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Mars 2014 ï RST.ODE/LER-PAC/14-11

1er REPORTING DU PROJET SEA-ERA MERMAID

(JUIN - DECEMBRE 2013)

Convention n° ANR-12-SEAS-0003-001

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Fiche documentaire

Numéro d'identification du rapport : RST.ODE/LER-PAC/14-11 **Diffusion** : libre : ☑ restreinte : ☐ interdite : ☐ **Validé par** : B. Andral Adresse électronique : bruno.andral@ifremer.fr	**date de publication :** mars 2014 **nombre de pages :** 33 **bibliographie :** **illustration(s) :** **langue du rapport :** Fr
Titre de lôarticle : 1er Reporting du projet SEA ERA MERMAID	
Contrat no Rapport intermédiaire ☐ Rapport définitif ☑	
Auteur(s) principal(aux) : **Serena Sanna**	**Organisme / Direction / Service, laboratoire** RST.ODE/LER-PAC
Destinataire : ANR - IFREMER	

Résumé : Le projet SEA-ERA MERMAID « Marine Environmental targets linked to Regional Management schemes based on Indicators Developed for the Mediterranean » a été lancé le 12 juin 2013 à Athènes. Son objectif est de fournir des éléments scientifiques pour la définition du bon état écologique au sens DCSMM, en complément des projets existants (PERSEUS) pour 5 descripteurs: Populations exploitées (D3), Conditions hydrographiques (D7), Contaminants dans lôenvironnement et les ressources exploitées (D8, D9), Déchets (D10).

Lôintérêt de Mermaid réside dans le fait quôil se focalise sur des échelles réduites à savoir trois sites pilotes : golfe du Lion, golfe de Saronikos (Ouest dôAthènes), bassin Silicien (entre côtes turques et Chypre).

A ces échelles MERMAID tentera de rapprocher les scientifiques et les gestionnaires pour la définition dôobjectifs environnementaux communs en lien avec le bon état et dôidentifier les mesures « réalistes » à mettre en î uvre pour les atteindre.

Mots-clés : DCSMM, Bon Etat Ecologique, contaminants chimiques, ressources halieutiques, déchets.

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1. Présentation

Le projet SEA-ERA MERMAID « Marine Environmental targets linked to Regional Management schemes based on Indicators Developed for the Mediterranean » a été lancé le 12 juin 2013 à Athènes. Son objectif est de fournir des éléments scientifiques pour la définition du bon état écologique au sens DCSMM, en complément des projets existants (PERSEUS) pour 5 descripteurs particuliers : Populations exploitées (D3), Conditions hydrographiques (D7), Contaminants dans lôenvironnement et les ressources exploitées (D8, D9), Déchets (D10).

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Le projet est constitué de 5 Workpackages (WP) :

- WP1 : Identification et quantification des indicateurs dôétat pour lôévaluation de la qualité de lôenvironnement ;
- WP2 : Définition de GES et proposition dôobjectifs pour les atteindre ;
- WP3 : La conception dôun programme de surveillance pour le suivi de qualité ;
- WP4 : Programmes de mesure pour lôatteint du bon état ;
- WP5 : Coordination.

Les projet a débuté en février 2013 et sôachèvera en septembre 2015.

Lôifremer coordonne le WP1 et participe activement au WP3.

Pour lôifremer, participent :

- ODE/UL/LER-PAC Toulon et Bastia : B. Andral, F. Galgani, S. Sanna
- RBE/HM Sète : S. Bonhommeau
- RBE/BE/LBCM Nantes : J. Knoery, C. Brach-Papa
- ODE/DYNECO/PHYSED Brest : R. Vernay

2. Réunions

2.1. Kick off Meeting

Lôfremer (B. Andral) a participé au Kick-off Meeting tenu à Athènes le 12 juin 2013.

Les participants de l'atelier étaient :

Baris Salihoglou (IMS-METU) : leader WP3
Tezcan (IMS-METU)
Areti Kontogianni (Univ of AEGEAN) leader WP4
Michalis Skourtos (Univ of AEGEAN)
Heleni Kaberi (HCMR) : coordinateur et leader WP5
Nikos Streftaris (HCMR)
Celia Vassilopoulou (HCMR) : leader WP 2
Mairi Pantazi (HCMR)
Nadia Papadopoulou (HCMR)
Barbara Zannou (HCMR)
Catherine Tsangaris (HCMR)
Giannis Hatzianestis (HCMR)
Costas Parinos (HCMR)

A cette occasion, les partenaires ont identifié les travaux à réaliser dans chaque WP, les coopérations entre les différents partenaires et les interactions entre chaque WP (**cf. Compte-rendu en Annexe 1**).

Lôobjectif du WP1 est de réaliser à lôéchelle des 3 sites pilotes une évaluation de lôétat du milieu marin et de le croiser avec les pressions existantes. Le but est dôutiliser la même méthodologie pour évaluer les pressions et par descripteur estimer pour chaque zone atelier les secteurs à risque..

Les lacunes de cette évaluation seront identifiées.

En fin de programme si les travaux du WP3 permettent dôaffiner cette évaluation les données seront prises en compte dans le document de restitution.

WP2 pilote HCMR : lôobjectif est sur la base des résultats du WP1 de discuter avec un panel de gestionnaires de la définition et de lôatteinte des GES. Le travail sera réalisé selon une approche SMART.

Lôobjectif est dôidentifier les principaux enjeux sur chaque bassin.

WP3 pilote METU : lôobjectif est de dresser sur chaque zone atelier la liste des programmes de surveillance existants capable de renseigner chacun des descripteurs et dôidentifier les outils de modélisation capables dôappuyer les programmes de surveillance.

WP4 pilote Aegean University : lôobjectif est de relier les objectifs jugés prioritaires avec des mesures de gestion acceptables. Le leader compte utiliser plusieurs types dôapproche issues de la bibliographie et les comparer entre elles, en sôappuyant sur un groupe de travail composés de gestionnaires locaux.

2.2. Réunion interne Ifremer

Une réunion interne pour organiser la contribution de lôIfremer a eu lieu le 27 septembre 2013.

En ce qui concerne le **WP1**, lôobjectif est de réaliser à lôéchelle des 3 sites pilotes une évaluation de lôétat du milieu marin basée sur les 5 descripteurs. Cette évaluation sera réalisée sur la base des données disponibles et des Initial Assessment (IA) réalisés dans chaque pays.

En lien avec ce bilan, une base des principales pressions exercées sur le milieu devra être réalisée de manière à évaluer les liens entre les pressions et la qualité du milieu.

La méthodologie reste à définir, lôIfremer devant proposer une méthode de travail aux deux autres partenaires. A ce stade lôIfremer dispose avec lôévaluation initiale faite au niveau central et les travaux réalisés au niveau de la sous région (au sein du Conseil Maritime de Façade) des éléments pour y répondre basés sur une approche DPSIR référencée au niveau international.

