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Montreal, 28 November-2 December 2005
Item 3 of the provisional agenda*

TOWARDS THE DEVELOPMENT OF A JOINT WORK PLAN FOR THE MANAGEMENT OF MARINE INVASIVE ALIEN SPECIES

Note by the Executive Secretary

1. The present document provides an update on work related to the development of a joint work plan for the management of marine invasive alien species, in accordance with decisions VI/23 1/ and VII/5. Decision VI/23 2/ paragraph 26(e) requested the Executive Secretary, in collaboration with the Global Invasive Species Programme and other relevant organizations to develop a joint programme of work on invasive alien species. Similarly, activity (a) under operational objective 5.2 in the programme of work on marine and coastal biological diversity (decision VII/5, annex I), refers to the development of an international cooperative initiative to address impediments to the management of marine alien species, particularly to address technical problems related to the identification and control of marine invasions.

2. Work to fulfil the mandate provided by these two decisions is now underway. The first component of this effort was the Workshop on the Joint Programme of Work on Marine and Coastal Invasive Species. This workshop, which was jointly convened by the Secretariat of the Convention on Biological Diversity, the Global Invasive Species Programme (GISP) and the UNEP Regional Seas Programme, took place in Montreal, from 27 to 29 June 2005. Subsequently, following a procedure identified by the workshop, the results of the workshop discussions are being consolidated into a comprehensive assessment of status, and further proposed activities that will form a basis for future collaborative efforts amongst relevant organizations.

3. Annex I to this document presents the procedural report of the Workshop on the Joint Programme of Work on Marine and Coastal Invasive Species. Annex I of the original report is not presented here, as it has been replaced by the further consolidation of the workshop results, leading to the Draft Joint Work Plan for the Management of Marine Invasive Alien Species, which is available in the present Annex II. Consultations with relevant agencies are currently being undertaken regarding the content of the draft joint work plan, prior to final agreement on its content. Finally, annex III to this document provides a list

* UNEP/CBD/SBSTTA/11/1/Add.1.

1/ One representative entered a formal objection during the process leading to the adoption of this decision and underlined that he did not believe that the Conference of the Parties could legitimately adopt a motion or a text with a formal objection in place. A few representatives expressed reservations regarding the procedure leading to the adoption of the decision. See UNEP/CBD/COP/6/20, paras. 294-324.

2/ Ibid.

/…

of participants of the Workshop on the Joint Work Programme on Marine and Coastal Invasive Alien Species.

Annex I

REPORT OF THE WORKSHOP ON THE JOINT WORK PROGRAMME ON MARINE AND COASTAL INVASIVE ALIEN SPECIES
(*Montreal, 27-29 June 2005*)

I. PROCEDURAL REPORT

1. The Workshop was jointly convened by the Secretariat of the Convention on Biological Diversity, the Global Invasive Species Programme (GISP) and the UNEP Regional Seas Programme. The Workshop met from 27 to 29 June 2005 in Montreal, with financial support from GISP and the Regional Seas Programme of the United Nations Environment Programme (UNEP).

2. Twenty participants were present, including experts from organizations undertaking work on marine invasive species, Regional Seas Coordinating Units, and countries with specific demonstrated expertise on marine invasive species. A full list of the participants is contained in annex II. 3/

3. The Workshop was opened by a representative of the Executive Secretary to the Convention on Biological Diversity on behalf of all three conveners at 9 a.m. on Monday 27 June 2005. The representative of GISP explained the purpose of the Workshop, its mandate, and expected outputs. This was followed by presentations from the Secretariat of the Convention on Biological Diversity on the context of the Workshop in the framework of the implementation of Article 8(h) and decisions VI/23 4/ and VII/5, as well as presentations by international and regional organizations on their relevant activities. A summary of existing efforts relating to marine invasive species was presented by a representative of GISP, and was also distributed to participants in the form of information documents.

