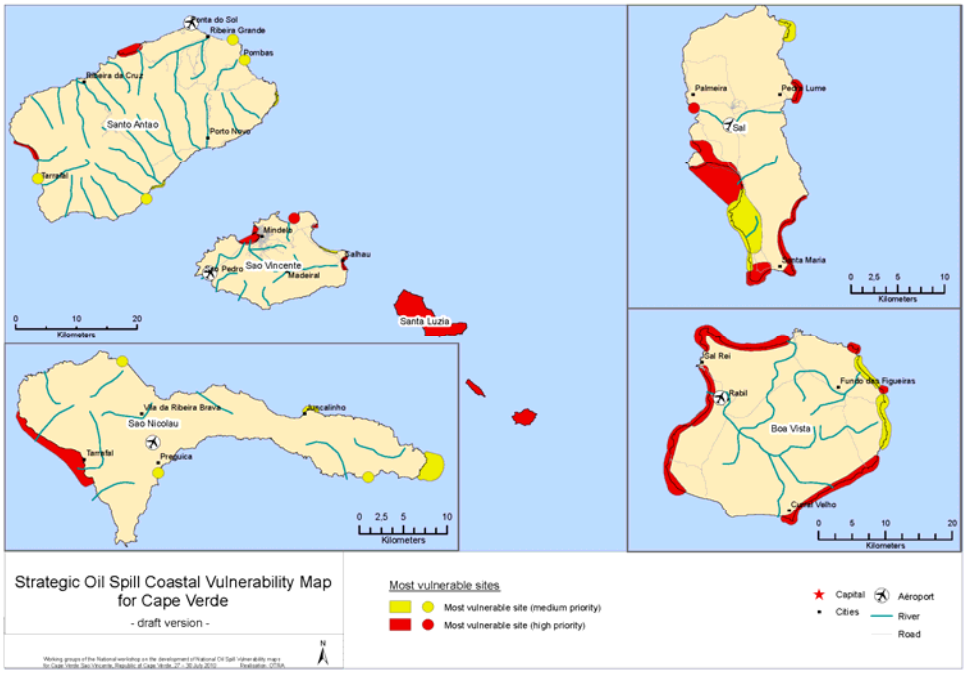
Value of the vulnerability	Type of biological resources and protected area
Low vulnerability	Tourism area (with or without infrastructures)
Medium vulnerability	Small Port, Fishing village , important area for tourism activities (with some infrastructures
High vulnerability	Port, Water-intake, Dry docks, Most important area for tourism activities (with many infrastructures)

Mapping: the synthesis mapping representation of the vulnerable human-use resources and activities depends on the spatial extent of these resources (point or polygon).

Only the Medium and High vulnerability are used for the identification of the most vulnerable sites.

6.3 Strategic map produced for the eight Island of Barlavento using the methodology



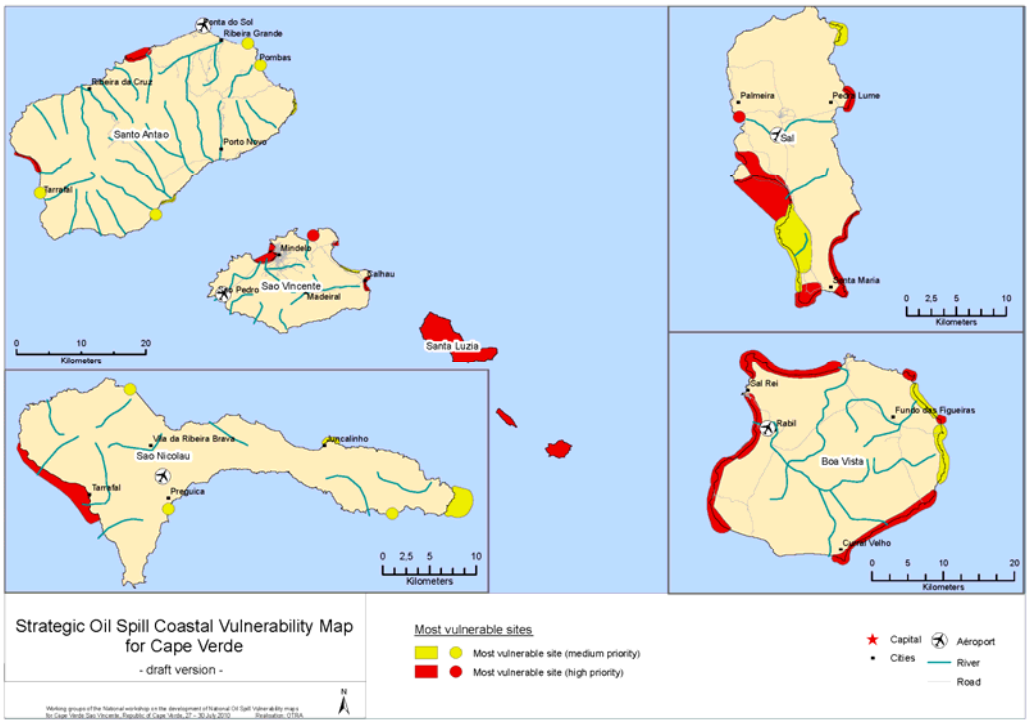


6.4 Mapping of the most vulnerable sites

To make the decision easier, the methodology of the Identification of the most vulnerable sites classify the shoreline in sector according to the level of the vulnerability identified during the synthesis method:

- One sector of the shoreline is considered to have an high priority when there is at least one or more High Vulnerable area on this sector
- One sector of the shoreline is considered to have an medium priority when there is at least one or more Medium Vulnerable area on this sector

Example of strategic map with the most vulnerable sites



6.5 Actions Plan

During the last days, the participants developed an action plan to continue the development of the coastal vulnerability mapping and its interrogation into the NOSCP, including the identification of a working group to implement this action plan.

The action plan is detailed in Appendix 4.

7 Conclusions

The 'key' organization for the development of the coastal vulnerability maps, were well represented at the workshop, which allowed us:

- To take advantage of the expertise of all participants to produce a first set of tactical and strategical coastal vulnerability maps,
- To a simple and rapid method to identify the most vulnerable sites.

The active participation and motivation of participants and national authorities for the project of the coastal vulnerability mapping, the conjunction of the this workshop with the national workshop on the test and the update of the national oil spill contingency plan (to come) are a positive and encouraging signs of commitment of the Republic of Cape Verde to improve his level of oil spill preparedness and response.

In view of:

- the involvement of the participants and national authorities,
- the quality and quantity of the work done by all participants during four days,
- and the overall positive evaluation of the workshop by participants.

The IMO/IPIECA representative considers that the national workshop on the development of national Oil Spill Vulnerability maps for Cape Verde reached its objectives.

8 Appendices

Appendix 1. Program of the workshop

Day 1 : Tuesday 27 July	
	Introduction
08h00	Registration of participant
09h30	**Presentation of the IMO/IPIECA GI WACAF project** Consultant IMO/IPIECA GI WACAF
	Workshop objectives, of the lecturers and all course participant Consultant IMO/IPIECA GI WACAF
10h00	**National Oil Spill Contingency Plan and discussion** GIWACAF Focal point
10h30	**Coffee break**
	Vulnerability mapping introduction
11h00	**Introduction to Coastal vulnerability mapping and international guidelines**
12h30	**Lunch break**
13h30	**Coastal vulnerability mapping** Christophe Carrié, Consultant GI WACAF - ESI Methodology - Identification of the most sensitive sites
15h00	**Coffee break**
15h30 To 17h00	**Presentation & Assessment of the GIS data collected by participants for this project** Christophe Carrié, Consultant GI WACAF - tools, software data & personnel *Note. The data will have to be collected prior to the workshop and available in GIS format during the workshop to be assessed and used with a GIS software and to be correctly assess* *These data will be used for the development of the sensitivity maps the following day.*

Day 2 : Wednesday 28 July	
	Coastal vulnerability mapping
09h00	**Overview of the action plan to develop the vulnerability maps, attended results and integration into the NOSCP** Christophe Carrié, Consultant GI WACAF Discussion & questions
09h30	**Presentation of the GIS structure** according to the needs and available data Christophe Carrié, Consultant GI WACAF **Organisation of the session in 3 groups for the development of vulnerability maps** - type of coast and general environmental sensitivity - biological resources - human use, logistics & operational resources (including potential sources of pollution) **Working session in three groups for the development of vulnerability maps:** Coffee break included into the session
12h30	**Lunch break**
13h30	**Working session in three groups for the development of vulnerability maps (Cont'd)** - type of coast and general environmental sensitivity - biological resources - human use, logistics & operational resources (including potential sources of pollution) *Note. Each group, will be made up of 2 to 3 experts and one GIS expert with a computer equipped with a GIS software.*
15h00	**Coffee break**
15h30 to 17h00	**Working Session in 3 groups for the development of vulnerability maps** (continuation of the session)