De plus le LER-PAC dispose dôune base de données pression réalisée dans le cadre de la Directive Cadre Eau (DCE) et du partenariat avec lôAgence de lôEau Rhône ï Méditerranée - Corse. Pour la compléter il faudra lôincrémenter de données sur les pressions liées à la pêche notamment dans le golfe du Lion et en lien avec le panache du Rhône (conditions hydro).

Sur la base de ce travail il faudra définir les principaux risques pour chaque zone (cf. travaux réalisés au CMF) et on les cartographiera. Enfin les lacunes de cette évaluation seront identifiées.

Concernant le **WP3** (Programme de surveillance), les deux premières tâches consistent à fournir au coordinateur (METU) la liste des programmes de surveillance existants susceptibles de renseigner les 5 descripteurs et dôidentifier les compléments nécessaires au bon suivi de lôatteinte des GES.

La troisième tâche concerne lôutilisation dôoutils dôocéanographie opérationnelle et de modélisation pour compléter efficacement les résultats des programmes de surveillance.

A ce stade il a été décidé de travailler plus particulièrement sur le D3 et le D7.

Les outils dôocéanographie opérationnelle seront utilisés pour étudier :

- la connectivité entre les populations
- les zones favorables au recrutement et au développement de certaines espèces.

Pour cela, des modèles de dispersion larvaire utilisant des modèles de circulation océanique à haute résolution en Méditerranée seront utilisés. Cet outil sera couplé à un modèle bio-énergétique permettant de prendre en compte les conditions environnementales (température, nourriture disponible) le long des trajectoires simulées et d'identifier les zones les plus favorables à la croissance des larves et donc leur survie.

Lôespèce cible serait lôanchois (*Engraulis encrasicolus*) du Golfe du Lion. Cependant, cet outil de modélisation est générique et donc facilement transposable aux autres sites d'étude du projet. Le modèle de circulation océanique est en effet disponible à l'échelle de la Méditerranée dans son ensemble. Les résultats attendus sont ainsi des cartes d'habitat de ponte les plus favorables en Méditerranée pour l'anchois et des séries temporelles de la survie potentielle des larves pour chacun des sites d'étude.

Concernant le D7 les travaux porteront sur les apports du Rhône. Il est proposé de partir de scénario de débit solides et liquides et construire des indicateurs qui permettent de rendre compte :
- de lôextension de la dessalure
- des zones de dépôt de sédiments
- de la zone dôinfluence du panache du Rhône

Les simulations proposées permettront de montrer où faut il renforcer la surveillance et où faut il lôalléger, car il y a de la redondance.

Données utilisées

D3 Populations exploitées

En ce qui concerne les variables dôétat et conformément à ce qui a été fait pour lôIA, les données utilisées seront celles dôévaluation des stocks de la CGPM, des campagnes de pêche MEDITS et PELMED.

En ce qui concerne les variables pression les données utilisées seront les données VMS (Vessel Monitoring System) existantes pour les bateaux de taille supérieure à 12 m. Il est possible grâce à ces données de connaître par secteur géographique le nombre de bateau en pêche, ceux qui font route, le temps passé par unité géographique et le type dôengin de pêche. Les données d'effort de pêche par flottilles fournies par le SIH de l'Ifremer à la plus fine résolution possible (carré de 1 minute par une minute) seront utilisées.

Ces données permettent dôobtenir des indices par année quôil est possible de moyenner et pour obtenir une réponse aux questions suivantes :

- quelles sont les surfaces exploitées,
- combien de temps,
- avec quels engins,
- et par déduction sur quel type de ressource.

Lôutilisation de cette méthode semble plus adaptée que celle des données obtenues en interrogeant le SIH sur les débarquements, car les prises ne viennent pas nécessairement du golfe du Lion et ne rendent pas compte de l'effort de pêche (et ainsi des pressions) exercé spatialement dans le Golfe du Lion.

D7 Conditions hydrographiques

Pour ce descripteur on repartira également de lôévaluation initiale et on regardera comment les outils de modélisation et dôimagerie actuellement disponibles peuvent compléter ce bilan de santé. En matière de pression, les deux principaux facteurs (en sus des évènements extrêmes naturels) agissant sur le D7 sont les apports du Rhône et la remise en suspension dans la colonne dôeau des sédiments après le passage de chaluts.

A ce niveau là, et après avoir échangé avec le D3 en ce qui concerne la localisation et la fréquence de travail des flottilles, il sera possible de regarder quelles sont les zones plus ou moins influencées par ce phénomène et de le quantifier à partir de données de la bibliographie.

D8 et D9 Contaminants (dans lôenvironnement et les ressources exploitées)

Concernant les données utilisées pour lôIA il est proposé de partir sur les données des réseaux de surveillance Ifremer et de les compléter par les données acquises dans le cadre de programmes de recherche tels que COSTAS, MERLUMED etcé ..

Lôobjectif est de coller à lôIA mais de le présenter selon un gradient côte large et selon différentes matrices. Les données seront complétées par une classification en fonction de différentes « normes ou limites ».

Les NQE Biotes disponibles ou en discussion, les valeurs seuils OSPAR, les normes sanitaires.

En terme de contaminants il est proposé de travailler à partir des contaminants classiques MEDPOL/OSPAR et de compléter par quelques émergeants sur lesquels on a des données (action LBCM).

Concernant les pressions le LERPAC complètera sa base pression par des données issues du projet METROC sur qui a permis dôidentifier les apports potentiels dôune grosse agglom »ration (Marseille) sur le milieu marin.

LBCM doit lui fournir des éléments sur les apports atmosphérique pour la compléter sachant que pour les apports des rivières et fleuve dans la zone lôIA et le volet pression rédigé par lôAgence de lôEau donne tous les éléments nécessaires et complémentaires.

Pour le volet pollution diffuse par les pesticides (agriculture) le LERPAC propose de prendre le driver % de surface agricole.

D10 Déchets

Les données utilisées pour lôIA et repris dans MERMAID seront celles issues de campagnes MEDITS (déchets sur le fond), des campagnes canyons et des campagnes DCE (microplastiques de surface).

En ce qui concerne la base de donnée pression elle reprendra les éléments du volet pression de lô évaluation initiale agrémenté de variables forçantes complémentaires ce qui devrait aboutir à la typologie suivante : villes (populations), apport fluviaux , courrant ligure, vent , pêche , tourisme.

Restera à mettre des valeurs en face de ces différents type dôapports de déchets et cô est à ce stade que nous attendons beaucoup de lôutilisation du modèle DPSIR pour prendre des idées.