4. The Workshop was undertaken in an informal setting. The plenary was chaired by Ms. Lynn Jackson from GISP. Four working groups were established to address: (i) unintentional vectors; (ii) vectors associated with intentional introductions; (iii) post-border management; and (iv) cross-cutting issues. Working Group 1 was chaired by Mr. Steve Raaymakers from SPREP; Working Group 2 by Mr. Ryan Hill from the Secretariat of the Convention on Biological Diversity; Working Group 3 by Mr. Chad Hewitt from New Zealand; and Working Group 4 by Ms. Marjo Vierros from the Secretariat of the Convention on Biological Diversity and Ms. Hanneke VanLavieren from the Regional Seas Programme.

5. Each Working Group evaluated gaps related to ongoing work on invasive alien species in the marine environment, based on the information documents prepared as background material for this meeting and guided by their Terms of Reference. The Working Groups then proposed activities that could be undertaken to address these gaps. Where possible, lead agencies were assigned for each activity. The Terms of Reference and the results of the Working Group discussions are contained in annex I 5/ to this document. These results, as well as the updated information documents, will be consolidated after the workshop into a comprehensive assessment of status, and further proposed activities that will form a basis for future collaborative efforts amongst relevant organizations.

6. The Workshop adopted the substance of its draft report, and the procedure to finalize it. The Workshop requested the representatives of GISP, the Secretariat of the Convention on Biological Diversity and the Regional Seas Programme to consolidate the inputs, as indicated in paragraph 5 above.

7. The meeting was closed at 3:30pm on Wednesday, 29 June 2005.

3/ Annex III of the present document.

4/ One representative entered a formal objection during the process leading to the adoption of this decision and underlined that he did not believe that the Conference of the Parties could legitimately adopt a motion or a text with a formal objection in place. A few representatives expressed reservations regarding the procedure leading to the adoption of the decision. See UNEP/CBD/COP/6/20, paras. 294-324.

5/ The original annex I is not presented here. Instead, the consolidated output of the workshop, leading to the draft joint work plan for the management of marine invasive alien species is available in annex II.

Annex II

DRAFT JOINT WORK PLAN FOR THE MANAGEMENT OF MARINE INVASIVE ALIEN SPECIES

October 2005

Compiled by:

GISP
The Global Invasive Species Programme

In association with:

CBD

UNEP

Developed based on contributions made by various organizations before, during and after the Workshop of the Joint Work Programme on Marine and Coastal Invasive Alien Species, held in Montreal on 27-29 June 2005.

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INTRODUCTION

Invasive Alien Species (IAS) in the marine environment represent one of the greatest threats to the world's oceans and the biodiversity contained therein. Along with the over-exploitation of natural resources, marine pollution and the physical alteration or destruction of habitats, marine IAS are causing impacts to the environment, global industry and human health. However, unlike many other types of impacts, marine invasions are largely irreversible, rendering prevention one of the most important aspects of marine IAS management.

Recent decisions (VI/23 6/ and VII/5) of the Conference of the Parties (COP) of the Convention on Biological Diversity (CBD) call for the development of a joint programme of work on managing the major vectors of marine IAS introduction. This process is being coordinated by the Global Invasive Species Programme (GISP) on behalf of the Conventionon Biological Diversity and in conjunction with the United Nations Environment Programme (UNEP) Regional Seas Programme (RS), involving all major stakeholders and role-players in the international management of marine IAS.

The areas of marine IAS management that are targeted under this plan have been separated into 'prevention' issues, post-border management, and other cross-cutting issues. The predominant vectors associated with marine bio-invasions, addressed under prevention, have been separated into 'unintentional' and 'intentional' categories. Unintentional vectors are those where any marine species could be transferred accidentally as part of an unrelated process (e.g. ballast water transfers, biofouling, canal developments etc.). Intentional introductions involve a specific species being introduced for a desired purpose (e.g. mariculture, aquariums, biocontrol etc.) and then becoming invasive in the wild. These types of introductions may also have accidental 'unintentional' consequences when associated parasites or pathogens are released with them.