Day 3 : Thursday 29 July	
	Vulnerability ranking and identifying most vulnerable sites
09h00	**Presentation of vulnerability maps developed by the 3 groups** - type of coast and general environmental sensitivity - biological resources - human use, logistics & operational resources (including potential sources of pollution) Christophe Carrié, Consultant IPIECA & Participants
10h00	**Practical methodology for the identification of most vulnerable sites** - Ranking of the vulnerability of the type of shore - Ranking of biological and human use resources - Synthesis and identification of the most sensitive sites Christophe Carrié, Consultant IPIECA & Participants (plenary session)
12h30	**Lunch break**
13h30	**Session in 3 groups to rank the data for the identification of the most vulnerable sites** *Note. Each group, so each thematic, will be made up of 2 to 3 experts and one GIS expert with a computer equipped with a GIS software*
15h00	**Coffee break**
15h30 to 17h00	**Presentation of the most vulnerable sites & possible complementary information from experts knowledge** **Technical validation of the coastal vulnerability maps and the most vulnerable sites identified** Christophe Carrié, Consultant IPIECA & Participants (plenary session)

Day 4 : Friday 30 July

Vulnerability maps Action Plan

09h00	**General Action Plan to continue the development and the finalisation of the coastal vulnerability maps** including the other island of the Republic of Cap Verde, the identification of the most sensitive sites, the integration of the maps into the National oils spill contingency and The training of personnel national organisation in charge of the finalisation of the sensitivity maps (& identification of technical needs and complementary for the coastal sensitivity mapping project) Christophe Carrié, Consultant
10h30	**Coffee break**
11h00	**General Action Plan (Cont'd)**
12h30	**Lunch break**
13h30	**Adoption of the General Action Plan** **Transfer of the GIS developed to the national organisation in charge of the finalisation of the sensitivity maps**

Appendix 2. List of Participants

N°	NAME	INSTITUTION	N° TEL	E- MAIL
01	João do Rosário	CAPE VERDE MARAD	9757780/9966941	rosarlopes@hotmail.com
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22	Marcelina Fortes	UNIVERSITY OF CAPE VERDE	984.89.53	marcelina_2008@hotmail.com
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24	Zeferino Fortes	Presidente		

Appendix 3. Opening and Closing Ceremony

Welcome address by the José Figueiredo of the Instituto Marítimo e Portuário

O Projecto de Iniciativa Global para a Africa Ocidental e Central é uma parceria entre a Organização Maritima Internacional (IMO) e a Associação internacional da Indústria Petrolífera para Conservação Ambiental (IPIECA) para reforçar a capacidade dos Estados na preparação para responder face a derrames de hidrocarbonetos no mar. A característica inovadora fundamental é enfatizar a promoção da parceria pública/privada para responder de forma efectiva a LUTI derrame de hidrocarbonetos fazendo uso dos recursos existentes e da experiência da indústria peh·olífera. É um programa conjunto com o horizonte temporal de quarto anos cri ada pela IMO, 8 companhias petrolíferas (BP,Chevron,ENI, Exxon Mobil, Marathon, PERENCO, Shell and Total membros da Associação IPIECA.

Preparação inicial requerida

- Identificar uma equipa técnica nacional com as seguintes competências e experiências, incluindo as relevantes ONG' S
- Recolher os relevantes mapas do GIS existentes:
    - Tipos de linha de costa
    - Recursos biológicos
    - Recursos socio-económicos
- Equipamentos de luta antipoluição e outras informações práticas
- Iniciar o desenvolvimento dos mapas de sensibilidade
- Informar aos espertes da GI WACAF acerca dos dados recolhidos para facilitar a preparação dos trabalhos

Objectivos do Grupo Técnico de trabalho

- Conduct Environmental Sensitivity Index (ESI)mapping ofthe shoreline
- Identificar os recursos biológicos mais sensíveis em caso de poluição por hidrocarbonetos
- Identificar os recursos socio-económicos mais sensiveis em caso de poluição por hidrocarbonetos
- Desenvolver o GIS para desenvolver os mapas de sensibi lidade a poluição por hidrocarbonetos.
- Desenvolver um indicador reslmudo e integrado de sensibilidade global

Welcome address by IMO/IPIECA representative

Monsieur le Président de L'institut Maritime Portuaire,

Monsieur le Représentant de la Direction Générale de l'Environnement

Messieurs les Membres du Conseil d'administration,

Messieurs les Représentants des sociétés Pétrolières

Messieurs les Représentants des Universités du Cap Vert

Messieurs les Représentants des Organisation Non Gouvernementale du Cap Vert

Chers Participants

Mesdames, Mesdemoiselles et Messieurs,

C'est pour moi un privilège de prendre la parole à l'ouverture de cet Atelier national pour le développement des cartes de vulnérabilité côtières aux pollutions par hydrocarbures de la République du Cap Vert.

Comme vous le savez, cette réunion organisée par les autorités de la République du Cap Vert bénéficie de l'appui technique et financier de l'Organisation Maritime Internationale, l'OMI, et de l'industrie pétrolière internationale, à travers l'Association Internationale de l'Industrie Pétrolière pour la Sauvegarde de l'Environnement – l'IPIECA. Cet appui se fait dans le cadre de l'Initiative Mondiale OMI/ IPIECA, pour la Région de l'Afrique de l'Ouest et du Centre sur la préparation, la lutte et la coopération contre la pollution par les hydrocarbures (nommée 'GI WACAF').

Entre 1991 et 1994, toute une série de séminaires régionaux de l'OMI a été organisée avec succès dans plusieurs régions du monde pour promouvoir le concept d'une proche coopération entre les gouvernements et l'industrie. Il en a découlé le lancement officiel en 1996 de l'Initiative mondiale entre l'OMI et l'Association internationale de l'industrie pétrolière pour la conservation de l'environnement (l'IPIECA) afin de promouvoir la coopération entre le public et le privé en faveur de l'efficacité de la lutte contre les déversements accidentels d'hydrocarbures.

Le projet GI WACAF a été établi, dix ans après, en avril 2006. C'est le projet phare des diverses initiatives régionales dépendant de l'Initiative mondiale mises en place à ce jour. Ce projet est financé par l'OMI et huit compagnies pétrolières membres de l'IPIECA. Aujourd'hui, il couvre 22 pays de l'Afrique de l'Ouest et du Centre. Depuis son instauration, des progrès significatifs ont été constatés dans l'amélioration des capacités de lutte contre les déversements. Il convient de noter qu'entre 2006 et 2009, 43 ateliers ont été organisés au total et 3000 personnes ont été formées. Côté résultats, l'indicateur général du niveau de préparation a augmenté. Et les 6 indicateurs clés de performance de préparation ont tous progressés. (Législation ; Plan national de lutte ; désignation des autorités nationales ; accords ; formation et exercices ; ressources nationales).

Je voudrais aussi saisir cette occasion pour vous adresser, au nom de M. Efthimios Mitropoulos, secrétaire général de l'Organisation Maritime Internationale, et de M. Richard Sykes, Secrétaire de l'Association Internationale de l'Industrie Pétrolière pour la Sauvegarde de l'Environnement, nos vœux de succès dans vos travaux ainsi que nos remerciements les plus sincères à tous ceux

qui ont aidé à la préparation de cet atelier et particulièrement au gouvernement de la République du Cap Vert.

Monsieur le Président de l'Institut Maritime et Portuaire, mesdames et messieurs les participants,

Le sujet qui nous réunit aujourd'hui est important pour la République du Cap Vert de part sa position géographique dans une région fortement productrice et par conséquent exportatrice d'importantes quantités de pétrole par voie maritime.

En effet, il est reconnu qu'aucun pays côtier n'est à l'abri d'accidents pouvant entraîner une marée noire. La circulation des navires, en particulier des pétroliers, qui fréquentent les ports ou traversent les eaux côtières, ainsi que l'exploration et l'exploitation du pétrole, s'accompagnent d'un risque de pollution des mers par les hydrocarbures suite à des incidents tels que collisions, échouements, incidents lors de transbordement d'hydrocarbures et autres accidents maritimes et portuaires.