En ce qui concerne le WP3 il est proposé de relier les modèles hydro à la dérives des microplastiques tel que cela a été fait par le LERPAC en Corse.

2.3. Mermaid Meeting

Une deuxième réunion Mermaid a eu lieu le 28 Janvier 2014, au cours de lôAssemblée Generale PERSEUS (27/01-28/01) au Divani Acropolis Hôtel à Athènes.

Les participants de l'atelier étaient Dr Eleni Kaberi (coordinateur du projet), Dr Bruno Andral (leader WP1), Mme Pantazi Maria (participant WP2), Dr Baris Salihoglu (leader WP3), Dr Areti Kontogianni (leader WP4) et le professeur Michalis Skourtos (participant WP4) .

Les principaux objectifs du projet ont été rediscutés notamment en ce qui concerne la typologie des pressions et lôapproche socioéconomique.

Chaque WP leader a proposé une liste dôactions visant à atteindre les résultats et de faciliter la livraison à temps des delivrables (cf. **CR du Meeting en annexe 2**).

3. Résultats et prochaines étapes

WP1. Dans le cadre du WP1 et du delivrable D1.1 "Table des typologies / familles des pressions dans les zones d'étude" (**annexe 3**) l'Ifremer a réalisé un tableau décrivant les typologies/familles de pressions identifiées dans le Golfe du Lion réalisé à partir de l'annexe 3 Tableau 2 de la DCSMM. Ce tableau sera complété avec les contributions des partenaires grecs et turcs. La prochaine étape sera de quantifier les différentes pressions (méthode DPSIR lorsque absence de données) et de croiser les résultats avec les données relatives à l'état initial.

WP2. En ce qui concerne le WP2, l'Ifremer a transmis les noms de trois stakeholders qui seront impliqués dans Mermaid pour la zone d'étude du golfe du Lion. P. Boissery (AERMC), S. Auscher (DREAL LR), F. Fredefon (DIRM).

WP3 : Nous attendons le template du METU pour l'inventaire des programmes de surveillance. En interne Ifremer rassemble les principaux outils/réseaux de surveillance existants susceptibles de renseigner les 5 descripteurs.

WP4 : l'Ifremer a réalisé un tableau des mesures de management maritime actuelles en lien en France avec les descripteurs D3 - D7 - D8 - D9 et D 10 (**Annexe 4**) qui sera integré dans le delivrable D4.1 "Review of marine management programs and policies for specific descriptors in the study areas"(Leader : Aegean University).

Annexe 1

MERMAID Kick Off Meeting (Anavyssos, 12 June 2013)

The MERMAID KO meeting was held in HCMR on 12 June 2012 at Anavyssos, it also served the purpose of the SC meeting.
The Agenda can be found in Annex 1, and the list of Participants in Annex 2.
The presentations by the WP leaders (considered part of these minutes) can be temporally found in the link: https://www.box.com/s/nxilka2xiyqvxgc86ibe (pending the construction of the project web site).

Objectives (SEASERA and MERMAID) (Presentation by Coordinator: Eleni Kaberi)
See presentation for details
Key points & Actions:

- Official start of MERMAID : February 2013

WP5 Activities Management and Reporting (Presentation by Project Manager : Nikos Streftaris)
See presentation for details
Key points & Actions:

- Next SC will be done by Skype in T6 ï October 2013.
- The WP leaders also undertake the role of the Task leaders in their WP.
- Need extra contact points by partners on different tasks and not only task leaders.
- Countries have specific reporting requirement following national authorities/ funding bodies as in the case of Turkey where reports have to be submitted to TUBITAC every 6 months).

WP1 Activities, Deliverables and Interconnection with the other WPs (Presentation by Bruno Andral)
See presentation for details of the proposed work in the different areas.
Key points & Actions:

- The main issue was the need to identify and link the PRESSURES in the area to the IMPACT and then to the ENVIRONMENTAL STATUS of the area. Based on these then MONITORING Programmes can be proposed specific for each area and specific to the scale. Important to establish common methodologies and criteria.
- MERMAID should benefit from similar work of other projects (MYTIMED in the case of GoL), ODEMM and Strategies (WFD and MSFD IAs) for the identification of pressures and the links between Pressures and Environmental Quality.
- Main pressures identified: GoL chemical pollution and litter.
  Cilician: eutrophication (ok to link e.g. TRIX) and fisheries (need more work).

Saronikos Gulf: according to PERSEUS results, overfishing, chemical pollution and litter.

- There is a need to clarify as soon as possible the availability and suitability of available models. Turkish model is too general for this purpose, problem to downscale.

WP2 Activities, Deliverables and Interconnection with the other WPs
(Presentation by Mairi Pantazi)
See presentation for details
Key points & Actions:

- WP2 work will start in T6 (October 2013) following closely the outcomes and progress of work of WP1
- Use info (docs etc) already archived in PROGECTA PERSEUS, plus other works (e.g. ODEMM). Results of ODEMM project were presented by Nadia Papadopoulou (See presentation for details)
- Uniform approach will be followed towards the adoption of targets with consistent approach in all case study areas
- The basic issues in each areas have to be identifies and scored accordingly > suitable indicators will be then proposed and finally tested for their efficacy in the area/ issue
  - Apply the ñsignal detection theoryò (details in presentation).
  - SMART methodology to all indicators not only those in MSFD
- Stakeholder platforms carefully constructed based on the experience of other projects

WP3 Activities, Deliverables and Interconnection with the other WPs
(Presentation by Baris Salihoglu)
See presentation for details
Key points & Actions:

- Litter is a good candidate for pilot monitoring survey as it is an issue common in all 3 areas. Litter protocols exist or will be available shortly through the MSFD task groups and the UNEP/MAP ECAP.
- Turkey will apply a litter pilot monitoring survey.
- In France the proposed pilot survey will link the remote sensing to hydrodynamic models for fisheries and maybe for litter. This methodology was tested in GoL.
- Pilot monitoring in Saronikos is not defined yet.

WP4 Activities, Deliverables and Interconnection with the other WPs
(Presentation by Michalis Skourtos)
See presentation for details
Key points & Actions:

- Stakeholder identification and set up of platforms ***ï*** In collaboration with the work of WP2. Stakeholders should be on the same level in all areas. Get a small CORE group e.g. ministry of environment, local authority, ministry of maritime authorities, NGOs, users (fishermen)

- Partners will send the key stakeholders identified from their work in other projects to the WP leader.
- Partners will also identify local stakeholders in their area
- WP4 leader will send the lists of stakeholders from SESAME and PERSEUS to all partners.

- Briefing material to be prepared targeting stakeholders.
- The main work focuses on the management schemes. Available Management schemes from each area will be collected by the partners and sent to WP leader. Schemes should finally be tested in all 3 areas.