A review and gap analysis was conducted for existing initiatives addressing marine IAS on international, regional and national scales. This served as background material for a workshop to develop the Joint Work Plan, which was held at the CBD Secretariat in Montreal on 27 to 29 June, 2005. Workshop participants built on this framework to provide a comprehensive review of global activities and related gaps, and then continued to develop action points for the Joint Work Plan. This report presents the review of existing activities, gaps in existing management framework and identifies management action points for the Joint Work Plan on Marine Invasive Species, all categorized by vector type or potential area of management.

6/ One representative entered a formal objection during the process leading to the adoption of this decision and underlined that he did not believe that the Conference of the Parties could legitimately adopt a motion or a text with a formal objection in place. A few representatives expressed reservations regarding the procedure leading to the adoption of the decision. See UNEP/CBD/COP/6/20, paras. 294-324.

1.0 LEGISLATION & POLICY

1.1 International - General

- *The Convention on Biological Diversity (CBD)*

  - Article 8(h) of the Convention commits Contracting Parties to prevent the introduction of or eradicate those alien species which threaten ecosystems, habitats or species.
  - Subsequent COP decisions have:
    - invited Parties to address the issue of alien species for the conservation and sustainable use of biological diversity and to incorporate such activities into their national strategies, programmes and action plans (IV/1 C);
    - invited GISP and others to develop a marine IAS programme (VI/23 (20));
    - requested the Executive Secretary in cooperation with GISP and other relevant organisations to …develop a joint programme of work …among the CBD, Ramsar, the IMO, the IPPC and other relevant bodies (VI/23 p.26 (e)

- *IUCN/GISP*

  The IUCN's Commission on Environment Law and the Environmental Law Programme are playing a key role in supporting the development of legal and institutional frameworks for addressing Invasive Alien Species. The Environmental Law Programme published, as part of GISP Phase I, *A Guide to Designing Legal and Institutional Frameworks on Alien Invasive Species*. This guide seeks to provide national legislators and policy makers with practical information and guidance for developing or strengthening legal and institutional frameworks on alien invasive species, consistent with Article 8(h) of the Convention on Biological Diversity (CBD), as well as explaining and clarifying pertinent obligations under other international instruments.

1.2 International - Marine Sector

- *The Convention on Biological Diversity (CBD)*

  - In view of their common concern for the conservation and sustainable use of marine and coastal biodiversity, the Parties to the Convention on Biological Diversity agreed on a program of action for implementing the Convention. The programme, called "Jakarta Mandate on Marine and Coastal Biological Diversity" was adopted in 1995. Through its programme of work, adopted in 1998, and reviewed and updated in 2004, the Convention focuses on integrated marine and coastal area management, the sustainable use of living resources, marine and coastal protected areas, mariculture and alien species.
  - The elaborated programme of work on marine and coastal biological diversity adopted at the seventh meeting of the Conference of the Parties (VII/5) includes an element on invasive alien species consisting of:

Goal: To prevent the introduction of invasive alien species into the marine and coastal environment, and to eradicate to the extent possible those invasive alien species that have already been introduced.

  - **Operational objective 5.1:** To achieve better understanding of the pathways and the causes of the introduction of alien species and the impact of such introductions on biological diversity.

- **Operational objective 5.2:** To put in place mechanisms to control all pathways, including shipping, trade and mariculture, for potential alien invasive species in the marine and coastal environment.
- **Operational objective 5.3:** To maintain an incident list on introductions of alien species.

- *The United Nations Convention on Law of the Sea (UNCLOS)*

  Article 196 of the United Nation's Convention on the Law of the Sea (UNCLOS) which provides that "States shall take all measures necessary to prevent, reduce and control … the intentional or accidental introduction of species, alien or new, to a particular part of the marine environment, which may cause significant and harmful changes thereto"

- *International Maritime Organisation (IMO)*

  The Marine Environment Protection Committee (MEPC) of IMO established a Ballast Water Working Group in 1991 to address the problem of transfer of harmful aquatic organisms in ship's ballast water and sediments. This Working Group has developed:

  - A set of Voluntary Guidelines : Guidelines for the Control and Management of Ship's Ballast Water to Minimise the Transfer of Harmful Aquatic Organisms and Pathogens (adopted in 1993, and updated in 1997)
  - The International Convention for the Control and Management of Ships' Ballast Water and Sediments which was adopted in February, 2004
  - Various guidelines to support implementation of the regulations under the Convention, including:

    - Guidelines on Sediment Reception Facilities
    - Guidelines on Ballast Water Management and the Development of Ballast Water Management Plans
    - Guidelines on Ballast Water Reception Facilities
    - Guidelines on Ballast Water Exchange
    - Guidelines on Risk Assessment
    - Guidelines on Approval of Prototype Ballast Water Treatment Technologies
    - Guidelines on the Introduction of Additional Measures including Emergency Situations
    - Guidelines for Ballast Water Sampling
    - Guidelines for Ballast Water Exchange Design and Construction Standards (for new ships)
    - Guidelines for Sediment Control in Ship's Ballast Water Tanks and Sediment Removal
    - Guidelines and Specifications for Approval of Shipboard Ballast Water Treatment Systems
    - Guidelines for Equivalence Compliance with the Convention by Pleasure and Search and Rescue Craft.

  These guidelines are in various stages of development.

- *The UN Food and Agriculture Organization (FAO)*

The FAO, with assistance from member countries and other partners has developed a framework for the management of species deliberately introduced for fisheries and aquaculture purposes. The framework consists of:

- Code of Conduct for Responsible Fisheries (CCRF) :

- Articles 7 and 9 among others apply to introduced species;
- Article 7.5 calls on states to apply the precautionary approach to the conservation, management and exploitation of living aquatic resources;
- Article 9.3.1 calls on states to conserve genetic diversity and maintain integrity of aquatic communities and ecosystems by appropriate management;
- Articles 9.2.3, 9.3.2 and 9.3.3 call on states to cooperate in minimizing risks from alien species by consulting with an notifying neighbouring states when an introduction is being planned; complying with other international instruments; and adopting measures to reduce the risk of the spread of disease.

- Technical Guidelines for Responsible Fisheries – Precautionary Approach to Capture Fisheries and Species Introductions
- The ICES Code of Practice (see below)
- Database on Introductions of Aquatic Species
- The Asia Regional Technical Guidelines and the Beijing Consensus (tools dealing with the risk of introducing pathogens through transboundary movement of live aquatic animals).

- *International Council for Exploration of the Sea (ICES)*

ICES have developed a Code of Practice on the Introduction and Transfers of Marine Organisms. It was initially adopted in 1973, and has subsequently been further developed and updated, with revised versions being adopted in 1979, 1990, 1994 and the most recent, 2003.

- While initially designed for ICES member countries concerned with the North Atlantic and adjacent seas, countries across the globe are encouraged to implement this code of practice.
- Includes aquarium-related transfers
- Addresses GMO's
- It includes annexes dealing with:
  - a prospectus of information required for applications
  - risk assessment
  - quarantine
  - monitoring

- *International Plant Protection Convention (IPPC)*

  IPPC addresses risks to plants. More specifically, it deals with plant pests, which are broadly defined as any species, strain or biotype of plant, animal or pathogenic agent injurious to plants or plant products. IPPC has developed numerous standards that contribute to the international regulatory framework on invasive alien species, and its scope is not limited to impacts on agricultural systems. For example, the International Standard for Phytosanitary Measures No. 11 *(Pest risk analysis for quarantine pests, including analysis of environmental risks and living modified organisms)* explicitly clarifies that its scope includes environmental risks and risks to biological diversity.

  While the IPPC has historically been applied to terrestrial and sometimes freshwater plants, it could also be applied to marine plants and pests affecting marine plants. Some other International Standards under the IPPC include:

  - ISPM No. 6, Guidelines for Surveillance

- ISPM No. 8, Determination of pest status in an area
- ISPM No. 9, Guidelines for pest eradication programmes
- ISPM No. 3, Guidelines for the export, shipment, import and release of biological control agents and other beneficial organisms
- ISPM No. 17, Pest reporting

- Ramsar

  Ramsar activities on invasives cover generically all wetland types both inland and coastal, but with perhaps more of a focus on inland system issues. These are described in: CBD/Ramsar 3rd Joint Work Plan (JWP), and the Ramsar COP8 Resolution on invasives.