Notre rencontre d'aujourd'hui démontre la volonté de votre pays d'améliorer sa politique et son système de lutte contre les pollutions, par le développement des cartes de vulnérabilité de la côte aux pollutions accidentelles, outil à part entière du Plan National d'Intervention d'Urgence.

En effet cet atelier se concentre sur l'élaboration d'outils et ressources opérationnels nécessaires à la planification d'urgence et au processus de décision dans le cas de déversement majeur d'hydrocarbures.

Je voudrais aussi remercier les Autorités de la République du Cap Vert, pour leur effort continu en vue d'améliorer le niveau de préparation du pays pour faire face à des événements de pollution marine accidentelle.

C'est par ces mots que je voudrais conclure, Monsieur le Président de L'institut Maritime Portuaire, mesdames et messieurs les participants, mais non sans vous avoir réitéré à tous, mes vœux les plus chaleureux de plein succès dans nos travaux.

Je vous remercie de votre aimable attention.

Closing speech of the IMO/IPIECA representative

Monsieur le Président de L'Institut Maritime Portuaire,

Monsieur le Représentant de la Direction Générale de l'Environnement

Messieurs les Membres du Conseil d'administration,

Messieurs les Représentants des sociétés Pétrolières

Messieurs les Représentants des Universités du Cap Vert

Messieurs les Représentants des Organisations Non Gouvernementale du Cap Vert

Mesdames et messieurs les participants,

Nous voici donc arrivés à la fin de votre Atelier national pour le développement des cartes de vulnérabilité côtières aux pollutions par hydrocarbures de la République du Cap Vert.

Durant cet atelier, plus de quinze experts ont très activement participé aux travaux couvrant les sujets clés de l'élaboration des cartes de vulnérabilités, tels que :

- L'identification de la vulnérabilité du type de côte
- L'identification des ressources biologiques vulnérables
- L'identification des ressources socio-économiques vulnérables
- L'identification des sites les plus vulnérables

Ainsi lors de cet atelier, une première version des cartes de vulnérabilité a été produite tant pour les responsables des opérations que pour les décideurs, et ceci par l'intermédiaire d'un Système d'Informations Géographiques. Une méthode simple et rapide d'identification des sites les plus vulnérables a aussi été mise en place.

L'atelier, par des discussions ouvertes et constructives des participants, a ensuite définit un plan d'action et des recommandations générales dans le but d'améliorer les cartes de vulnérabilités réalisées et de continuer les travaux sur des secteurs encore non cartographiés.

Au nom de l'Organisation Maritime Internationale (l'OMI) et de l'Association Internationale de L'industrie Pétrolière pour la Sauvegarde de l'Environnement (l'IPIECA), je veux adresser nos remerciements sincères au Gouvernement de la République du Cap Vert, et en particulier à Monsieur le Président de L'Institut Maritime Portuaire, et son représentant au projet de l'Initiative Mondial pour l'Afrique de l'Ouest et du Centre, pour leur rôle dans la préparation à la lutte et pour l'organisation de cet atelier important pour la mise à jour du Plan National d'Intervention d'Urgence.

Cela démontre votre volonté de mieux protéger l'environnement marin qui est précieux pour nous tous.

Je voudrais aussi remercier Direction Générale de l'Environnement pour son implication active pour cet atelier, ainsi les sociétés privées pour leur engagement auprès des autorités de la République du Cap Vert pour la lutte et la préparation à la lutte

Je souhaite aussi remercier tous les participants pour leur implication et participation active à cet atelier. Grâce à eux, l'atelier a pu produire des résultats concrets sur les cartes de vulnérabilité et un groupe de travail pourra poursuivre le développement des cartes ;

.

Je voudrais enfin saisir cette occasion pour souligner que notre coopération dans le cadre de vos travaux continue dans le cadre de l'Initiative Mondiale de l'OMI/ IPIECA pour l'Afrique de l'Ouest et du Centre, visant à améliorer la préparation, la lutte et la coopération contre la pollution par les hydrocarbures.

Après cette mission, un rapport final de cet atelier, contenant les recommandations et les plans d'actions formulés, sera soumis à l'OMI et à l'IPIECA et envoyé au coordinateur du projet GI WACAF, dans le but de les informer dans les meilleurs délais des résultats de cet atelier et d'en tenir compte dans l'élaboration de leurs activités futures.

C'est par ces mots que je voudrais conclure,

Monsieur le Président de L'Institut Maritime Portuaire,

Monsieur le Représentant de la Direction Générale de l'Environnement

Mesdames et messieurs les participants,

et avec mes remerciements sincères pour votre coopération des plus actives tout au long de nos longues journées de travail, et (surtout) pour votre hospitalité chaleureuse,

Je vous remercie de votre aimable attention.

Appendix 4. Action plan to continue the development of the coastal vulnerability mapping and its integration into the NOSCP

This section details the action plan developed by the participant during the workshop.

The action plan was developed according to the international recommendations for the coastal vulnerability mapping to oil spill (GIWACAF guidelines "Guide for Oil Spill Sensitivity Mapping in the West and Central Africa "IMO / IPIECA, 2008) and taking into account the resources of the Republic of Cape Verde.

1 – Supervision

The Instituto Marítimo e Portuário (IMP) under the responsibility of the Ministério das Infra-estruturas, Transportaes e Mar is the National competent authority in charge of the oil spill preparedness and response and the supervision of the coastal vulnerability mapping project development.

The IMP makes sure that the mapping project is simple, focusing on the needs, and allows the production of operational maps useful for decision makers and oil spill response operators.

The IMP should manage the project in four steps:

1. To complete the vulnerability of Barlavento islands already mapped during the workshop,
2. To apply the same methodology for the other islands to define:
    - The vulnerability of the type of coast,
    - The vulnerability of biological resources,
    - The vulnerability of human use resources,
3. To apply and / or update the methodology for the identification of the most vulnerable site,
4. To approve the coastal vulnerability maps by the national authorities.

2 - Identification of the personnel and resources required

The organism in charge of the GIS technical development and coastal vulnerability maps production will be the General Directorate of the Environment (DGE). The DGE should:

- Update the GIS structure approved during the workshop,
- Collect and input data provided by the experts of the environmental cell into the GIS for the development of the coastal vulnerability maps,
- Produce and submit the coastal vulnerability maps for validation to the environmental cell for the development of the coastal vulnerability maps.

An environmental cell for the development of the coastal vulnerability maps will be in charge of

- The identification of the coastal vulnerabilities to oil spill events,
- The validation of the coastal vulnerability maps developed.

This environmental cell will be composed by national experts from different organisms according to the data and expertises:

- For the base map
    - Organism(s) : IMP (bathymetry), DGOT, DGE
- Identification of the vulnerability of type of coast :
    - Organism(s): IMP, University (Cape Verde), INMG
- Identification of the vulnerable biological resources:

    - Organism (s): DGE, INIDA, (Institut National d'Investigation et de Développement Agraire, University, INDP, Biosfera, other NOG's
- Identification of the vulnerable human-use resources:
    - Organism(s): DGT, INDP, DGP, DGI, Institut National des Stastistiques, Direction Générale de la plannification, oil industries (SHELL,ENACOL)
- Identification of the logistics and operational resources :
    - Municipality, civil protection, army, IMP, oil industries
    - It is recommended to complete the map with the participation of "oil spill response expert" identified in the OSCP

The DGE is equipped with ArcGIS software of ESRI Company. It is recommended that the group of experts uses GIS software which can provide or convert GIS data in shapefile format.

The needs of experts identified are:

- Technical training and workshop on the use of GIS,
- Workshop on the development of Database,
- Training and workshop on the remote sensing,
- Technical assistance for the continuation of the coastal vulnerability mapping development.

3 - Definition and setup of the structure of the GIS

The GIS structure and the organisation of data according to the themes and sub-themes of the ESI methodology are relevant for the vulnerability mapping.

The GIS structure obtained at the end of the workshop will be used by the experts and completed according to the needs identified.

4 - Data collection and analysis

The environmental cell of experts and the DGE will be in charge of:

- The list of all sources of necessary data available in different organisms,
    - Need to identify preferentially the GIS data,
    - For each data: the experts should precise the sources, the date, the type, (GIS, paper, electronic version,
- The identification of other projects which could provide some date:
    - NOG's, UNEP, oil industries…
- The definition (if necessary) of complementary field investigation.