SPECIFIC ACTIONS TO BE PERFORMED DURING THE FIRST 6 MONTHS (until October 2013)

1. WP presentations will be circulated
2. Bruno will send the methodology of linking pressures to GES and setting the targets based on WFD and French MSFD IA
3. Areti will send the lists of stakeholders as formed in SESAME and PERSEUS
4. Bruno will send the French key stakeholders from WFD
5. Baris will send a list of stakeholders ï taking into account the meeting of Mediterranean Mayors in Izmir
6. All the partners will send any management measures (reports) from each area to Areti/Michalis
7. Prepare a leaflet for the stakeholders with the important environmental issues (main pressures) for each study area
8. Set skype meeting for 2nd SC

ANNEX 1

Kick off meeting, HCMR, Anavyssos, Athens
Provisional Agenda

Wednesday, June 12, 2013

9.30-10.00	Registration - Welcome - Introduction of participants Adoption of the Agenda Presentation of SEASERA objectives (Eleni Kaberi) Presentation of MERMAID objectives (Eleni Kaberi)
10.00-10.30	WP1 Activities, Deliverables and Interconnection with the other WPs (Bruno Andral)
10.30-11.00	WP2 Activities, Deliverables and Interconnection with the other WPs (Celia Vassilopoulou)
11.00-11.30	Coffee Break
11.30-	WP3 Activities, Deliverables and Interconnection with the other

12.00	WPs (Baris Salihoglu)
12.00-12.30	WP4 Activities, Deliverables and Interconnection with the other WPs (Areti Kontogianni)
12.30-13.00	WP5 Activities and Deliverables (Nikos Streftaris)
13.00-14.30	Light Lunch
14.30-16.30	General Discussion
	End of kick off meeting
17.00-18.30	Scientific Steering Committee meeting

ANNEX 2

List of Participants

Bruno Andral (IFREMER) Bruno.Andral@ifremer.fr
Baris Salihoglou (IMS-METU) baris@ims.metu.edu.tr
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Annexe 2

MERMAID ï Meeting

1. Background

The MERMAID meeting was held on the 28th of January 2014, during the PERSEUS GA (27/01-28/01) at Divani Acropolis Hotel in Athens, Greece.

2. Attendees

The participants of the workshop were Dr Eleni Kaberi (coordinator of the project), Dr Bruno Andral (WP1 leader), Mrs. Pantazi Maria (WP2 participant), Dr Baris Salihoglu (WP3 leader), Dr Areti Kontogianni (WP4 leader) and Prof. Michalis Skourtos (WP4 participant).

3. Discussion

The coordinator of MERMAID Dr Eleni Kaberi welcomed the participants and opened the meeting discussing about the Annual Meeting of MERMAID which, after the attendeesô consensus, was set on the 28th of April 2014 in Athens, Greece. However, further communication regarding the finalization of the date and place will take place among the participants.

The main targets of the project were underlined and a discussion concerning each Work Packageôs respective deliverables and milestones has been carried out. In this discussion all participants agreed to follow the structure of scientific papers for the deliverablesô compilation and highlighted the importance of this perspective. A list of actions was suggested by each WP leader (presented below) aiming to achieve coherent and consistent outputs and to facilitate the on time delivery of the projectôs obligations.

List of actions per Work Package

WP1: Identification and quantification of the state indicators for the assessment of the environmental quality

D1.1 (T12): Table of typologies/families of pressures in the study areas

Bruno will circulate as soon as possible to all partners involved a template of the table of pressures (based on Annex III of MSFD) featuring the French example, which will be filled in accordingly by the others (Greeks and Turks) and sent back to him on time. D1.1 should be delivered at T12 (end of February).

WP2: Definition of GES and propose or adapt targets towards its achievement

M2.1 (T12): Establish Stakeholders platform

Maria (HCMR) redistributed the list of stakeholders to the participants involved in order for them to decide on the 3 (the least) key persons of their region that will be finally engaged in MERMAID. The importance of the stakeholdersô willingness to interact with the project along with their field of expertise (so as to cover all MSFD descriptors under study) was highlighted. Partners need to reply as soon as possible. M2.1 is due to T12 (end of February).

WP3. Design of integrated monitoring programmes for the assessment of Ecological Status

D3.1 (T10): Inventory of the existing monitoring programmes and observational systems linked to the selected descriptors in the study areas

Baris agreed to share with the involved partners a template of the inventory of the existing monitoring programmes and observational systems based on the Turkish example, so as to be followed by the others.

D3.1 is of high priority since itôs already overdue T(10).

WP4: Linking targets and management measures

D4.1 ï T12 Review of marine management programs and policies for specific descriptors in the study areas

Areti will send to all partners involved a common structure of the review of marine management programs and policies based on the Greek study area, to be followed by them.

D4.1 should be delivered at T12 (end of February).

Areti also underlined the preparation of a stakeholdersô meeting (after Easter holidays) in Athens.

She also mentioned a map presenting cumulative impacts in terms of ecosystem services shown by Xavier De Madron (PERSEUS-WP1 leader) during PERSEUS GA which will be distributed among the participants as food for thought for respective issues in the framework of MERMAID.

Based on that comment, Bruno suggested that Micheli et *al.* 2013 is a very interesting publication which would help in MERMAID, and will also be circulated among us.

Finally a common MERMAID template for all deliverables will be prepared and distributed by Eleni.

4. End of MERMAID meeting

Eleni thanked all the participants for attending and contributing to the meeting and wished for a fruitful and creative collaboration.

Meeting opened at: 10:30

Meeting closed at: 12:30

Annexe 3

Marine Environmental targets linked to Regional Management schemes based on Indicators Developed for the Mediterranean

WP1. Identification and quantification of the state indicators for the assessment of the environmental quality [Leader: IFREMER; participants: HCMR, IFREMER, METU, AEGEAN]

D 1.1 Table of typologies/families of pressures in the study areas

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The WP1 will integrate the existing scientific knowledge (considering also the Initial Assessment provided by the two EU Member States i.e. Greece and France) regarding the qualitative descriptors pertinent to fisheries (D3), hydrologic environmental parameters such as turbidity, currents and waves (D7), chemical pollution in the environment and biota (D8 & D9) and marine litter (D10); it will define the main pressures and related processes relevant to these descriptors in the three study areas (the Gulf of Lions, Saronikos gulf and Cilician basin) and assess their relative weights versus natural forcing (current, waves, salinity variations etc) that also are likely to impact descriptors; and it will assess the environmental quality of the ecosystems of these three areas. It will identify assessment gaps arising by lack of data and/or knowledge of pertinent methodological procedures. WP1 will be based on currently available data and on existing environmental assessment methodologies.