  Relevant CBD/Ramsar JWP actions are:

  8.2 The Ramsar Bureau will make available to CBD Parties the Ramsar "Guide to wetland invasive species guidance", prepared as a background paper for Ramsar COP8, so as to assist in the Conventions' joint efforts to address invasive species issues.

  8.3 Information products and other materials prepared by the Ramsar/IUCN communications and awareness-raising project on African wetland invasive alien species will be made available to the CBD Secretariat and publicised through the Ramsar Web-site for use by CBD Parties.

  8.4 The Ramsar Bureau and CBD Secretariat, working with the Global Invasive Species Programme (GISP), IUCN and UNEP-WCMC will seek jointly to develop a programme of work focusing on aquatic invasive species.

  8.5 The CBD Secretariat and Ramsar Bureau will ensure that GISP work on developing assessment of inland waters invasive alien species is taken into account in the review of the CBD programme of work on inland waters biodiversity, and ensure that this work is made available, as appropriate, to Ramsar Contracting Parties.

  Re Action 8.2, note that this guide did not in the event go as a background paper to COP8, but it is now planned to revise and update the draft for publication in the new Ramsar technical Report series.

1.3 Regional

- *UNEP Regional Seas Programmes*

The UNEP Regional Seas Programmes are all supported by regional conventions and therefore provide an ideal platform for implementation of marine and coastal IAS measures. IAS issues could relatively easily be incorporated into the agreements by means of a technical protocol. A number of the Programmes have already embarked on developing strategies on IAS:

- South Pacific REP are currently developing a Biosecurity Strategy
- Caribbean EP Contracting Parties to the SPAW Protocol (the regional biodiversity agreement) have requested that the CEP develop a programme on invasive species in the Caribbean in collaboration with other organisations and agreements including the CBD.
- ROPME adopted the IMO/GloBallast Regional Action Plan to minimize the transfer of Harmful Aquatic Organisms and Pathogens in Ship's Ballast Waters, and is collaborating

with IMO to facilitate its implementation in the ROPME Sea Area. ROPME is also involved in public awareness raising activities on marine invasive species.

- MAP have a regional action plan on species introductions in the Mediterranean Sea
- The Helsinki Commission (HELCOM) has been developing a regional action plan (in progress) to address ballast water, as a follow-up to the adoption in IMO of the Ballast Water Convention. HELCOM is also working towards close co-operation with the North Sea region.

- *Asia Pacific Economic Co-operation (APEC)*

The Asia Pacific Economic Cooperation (APEC) has identified introduced marine pests (IMPS) as a significant issue for the APEC Region7. Since 2001, the Marine Resource Conservation Working Group (MRC WG) has commissioned two detailed consultancy reports and workshops under the MRC WG project "Development of a regional management framework for APEC economies for use in the control and prevention of introduced marine pest". The first phase of this work looked at the scientific and theoretical basis of the issue; identified known IMPs in the Asia Pacific region; undertook a hazard analysis; and proposed a regional risk management response.

The second phase investigated the capacity of the APEC Economies to adequately address IMPs through a situation and gap analysis and proposed options for regional governance arrangements as well as for specific Economies.

At the second APEC Oceans Ministerial Meeting held in September 2005, APEC Oceans Ministers agreed to the further development and implementation of this work.

- *IMO – GloBallast Programme*
  A number of regional agreements/strategies/ action plans were developed during the first phase of this programme. The intent of the GloBallast Partnerships Programme will be to strengthen these agreements and initiate implementation.

- *Antarctic Treaty Consultative Meeting (ATCM)*
  Article 4 of the Madrid Protocol requires that Parties do not introduce animals or plants to the Antarctic Treaty Area, other than for specified purposes for which a permit has been issued.

  A proposal to establish an intercessional contact group to assess the current threats of IAS to the Antarctic environment was submitted to the Antarctic Treaty Consultative Meeting in June, 2005.