5 – Development of the base map

To finalize the coastal vulnerability maps, the environmental cell should:

- Validate the base map used during the workshop,
    - Coastline (to compare with the official coastline),
    - location of islands, Roads, cities,
- Complete the base map by:
    - Bathymetry,
    - Altimetry,
    - Main infrastructures (lighthouse, etc),
    - Satellite image (file .ecw),

- Current, wind, waves (direction, speed, force) for specific maps.

6 - Identification of the coastal vulnerability

The experts of the Republic of Cape Verde recognized the interest of the ESI methodology to produce the coastal vulnerability maps and they decided to use it as detailed in the GIWACAF guidelines "*Guide for Oil Spill Sensitivity Mapping in the West and Central Africa* "IMO / IPIECA, 2008.

6.1 - vulnerability of the type of coast

Action for the Barlavento islands:

- To validate the type of coast using Google Earth or field validation
  - Some types of coast are missing : marsh : ESI 9 in Sao Vincente,
  - The vulnerabilities of the Santa Luiza, Branco, Brava, Raso islands were not identified during the workshop.

Action for the others islands:

- To use the atlas : "*gestao da zona costeira - volume1 - atlas da natureza da costa e da ocupacao do littoral reconhecimento fotografico*",
- To update with Google Earth interpreation or field validation, more particularly for the major ports.

6.2 - vulnerable biological and human-use resources

Action for the Barlavento islands:

- To validate all information digitalized during the workshop by official document,
- To use of GIS data of Sal island available at the DGE,
- To use of GIS data for delimitation of all protected area,
- To complete by the subtidal habitats,
- To complete by the seasonality of biological and human-use resources,
- To include the biomass value (and biodiversity) and statistics information,
- To complete the location of all fishing / coastal villages,
- To complete the location of all "beach port" and ports,
- To complete tourism activities,
- To include the navigation channel and the traffic between islands.

Action for the others islands:

- To use all official document to continue the work from the ESI methodology.

6.3 - logistics and operational resources

Action for the all islands:

- To identify the logistics and operational resources
  - Access, (type: road, track) "trafficability" (foot, 4x4, truck...),
  - Access by boat,
  - Hazardous site,
  - Operational Site,
  - Waste storage,

  - Facility to treat waste,
  - Location of Oil Spill response equipment (boat, boom, etc.),
- To provide environmental recommendations for the oil spill response operators.

6.4 - Synthesis and identification of most vulnerable sites

Action for the Barlavento islands

- To refine, if necessary the methodology (depends on the new data collected),
- To continue the identification of the most vulnerable site,

Action for the other islands:

- To apply the methodology of synthesis,
- To continue the development of strategical maps for the decision maker,
- To present the map to the decision makers to obtain their validation,
- To study the feasibility of protections of the most vulnerable sites.

Action for the all islands:

- To identify the most vulnerable sites based on the tactical maps,
- To study the feasibility of the protection of the most vulnerable sites,
- To organize a workshop at national level to discuss the priority for protection,
- To organize a workshop at island level to discuss the priority for protection,
- To produce a final set of maps identifying the validated most vulnerable sites,
- To test the map with the OSCP during exercise.

7 – Coastal vulnerability atlas

- To develop an atlas including tactical, strategical and operational maps with some recommendations, photos, etc
- To improve the tactical maps :
  - To Improve the maps developed to the four thematics in one map:
    - Vulnerability of types of shore,
    - Vulnerable biological resources,
    - Vulnerable human-use resources,
    - Logistic and operational resources,
  - To produce one map per island or group of islands,
  - To develop map in different format A4, A3 A0,
- To improve the strategical maps:
  - To develop map in different A3 (by island), A0 (for all the Cape Verde country),
- To produce Operational maps,
- To share maps (in PDF format) on a website (www.sia.cv).

8 - Updates and test of the atlas

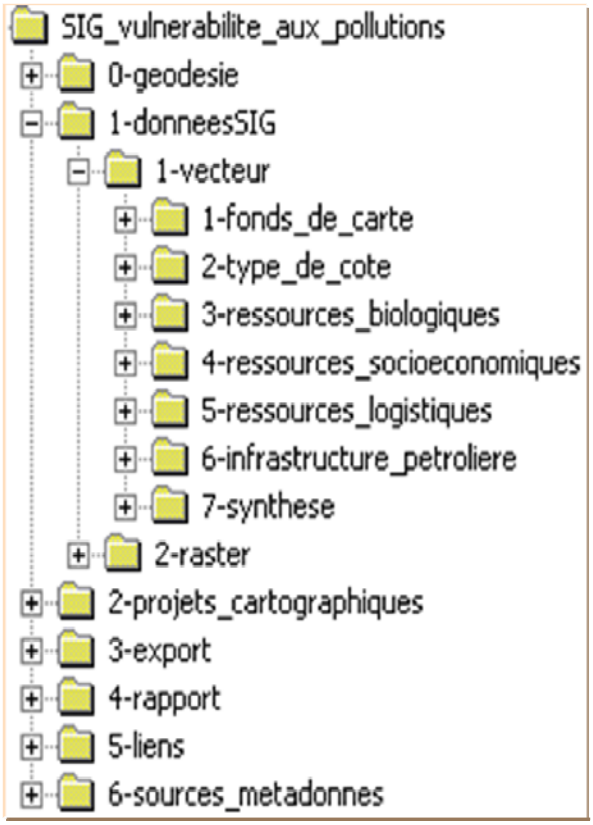
- Take into account any changes:
  - Shoreline : Erosion / modification,
  - Biological resources : Biodiversity alteration , threatened species, new colonies,
  - Human use resources : New coastal activities,
  - Logistics and response operations resources,
  - Modification of access, booming anchoring point,
  - New oil spill response equipment,

    - New data / imagery ,
- Regularly collect geographic information regarding the themes of the atlas,
- Publish an updated version of the atlas whenever required:
    - at least every 3 – 5 years,
    - or in case of major change.

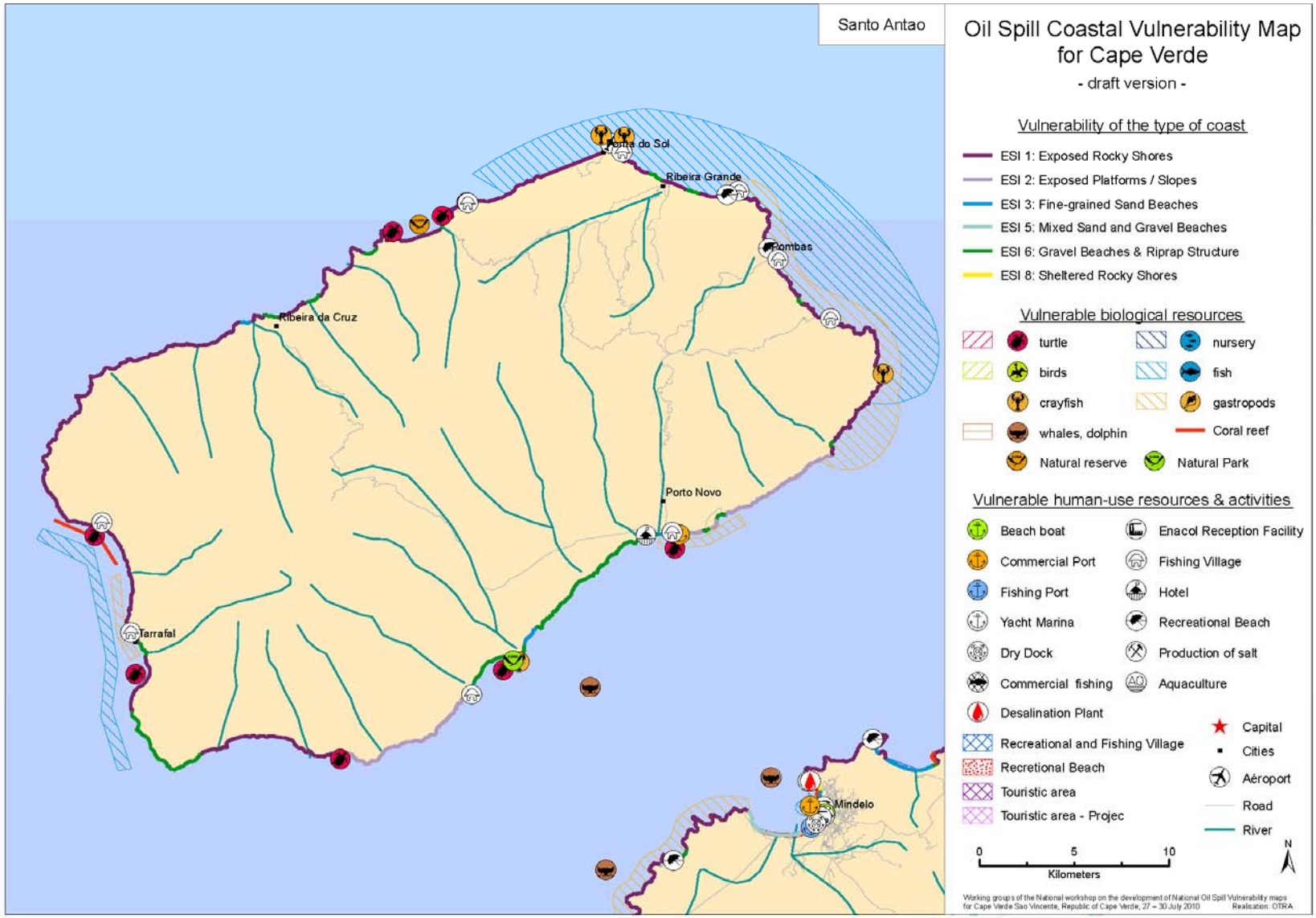
Appendix 5. Tactical and strategical maps for Barlavento islands based on a GIS