The main objectives of WP1 are to:

- Identify the existing gaps in the knowledge of the processes through which human activities impact the marine ecosystems;
- Define the main threats related to the selected descriptors on the selected study areas;
- Achieve a coherent assessment of the environmental quality;
- Identify assessment gaps.

The subtask 1.1 ñCharacterization of natural and human pressures in the study areasò will identify typologies/families of pressures will be constructed according to key parameters including human activities in the study areas. Preliminary link between pressure typology and pressure indicators will be built, leading to the identification of missing links.

The main issue is to identify and link the PRESSURES in the area to the IMPACT and then to the ENVIRONMENTAL STATUS of the area.

1. Methodology

Human activities generate very different types of pressure on the marine environment. Fauna, flora and marine habitats can be affected in different degrees whose reversibility depends on the vulnerability of their capacity to regenerate (or their resilience). These impacts also vary as a function of the types of pressure, their intensity and duration. The main consequences are the loss of biological diversity, the degradation of the ecological and sanitary quality of marine waters, the reduction of natural resources and the services provided to society by the marine environment.

The pressures generated by human beings can be classed into three groups (typology):

- **Biological disturbances** (extraction of species, introduction of pathogenic microbial organisms, etcé);
- **Physical disturbances** (physical loss, physical damages, interference with hydrological processes, etcé);
- **Chemical disturbances** (introduction of contaminants, excessive enrichment with nutriments, etcé).

Identification of pressure was performed in an overall objective, the construction of a database to analyse the link state - pressure, and identifying pressure wich impact the differents descriptor.

For this, the different descriptors are analyzed to assess the state of the marine environment and then in a second step, the scientists referents of each of these elements were found to determining the relevant pressure considerations.

Thus, for each descriptor considered, relevant anthropogenic pressures have been identified. In this work, the most difficult problem to solve is that some descriptors are a state indicator but also a pressure and an impact indicator, such as waste or chemicals.

To quantify the pressures identified by the experts, the approach of DPSIR (Driving Forces - Pressures - State- Impact - Responses, OECD, 1993; IMPRESS, 2002) will be used.

The Driver-Pressure-State-Impact-Response (DPSIR) framework is a means of structuring and organizing indicators in a way that is meaningful to decision makers. DPSIR was promoted to show the causeï effect relationships between environmental and human systems.

Drivers, which may be social, economic or environmental developments, exert Pressures on a certain environment. As a result of these Pressures, the State of the environment changes. This then leads to an Impact (social, economic or environmental), which may lead to a societal Response. The response may feed back to Drivers, Pressures, States or Impacts.
In a first step, we analyse all the pressure wich are a significant impact on the 5 descriptors taken in consideration.

To do this firstly it was utilised the Annex III- Table 2 ñPressures and impactsò of the Marine Strategy Framework Directive that contains an indicative list of the pressures and impacts on the marine environment. The objective of the deliverable D1.1 is in fact to achieve a characterization of natural and human pressures in the study areas by constructing typologies/families of pressures according to key parameters including human activities and natural inputs in the study areas.

As this kind of analysis of impacts and pressures cannot be carried out in the absence of a characterisation of the human activities creating such pressures we, secondly, referred too the indicative list of human activities exerting pressures in the marine environment, provided in the Annex of the European Commission Staff Working Paper ñRelationship between the initial assessment of marine waters and the criteria for good environmental statusò (SEC (2011) 1255 final).

In fact this list of human activities indicates the pressures, according to the Table 2 of Annex III to the Directive, which each activity may generate. It is also based on guidance from the MSFD Working Group on Economic and Social Analysis, assessments and publications by Regional Sea Conventions, and the draft outline of the UN Regular process for global reporting and assessment of the state of the marine environment, including socio-economic aspects.

Thirdly this list was integrated with the information collected in the framework of the French Initial Assessment for the Mediterranean Sea. The result is an analysis of the possible pressures coming from different human activities in the Gulf of Lion (Table 1).

The table distinguishes between biological disturbances, physical disturbances and chemical disturbances. The activities are divided into extraction of living resources, food production, man-made structure (included construction phase), extraction of non-living resources, energy production, transport, waste disposal, tourism and recreation, research and survey, military, land-based activities/industries.

The table leads to a threefold analysis:

- It shows those pressures that are taken in consideration both in the European Commission document and the Gulf of Lion;
- It identifies as ñsource of pressureò for the Gulf of Lion some human activities that were not taken in such consideration by the European Commission Staff Working Paper;
- It puts in evidence those pressures that according the EC should be counted but that have not been considered relevant in the Gulf of Lion.

2. Typology of disturbances in relation with differents descriptors

2.1. Biological disturbances

2.1.1. The extraction of species (commercial and recreational fishing)

The species fished most in terms of tonnage unloaded in the Western Mediterranean are the sardine, anchovy and whiting. Among the halieutic stocks of the Western Mediterranean that have been subject to a full scientific evaluation whiting and goatfish of the Gulf of Lion are exploited beyond the criteria known as ñmaximum sustainable yieldò (MSY) and are thus considered as being over-fished with respect to the targets of the common fishing policy (CFP).

However, the study of trends over the last ten years suggest that most stocks are evolving favourably (reduced mortality due to fishing).

Fishing also contributes to the mortality of protected and emblematic species such as marine mammals, birds and sea turtles due to **accidental capture**. Accidental captures of small cetaceans, particularly the striped dolphin and bottlenose dolphin, have been observed due to offshore and bottom trawling in the Gulf of Lions. Few figures are available at present on the trapping of birds and sharks by fishing. Accidental captures of sea turtles have been observed, particularly by nets, dragnets and trawl lines.

The pressure exerted by fishing leads to **effects on the populations of each species** (abundance and size of individuals), **on all communities of fish and marine invertebrates** (abundance, average size and diversity) and **on the food chain**. Thus, an increase in the number of predators and a relative decrease in the number of preys were observed during the period 1995-2006.

2.1.2. The introduction of non-indigenous species

Non-indigenous species are species that have been transferred by man outside their natural area of distribution and dispersion. On the scale of the Western Mediterranean, and more generally that of Europe, it appears that French waters are among those most affected by the introduction of non-indigenous species. It also appears that France is the source of dissemination of at least half the non-indigenous marine species introduced in Europe.
Nearly 150 non-indigenous species have been identified in the Western Mediterranean. The main vectors of introduction are sea farming and maritime transport. Sea farming is a major vector for introducing and disseminating a large number of non-indigenous species (e.g. algae, molluscs, crustaceans), in particular through the regular transfer of seed oysters and stocks of oysters between different oyster farming sites. Ports are also major sites for the introduction of non-indigenous species due to deballasting operations (the emptying of ballast water from ships) and fouling organisms (organisms that attach themselves to hulls).