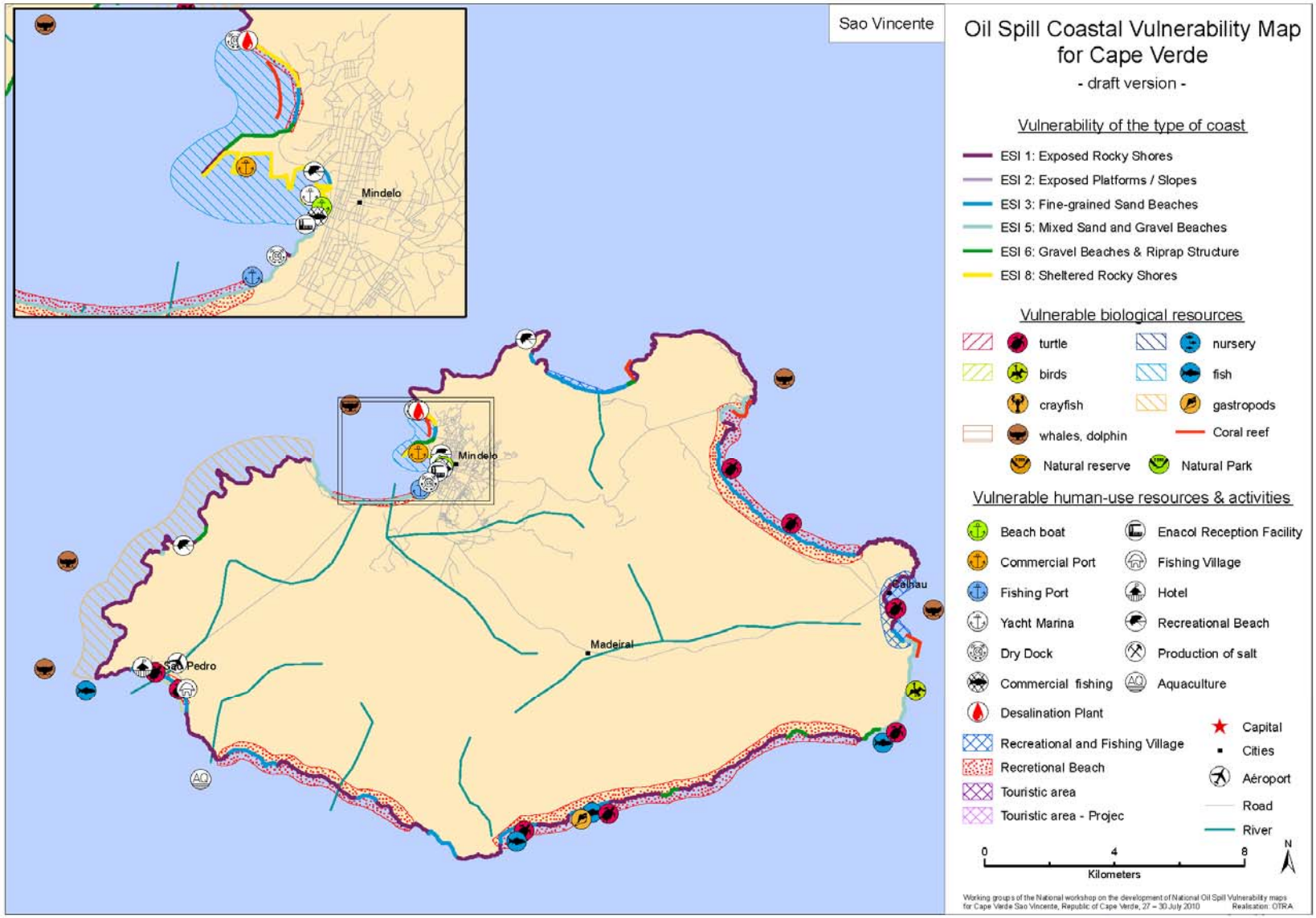
Structure of the Geographic Information System

GIS Structure for the development of the coastal vulnerability mapping of the Republic of Cape Verde developed by the experts during the workshop is composed by the following folders:



File related to the datum used for the GIS layers
GIS layers for the base map ➔ « 1-fonds_de_carte°» (data completely provided by the facilitator, claimant a validation by the Republic of Cap Verde)
GIS layers for the vulnerability of type of coast ➔ « 2-type_de_cote »
GIS layers for the vulnerable biological resources ➔ « 3-ressources_biologiques »
GIS layers for the vulnerable human-use resources and vulnerable economical activities ➔ « 4-ressources_socioeconomiques»
GIS layers for logistics and operational resources ➔ « 5-ressources_logistiques »
GIS layers for oil industries infrastructures ➔ « 6-infrastructure_petroliere »
GIS layers for synthesis ➔ « 7-synthese »
GIS project ➔« 2-projets_cartographiques »
Map in PDF format ➔ « 3-export »
Reports related to the GIS ➔ « 4-rapport »
Linked documents to the GIS layers (hyperlinks) ➔ « 5-liens »
Sources of data ➔ « 6-sources_metadonnes »


Santo Antao
Oil Spill Coastal Vulnerability Map for Cape Verde
- draft version -
Vulnerability of the type of coast
ESI 1: Exposed Rocky Shores
ESI 2: Exposed Platforms / Slopes
ESI 3: Fine-grained Sand Beaches
ESI 5: Mixed Sand and Gravel Beaches
ESI 6: Gravel Beaches & Riprap Structure
ESI 8: Sheltered Rocky Shores
Vulnerable biological resources
turtle
nursery
birds
fish
crayfish
gastropods
whales, dolphin
Coral reef
Natural reserve
Natural Park
Vulnerable human-use resources & activities
Beach boat
Enacol Reception Facility
Commercial Port
Fishing Village
Fishing Port
Hotel
Yacht Marina
Recreational Beach
Dry Dock
Production of salt
Commercial fishing
Aquaculture
Desalination Plant
Recreational and Fishing Village
Recretional Beach
Touristic area
Touristic area - Projec
Capital
Cities
Aéroport
Road
River
0
5
10
Kilometers
N
Working groups of the National workshop on the development of National Oil Spill Vulnerability maps for Cape Verde Sao Vincente, Republic of Cape Verde, 27 – 30 July 2010
Realisation: OTRA
Porto da Sol
Ribeira Grande
Pombas
Ribeira da Cruz
Porto Novo
Tarrafal
Mindelo


Sao Vincente
Mindelo
Mindelo
Madeiral
Calhau
Sao Pedro
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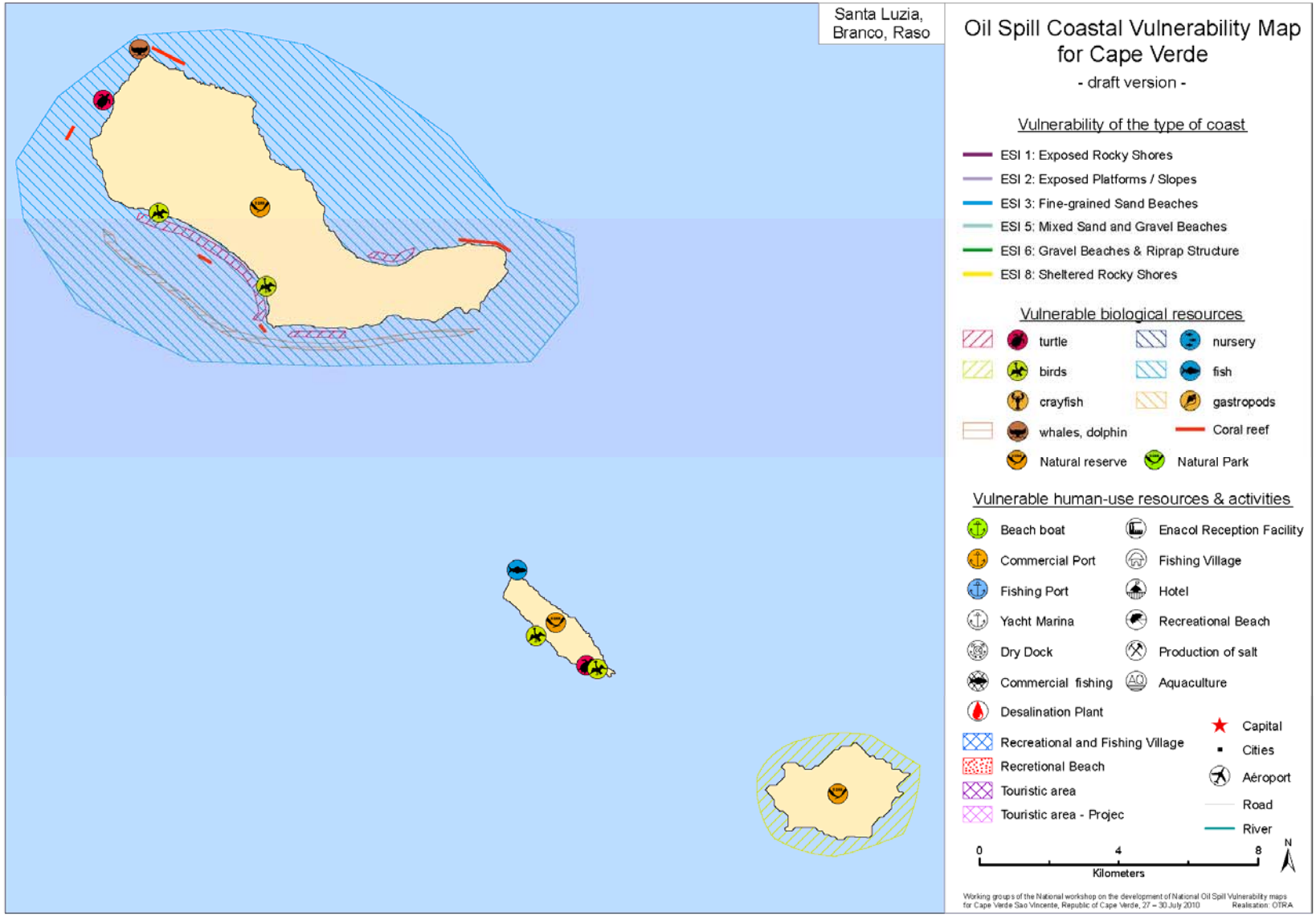
Realisation: OTRA