However, obtaining knowledge of these impacts is complex and requires long-term investment in order to find responses and prepare for future evolutions

2.1.3. The introduction of pathogenic microbial organisms

The pollution of the marine environment by microorganisms (bacteria, viruses) stems in particular from the discharge of domestic wastewater, treated or not on land and on ships, the excrement of species (wild and bred), discharges of contaminated rainwater (leachate from roads, defective sewer network connections). The introduction of pathogenic organisms mainly has consequences for health and can affect the quality of bathing and shellfish breeding areas, with not inconsiderable effects on human beings.

The **quality of bathing water** in the Western Mediterranean generally (in 98% of cases in 2010) conforms to health standards with 86% of waters classified as being of ñgood qualityò. A significant increase of bathing water quality was observed from 1995 to 2000 due to the development of municipal waste water treatment plants on the coast.

The **microbial quality of shellfish areas**, based on the detection of the indicator bacteria *Escherichia Coli* is mainly classed as ñaverageò. Over the last 10 years, only two points, both located in the hydrological basin of the Camargue, have undergone improvement regarding the microbiological quality of shellfish.

The introduction of pathogenic organisms has also had **impacts on the health of molluscs** in natural and artificial breeding areas as well as on that of fish (wild and bred). Viruses (*herpes virus*) and bacteria of the genus *Vibrio* have been detected in particular in the Portuguese oyster and are thought to be the likely cause of recent episodes of excess mortality. However, it is often difficult to measure the impact of these infectious agents on both animals bred in oyster and fish farms and those taken from natural stocks. Likewise, it is difficult to know the reasons for their presence and their proliferation which result from a combination of factors.

2.2. Physical disturbances

2.2.1. Physical loss

Ships navigating in a shallow water area, such as embayment, canals, straits and their inner reaches of harbours and ports, tend to stir up sediments from soft bottom. While the fine sediments fraction may remain suspended in the water column for some time, the coarser fraction settles rapidly and is dispersed over a wide area of the seabed, smothering benthic habitats and biota in the process.

2.2.2 Physical damage

Human beings practice different activities on the coast, in the tidal zone and in the sea, interacting directly and indirectly with the soil and seabed, and they can exert pressure on the substrate and the marine life associated with it. This is the case in particular of coastal developments, shellfish farming, seaport dredging and dragnet fishing.

Pressures of **clogging** result mainly permanent building located on the coast, such as defenses against the sea and the harbour infrastructure. The quantity of dredged sediments are not inportant in the golfe of Lion but mainly concern the golfe of Fos.

Scouring is physical damage entailing the wear or erosion of the seabed caused by direct interaction between equipment and the seabed. In terms of surface area scouring is mostly caused by bottom drag nets (trawlers and dredgers) for the most part used on the continental shelf of the Gulf of Lions.

The scouring caused by ships anchoring and underwater cables is more localised but potentially more intense. Also, scouring caused by the anchorage of pleasure craft is not inconsiderable in certain coastal habitats such as posidonia meadows and specific habitats such as coralligenic bottoms there are non specific.
Degradation of habitats may also result from the **extraction of mineral marine materials** such as the use of aggregates (siliceous sands and gravels) and the dredging of ports and navigation channels. Currently, marine aggregates are not extracted from the Western Mediterranean. However, substantial requirements for sand for managing the coastline will, in the medium term, lead to the extraction of large quantities of sand dedicated to replenishing beaches in the gulf of Lions.

Modifications of turbidity and the type of sediments result from the human activities mentioned previously. These modifications are indirect consequences occurring in the water column and on the bottom at distances and on surfaces related to hydrodynamic conditions. On the scale of the gulf of Lions the most marked effects (temporary increase of turbidity, changes of the nature of the seabed) are linked to coastal infrastructures and developments and fishing with dragnets that involve large areas. The effects linked to other activities are usually localised and of relatively low intensity. The localisation of pressures and their seasonality are decisive since even a slight modification of turbidity or the nature of the seabed can lead to major impacts if it concerns a sensitive ecosystem and/or if it occurs during a period of the year when natural turbidity is low (in summer).

Another indirect though major ecological impact is caused by mechanised debris collection on beaches which degrades this type of habitat. Lastly, little is known as yet of the effects of microdebris. A lot of experts agree that its ecological impact is far from negligible.

2.2.3. Interference with hydrological processes

A part from the effects of climatic warming and the freshwater input from the Rhône and coastal rivers, some human activities are liable to lead to direct hydrological modifications on the environment.

Regarding water temperature, discharges of the water used to cool electricity power plants are the biggest source of thermal modification in terms of magnitude. However, the spatial influence of discharges of hot water from three power plants installed on the coast of the marine sub-region is very limited (around a kilometre), leading to no known ecological impact in the gulf of Lions.
Regarding salinity and marine currents, no direct effect of anthropic activity can be highlighted at present, except at very small scales. It is nonetheless possible that the

modification of the hydrological regime of rivers, linked to anthropic activities in catchment areas, may modify regional circulation through changes in salinity and contrasts of density. Furthermore, developments in the sea such as dikes modify local currents in turn affecting sediment transport and the nature of the seabed. The ecological impacts of such modifications are considered minimal at present. The potential development of renewable energies at sea, notably wind energy, could be an additional impact. However, they should not have a strong influence on medium currents outside the parks.

2.2.3. Other physical disturbances (marine litter and underwater noise)

Human activities generate a lot of debris found in the marine environment and partially on the coast. Large quantities of debris are discharged into the Western Mediterranean due in large part to the considerable number of tourists that frequent the coast, and the proximity of cities.

The debris washed up on the **French Mediterranean coast** are mainly composed of plastic and polystyrene objects (90%). Food packaging makes up a large part of this debris. Packaging and other debris linked to hygiene and health are also present in large volumes. Furthermore, leisure activities are represented by large quantities of childrenôs toys, boxes of bait and fishing lines. The main areas of accumulation are those exposed to dominant winds and close to river outlets.

The areas of high concentrations of **debris found on the seabed** are located in eastern Corsica, on the margins of the plume of Rhône River, and in all the coastal underwater canyons. Large accumulations of detritus are also found facing large cities and towns that attract many tourists. Concentrations of debris are lower on the continental shelf of the Gulf of Lions. Although most of the debris is composed of plastic materials, much is linked to fishing activities.

These marine debris can have different impacts on marine organisms (particularly birds, turtles and mammals): trapping, tangling and ingestion can lead to modifying the behaviour and even the death of individuals. They can also increase the risk of transporting invasive species. However, these impacts are insufficiently quantified. There is also a risk with the dispersion of chemical contaminants which may be adsorbed to the particle.

Human activities at sea generate also **noise** that propagates easily in the aquatic environment. This sound disturbance is susceptible to have an impact on marine life. It can be of two types:

- The relatively continuous and permanent ñambient noiseò generated by maritime traffic and nautical activities. The pressure in the Western Mediterranean due to maritime traffic is moderate to high and is characterised by significant seasonal variations in ambient noise level;
- Noises of strong intensity and short duration generated by the use of acoustic emitters, seismic prospection and offshore works. Pressure due to the emission of sound pulses is moderate but has been increasing in recent years

The main known impacts of noise on marine fauna concern marine mammals. The Western Mediterranean is a zone frequented by a large number of species sensitive

to sound disturbances such as Cuvierôs beaked whale. Although no major incident linking sonars and the beaching of marine mammals has been recorded, the current lack of scientific knowledge on the impact of noise on marine species justifies specific observation of the region.

2.3. Chemical disturbances

2.3.1. Contamination of the marine environment by chemical substances

Chemical substances are widely used in our society. Their sources can be natural (e.g., heavy metals) or synthetic (e.g., solvents, plasticisers, detergents, drugs, phytosanitary products). Some of these substances are considered dangerous as they can have harmful effects on fauna, flora and human health. In the Western Mediterranean, the pressure from chemical contamination is globally greater in the main ports, around the large cities and in the zone subject to the plume of the Rhone. To this must be added atmospheric fallout and accidental and illegal pollution linked to maritime transport that concern the entire marine sub-region.

Most of the **inputs** into the marine sub-region come from the **Rhone and coastal rivers**. They represent 88% of the input of contaminants in the sea. These inputs above all concern metals, organic semi-volatile contaminants (e.g. DEHP), pesticides, hydrocarbons and PCBs.

The inputs from the Rhone Valley of cadmium and mercury are negligible. Flows of zinc decreased considerably from 1997 to 2002 and seem to have stabilised in recent years. Copper and lead discharged by the river are subject to considerable inter-annual variations. Discharges of lindane (a pesticide forbidden since 1998) have also decreased considerably, although traces are still present in the environment.

Although diffuse, **atmospheric inputs** in metals, pesticides and PCBs can sometimes reach magnitudes comparable to those of the Rhone (especially for lead and lindane). The trends of these inputs are not known for the Western Mediterranean.

In addition to terrestrial and atmospheric inputs, the gulf of Lions is exposed to **accidental pollution and the illegal discharge of fuels and other dangerous substances** but it is .less affected than the Corsica island and the Côte-dôAzur.

The immersion of dredged sediments or dumping can be another source of chemical contamination. The dredging of ports and navigation channels is vital for maintaining access for shipping but the sediments dredged contain various concentrations of chemical contaminants. In the gulf of lions, nearly all the sediments dredged are immersed in the sea. The immersion of sediments is subject to strict regulations based on reference levels used to characterise the quantity of contaminants they contain and help decision-making regarding the best management given their impact on the environment.

In terms of impact, a large number of indicators provide evidence of contaminants in the environment, notably in sediments and living organisms. A scientific study in the Gulf of Lions, for example, revealed abnormally high concentrations of PCBs and PBDE of terrestrial origin in the flesh of whiting.

Thus the whole trophic network can be affected locally by certain contaminants. Lastly, the impact can also affect health and the socioeconomic fabric when species bred for human consumption are involved. Nonetheless, current knowledge of the impacts of these contaminants on life is still very meagre and it is necessary to perform considerable methodological and scientific research.

2.3.2. Nutrient and organic matter enrichment

Nutriments, notably, nitrogen and phosphorous are essential for the growth of aquatic plants that compose the basis of marine food chains. The balance in ecosystems between the availability of nutriments and marine plant and animal growth is governed by natural processes. The introduction of excess nutriments and organic matter in the sea by human activities can disturb this balance and accelerate the growth of algae, leading to effects harmful for water quality, marine ecology (loss of biodiversity, etc.) and human health (sanitary contamination through the proliferation of the toxins produced by these algae ï phytotoxins, etc.). This process is called eutrophication.
Regarding inputs of nitrogen and phosphorous, the two most substantial sources are from agriculture (more than 60% of nitrogen for the entire sub-region) and inputs linked to rainwater pollution (more than 57% of phosphorous input for the entire sub-region). The flow of nitrogen in nitrate form to the sea is fairly stable whereas the flow of phosphorous is decreasing.

The Rhone is the **main source of nutriment and organic matter inputs to the sea**, given its flow rate and the size of its catchment area (75 %). The coastal rivers, sometimes carry large quantities of ñconcentratedò inputs for short periods linked to flushing effects during flooding. Neighbouring catchment areas represent a large group of diffuse inputs often linked to rainwater runoff from urban areas, farmland and natural areas. Direct discharges into the sea of urban wastewater and industrial water can sometimes be considerable, especially close to large cities (Montpellier, Marseille). Pleasure craft and ports do not represent a major source of inputs into the sea. However, atmospheric fallout is another considerable source of nitrogen input in the sea.

Given the specific characteristics of the Mediterranean Sea, which is ñoligotrophicò (i.e. poor in nutritive salts) and without tides, inputs of organic matter and nutriments do not constitute a problem for its future. Only the coastal zone of the gulf of Lions which is exposed to the plume of the Rhone and the outlets of numerous lagoons, is subject to higher levels of eutrophication than the rest of the French coast of the marine sub-region.

Tableau 1- Human activities and their possible pressures on the marine environment in the Gulf of Lion

Indicative list of human activities		Biological disturbance			Physical loss	Physical damage	Interference with hydrological processes	Other physical disturbance		Contamination by hazardous substances	Systematic and/or intentional release of substances	Nutrient and organic matter enrichment
Activity theme	**Activity**	Extraction of species, including non-target catches	Non Indigenous species and translocations	Microbial pathogens	Smothering -Sealing	Siltation - Abrasion - Extraction	Thermal regime (change) - Salinity regime (change)	Underwater noise	Marine Litter	Synthetic compounds - Non synnthetic substances - Radio-nuclides	e.g. produced water, carbon storage	Fertilisers and other nitrogen and phosphorus-rich substances - Organic matter
Extraction of living resources	Fisheries incl.recreational fishing (fish and shellfish)											
	Seaweed and other sea-based food harvesting											
	Extraction of genetic resources/bioprospecting/maerl											
Food production	Aquaculture (fin-fish and shellfish)											
Man-made structure (included construction phase)	Land/sea physical interaction: land claim, coastal defence											
	Port operations											
	Placement and operation of offshore structures (other for energy production)											
	Submarine cable and pipelines operations											
Extraction of non-living resources	Marine mining (sand and gravel, rock)											
	Dredging											
	Desalination/water abstraction											
Energy production	Renewable energies generation (wind, wave and tidal power)											
	Marine hydrocarbon (oil and gas) extraction											
Transport	Shipping											
Waste disposal	Solid waste disposal incl. Dredge material											
	Storage of gasses											
Tourism and recreation	Tourism and recreation incl. Yachting											
Research and survey	Marine research, survey and educational activities											
Military	Defence - recurrent defence operations											
	Defence - dumping of unwanted munitions											
Land-based activities/industries	Coastal riverine and atmospheric inputs from land - industrial discharges and emissions											
	Coastal, riverine and atmospheric inputs from land-agricultural and forestry run-off and emissions											
	Coastal, riverine and atmospheric inputs from land-municipal waste water discharge											