Santa Luzia, Branco, Raso
Oil Spill Coastal Vulnerability Map for Cape Verde
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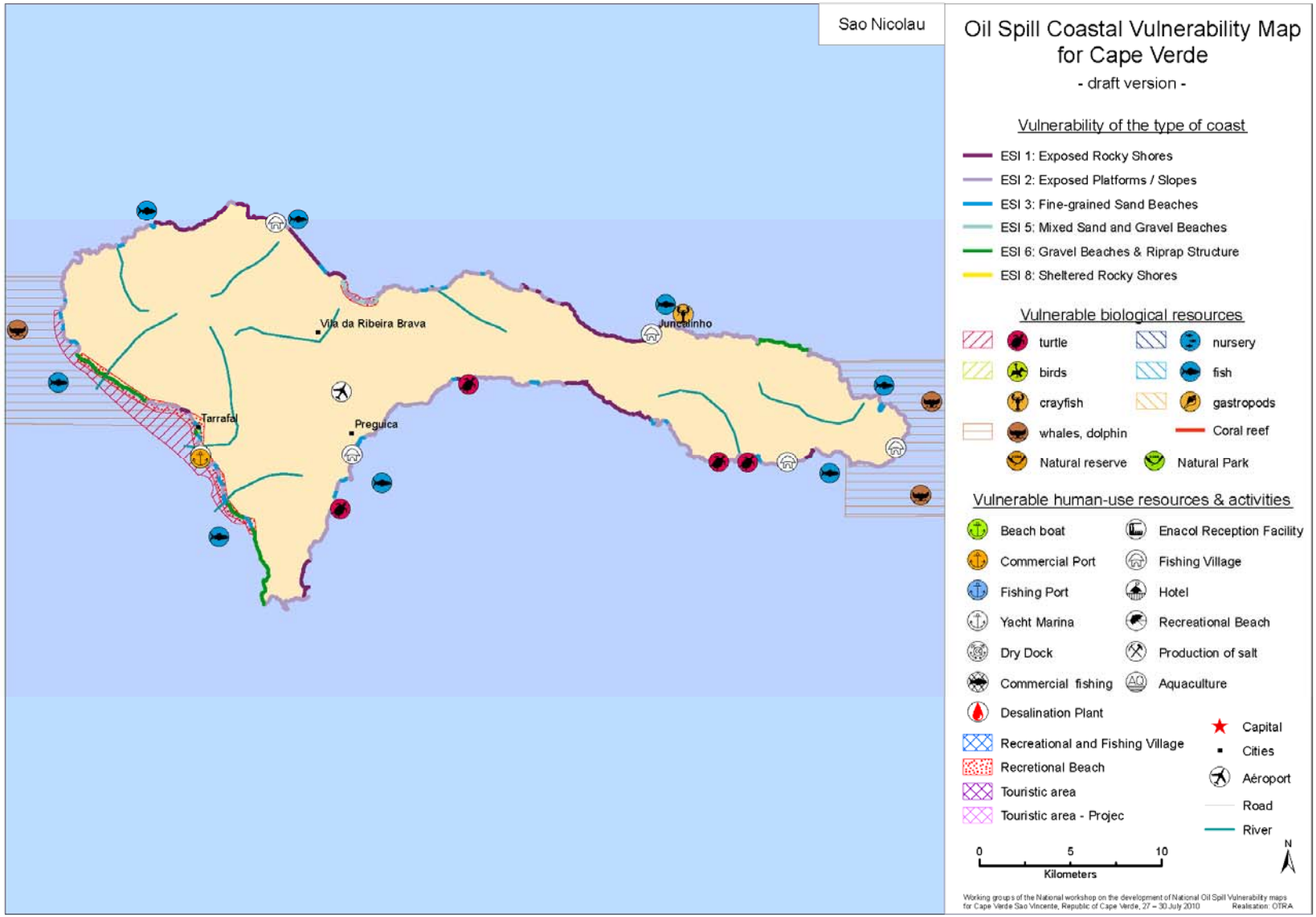
Sao Nicolau
Vila da Ribeira Brava
Juncalinho
Tarrafal
Preguica
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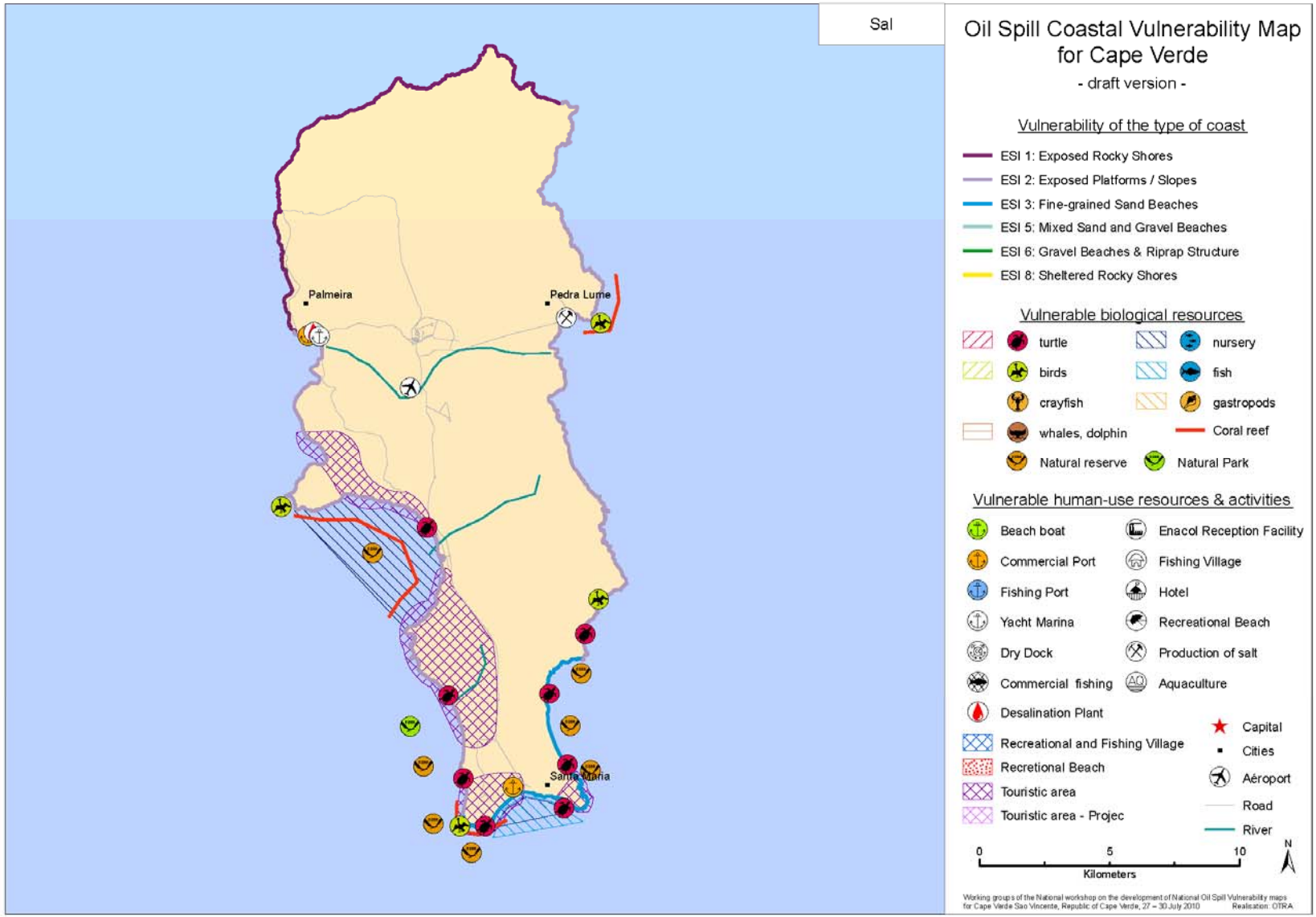
Sal
Palmeira
Pedra Lume
Santa Maria
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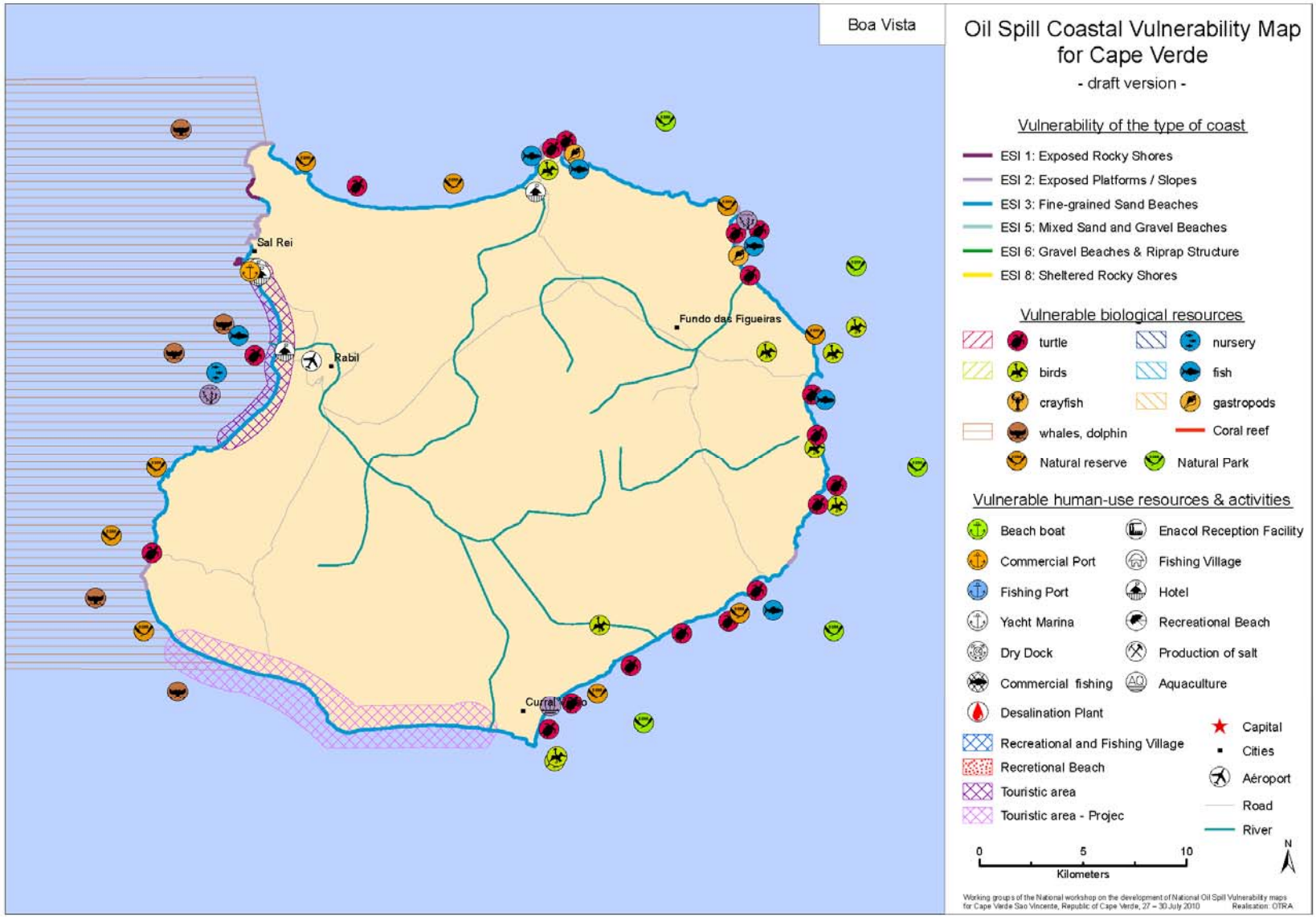
Boa Vista
Sal Rei
Rabil
Fundo das Figueiras
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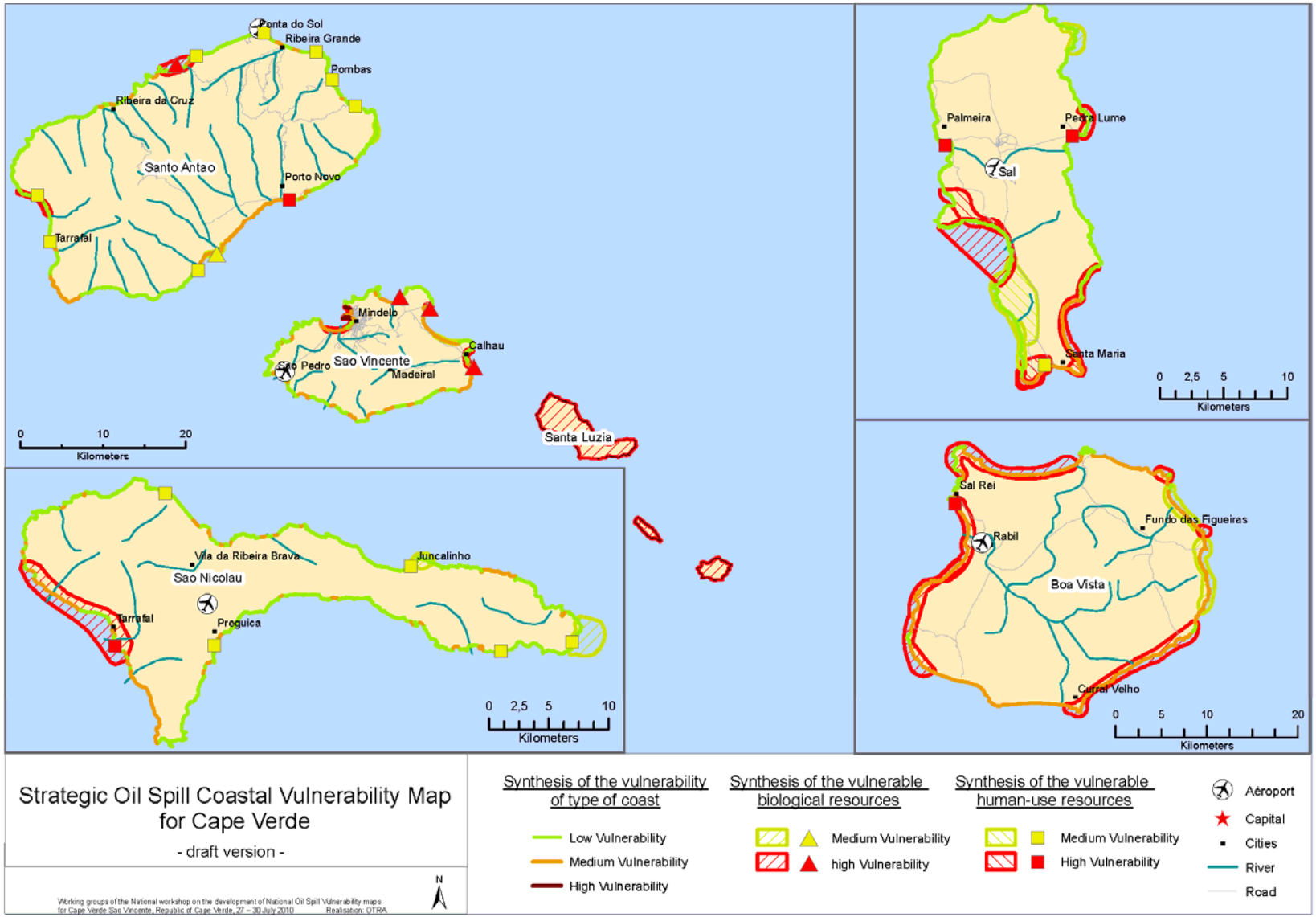
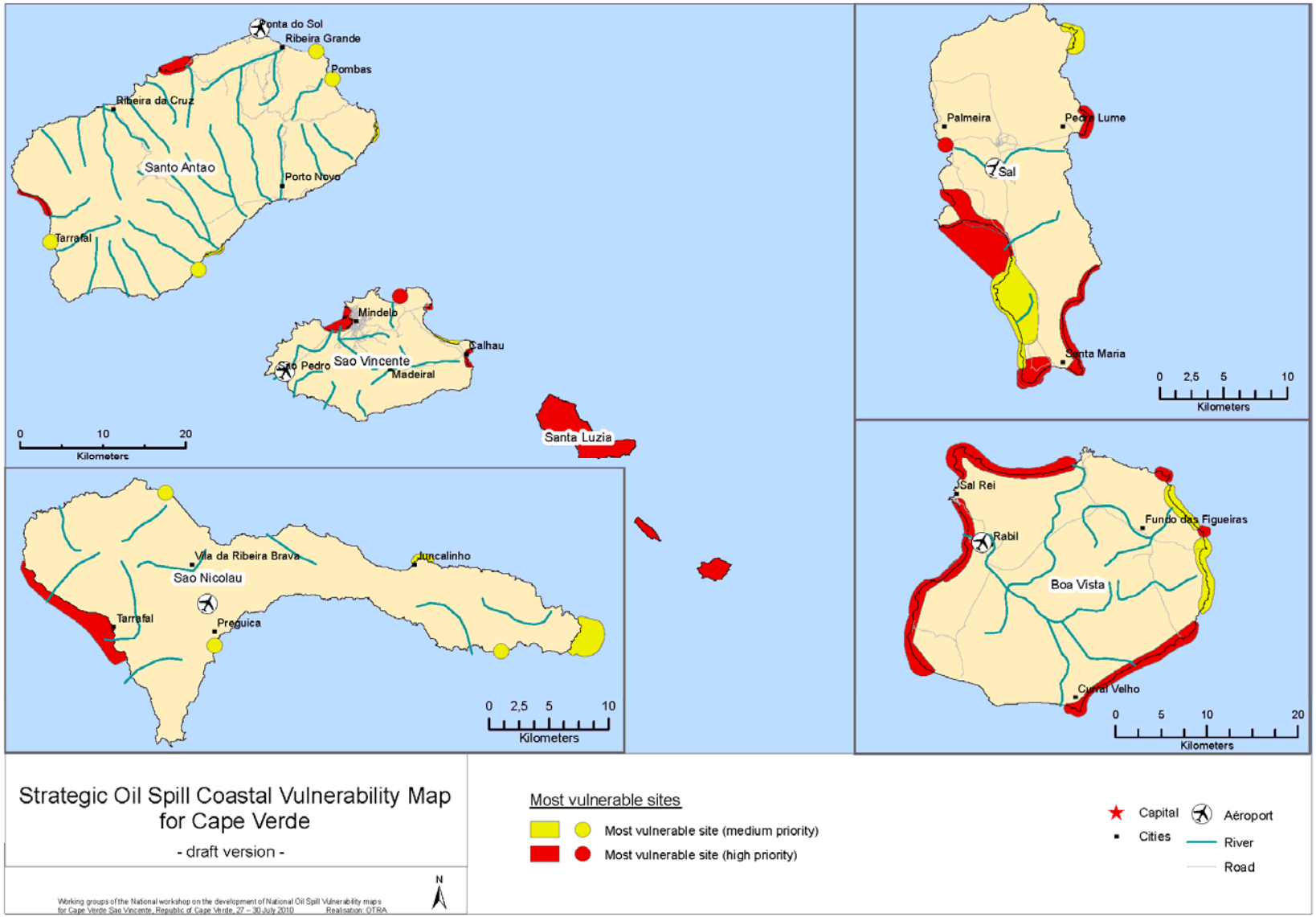
ESI 3: Fine-grained Sand Beaches
ESI 5: Mixed Sand and Gravel Beaches
ESI 6: Gravel Beaches & Riprap Structure
ESI 8: Sheltered Rocky Shores
Vulnerable biological resources
turtle
nursery
birds
fish
crayfish
gastropods
whales, dolphin
Coral reef
Natural reserve
Natural Park
Vulnerable human-use resources & activities
Beach boat
Enacol Reception Facility
Commercial Port
Fishing Village
Fishing Port
Hotel
Yacht Marina
Recreational Beach
Dry Dock
Production of salt
Commercial fishing
Aquaculture
Desalination Plant
Recreational and Fishing Village
Recretional Beach
Touristic area
Touristic area - Projec
Capital
Cities
Aéroport
Road
River
0
5
10
Kilometers
N
Working groups of the National workshop on the development of National Oil Spill Vulnerability maps for Cape Verde Sao Vincente, Republic of Cape Verde, 27 – 30 July 2010
Realisation: OTRA