Legend

- Human activity considered as "source of pressure" BOTH in the MSFD Annex 4 and for the Gulf of Lion
- Human activity considered as "source of pressure" in the Gulf of Lion
- Human activity NOT taken in consideration as "source of pressure" in the Gulf of Lion

			Descriptors				
			D3 - Fisheries	D7- Hydrologic environmental parameters such as turbidity, currents and waves	D8- Chemical pollution in the environment	D9- Chemical pollution in the biota	D10- Marine Litter
	Measure	Directive or public policy by which the measure is implemented	Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock	Permanent alteration of hydrographical conditions does not adversely affect marine ecosystems	Concentrations of contaminants are at levels not giving rise to pollution effects	Contaminants in fish and other seafood for human consumption do not exceed levels established by Community legislation or other relevant standards	Properties and quantities of marine litter do not cause harm to teh coastal and marine environment
Fishing	Regulate and control fishing (professional, recreational, seamanship)	Natural Reserve, Natura 2000					
		EC Regulation 1967/2006 concerning management measures for the sustainable exploitation of fishery resources in the Mediterranean					
		2011 EU Regulation 1343 / on certain provisions for fishing in the area covered by the GFCM Agreement					
		National regulations (decrees and ministerial orcers)					
		Regional regulations (prefectural)					
		Decree of 1 July 2011 establishing the list of protected marine mammals in national territory and methods of protection					
		National regulations (decrees and ministerial orders)					
		Natura 2000 UEGC (Grenelle de la Mer)					
		Nature Reserves, Bay contracts, Marine Parks, National Parks Management Plans					
		EC REGULATION 1881/2006 of 19 December 2006 setting maximum levels for certain contaminants in foodstuffs					
Marine protected areas	Create or expand marine protected areas	National strategy for the establishment of marine protected areas adopted in November 2011					
	Inventory of biodiversity and functionality areas of coastal funds	ZNIEFF, Natura 2000					
	Implanting artificial reefs for restoration of fish populations	Interregional PACA LR strategy					
	Refresh authorizations for installations classified for environmental protection	Measures by the Water Framework Directive (WFD) implemented through the Law n° 2004-338 of 21 april 2004					
Tourism and recreational activities	Regulate attendance of coastlines by the general public	Natura 2000, Nature Reserves, National Parks					
	Condition to obtain the license for pleasure motor boats to acquiring knowledge about environmental protection (waste, sanitary equipment, antifouling paints, fisheries resource).	Ministerial Decree of 28 September 2007					
Security and defense	Implement local water patrols	DIRECTIVE 2005/35/EC of the European Parliament and of the Council of 7 September 2005 on pollution caused by ships and the introduction of penalties for infringements					
Pollution and waste	Implement the provision of SDAGEs RM 5a-01: Develop or revise periodically sanitation master plans for planning the necessary equipment and to reduce pollution from stormwater	Outline for the organization of the development and management of water resources Rhone- Mediterranean (SDAGE)					
	Adapt the regulatory requirements of industrial establishments to the local context	Measures by the Water Framework Directive (WFD) implemented through the Law n° 2004-338 of 21 april 2004					
	Improve the collection and treatment of port wastewater	Measures by the Water Framework Directive (WFD) implemented through the Law n° 2004-338 of 21 april 2004					
	Implement the provision of SDAGEs RM 5a-05: adjust the conditions of release to protect areas particularly sensitive to pollution	Outline for the organization of the development and management of water resources Rhone- Mediterranean (SDAGE)					
	Find sources of pollution by dangerous substances	Measures by the Water Framework Directive (WFD) implemented through the Law n° 2004-338 of 21 april 2004					
		Directive 2006/11/EC on pollution caused by certain dangerous substances discharged into the aquatic environment of the Community					
		Decree 2005-378 of 20 April 2005 on the national program of action against the pollution of the aquatic environment (surface) by certain dangerous substances					
		EC Regulation 166/2006 concerning the establishment of a European Pollutant Release and Transfer Register and amending Council Directives 91/689/EEC and 96/61/EC					
		Decree of 31 January 2008 on the register of declaration of annual emissions and waste					
		Circular dated 13 July 2006 on the establishment and implementation of the monitoring program for surface freshwater under the Water Framework Directive					
	Implement the provision of SDAGEs RM 5c-03: reduce discharges from industrial sites and port facilities	Outline for the organization of the development and management of water resources Rhone- Mediterranean (SDAGE)					
	Ban TBT coatings on ships in all European Community waters	Regulation (EC) No 782/2003 of the European Parliament and of the Council of 14 April 2003 on the prohibition of organotin compounds on ships					
	Reduce weeded areas and use alternative techniques to chemical weed control in agricultural areas	Measures by the Water Framework Directive (WFD) implemented through the Law n° 2004-338 of 21 april 2004					
	Implement Departmental Plans to Eliminate Household Waste and Similar	Departmental Plans on elimination of household and similar waste					
		Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment					
	Statutorily regulate the establishment of port reception facilities for ship-generated waste and cargo residues	Directive 2000/59/EC					
		Seaports Code (art R343-1 and 2)					
	Improve the management of solid waste at sea (off SDAGEs)	Natura 2000, local policies					
	Regulate and control the discharges from ships, floating equipment and platforms.	International Convention for the Prevention of Pollution from Ships (MARPOL) and Division 213, 215, 217, 218, 219, 220, 221, 222 223,					
		Directive 2005/35/EC on pollution caused by ships and the introcuction of penalties for infringements implemented by the Act of 2 April 2008					
	Regulate the management of ballast water	International Convention for the Control and Management of Ballast Water and Sediments ship & Law 2008-476 of 22/05/08					
Management policies	Lead and coordinate the action of the State on sea	Decree 2004-112 of 6 February 2004 on the organization of the State on sea					
	Implement coastal and maritime components of the coastal scheme of territorial coherence (ScoT)	Outline for the organization of the development and management of water resources Rhone- Mediterranean (SDAGE)					
Hydromorphology	Restore the hydromorphological functioning of the area of freedom of rivers or coastal space	Measures by the Water Framework Directive (WFD) implemented by the Law n° 2004-338 of 21 april 2004					
	Conditionality to the permission for beach nourishment to the strict implementation of the national strategy for management of the coastline and in particular Action 7	National Coastline Management Strategy					