Ponta do Sol
Ribeira Grande
Pombas
Ribeira da Cruz
Santo Antao
Porto Novo
Tarrafal
Mindelo
Calhau
São Pedro
Sao Vincente
Madeiral
Santa Luzia
0 10 20
Kilometers
Palmeira
Pedra Lume
Sal
Santa Maria
0 2,5 5 10
Kilometers
Vila da Ribeira Brava
Juncalinho
Sao Nicolau
Tarrafal
Preguica
0 2,5 5 10
Kilometers
Sal Rei
Fundo das Figueiras
Rabil
Boa Vista
Curral Velho
0 5 10 20
Kilometers
Strategic Oil Spill Coastal Vulnerability Map for Cape Verde
- draft version -
Working groups of the National workshop on the development of National Oil Spill Vulnerability maps for Cape Verde Sao Vincente, Republic of Cape Verde, 27 – 30 July 2010 Realisation: OTRA
N
Synthesis of the vulnerability of type of coast
Low Vulnerability
Medium Vulnerability
High Vulnerability
Synthesis of the vulnerable biological resources
Medium Vulnerability
high Vulnerability
Synthesis of the vulnerable human-use resources
Medium Vulnerability
High Vulnerability
Aéroport
Capital
Cities
River
Road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Strategic Oil Spill Coastal Vulnerability Map for Cape Verde
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N
Most vulnerable sites
Most vulnerable site (medium priority)
Most vulnerable site (high priority)
Capital
Aéroport
Cities
River
Road

Appendix 6. Photography of the Workshop

Working session

Visit on the east shoreline of the Sao Vincente Island

Closing ceremony