1.4 National

Comprehensive strategies have been developed at the national level within the following countries:

- *New Zealand*

The Biosecurity Act 1993, which deals with unintentional introductions, is administered by the Ministry of Agriculture and Forestry (MAF). However, the Ministry of Fisheries is the lead agency for marine biosecurity, and established a Marine Biosecurity Team in 1998. They have developed a Risk Management Framework which comprises pre-border, border and post-border management.

The Hazardous Substances and New Organisms Act is used to manage intentional introductions.

7/ APEC consists of 21 Economies.

- *Australia*

Australia is developing a comprehensive National System for the Prevention and Management of Marine Pest Incursions. The National System will cover prevention, emergency management and ongoing management and control, supported by strategies for research and development, monitoring, communications and evaluation and review. All vectors for biofouling and ballast water will be addressed as well as other means such as the aquarium trade.

Currently measures are in place to control ballast water from outside Australian waters and ballast water movements into Victoria. A number of draft guidelines to address biofouling on a range of vessels have also been developed and are currently the subject of risk assessment and/or consultation. Guidelines for international yachts are being implemented on a voluntary basis from October 2005 and will move towards mandatory requirements. The objective is to have all elements of the National System developed by October 2006.

- *USA*

The USA have established an Aquatic Nuisance Species (ANS) Task Force, with Regional Panels, and are developing a new National Aquatic Invasive Species Act.

- *Chile*

The Under-Secretariat of Fisheries (USoF) is the lead agency for the management of introduced marine pests. USoF has joined forces with the National Fisheries Service (NFS), the National Commission for the Environment (NEC), and the National General Directorate of the Maritime Territory and Merchant Marine (GDMT) to formulate and implement a comprehensive IMP plan.

- *Norway*

WWF-Norway is still working on ballast water issues as a priority issue under their shipping programme. Work has focused on accelerating Norway's national process of ratification of the Convention. This has also involved participation in the IMO work leading to the adoption of the Ballast Water Convention.

- *Others*

Other countries which have made some progress with respect to addressing this issue include: Brazil, South Africa, Ecuador (Galapagos Islands)

2.0 PREVENTION

2.1 BALLAST WATER

Ballast water and sediment transfers have been well documented as one of the most significant vectors for marine IAS transfer. Efforts have been focused on developing an international management regime that provides for national-level implementation of control measures. The involvement of both environment/biodiversity and transport/shipping administrations, as well as a broad range of stakeholders, has made this issue particularly challenging at international, regional and national levels.

Capacity to implement existing guidelines and measures is lacking on a global scale, although some efforts are underway to address this. There is a need to develop new protocols and methodologies to increase the options available for both shipboard and land-based management of this vector. Ongoing reliance on the practice of ballast water exchange at sea has raised concerns over the effectiveness of this practice, and also as to any associated environmental repercussions. New technological solutions are needed to overcome such shortcomings in the toolbox of available management options.

Although significant progress has been made over the past 20 years, much work remains to be done in achieving effective prevention of species transfers via ships' ballast discharges.

2.1.1 International

- IMO
  The International Maritime Organization is recognized as the most appropriate international body to address the ballast water threat on a global scale. The IMO has been working on ballast water issues since the early 1990's, producing guidelines for managing ballast water and sediment, and culminating in the adoption of the International Convention for the Management of Ships' Ballast Water and Sediments in 2004. Ongoing work in support of the convention and ballast water management is coordinated through the following mechanisms:
  - Marine Environment Protection Committee and Ballast Water working group developing guidelines to support implementation of the BW Convention.
  - Office of Ballast Water Management
    Continues to manage IMO issues related to the Convention and the GloBallast Programme. Also functions as a clearing house mechanism for BW related materials.
  - GloBallast Partnerships
    Currently in PDF-B stage for GEF funding.
- GloBallast Partnerships
  - Currently in PDF-B phase for GEF funding
    This programme will focus specifically on ballast water management in developing regions, building on frameworks developed during the first phase, and expanding into new regions as well. It helps promote and prepare countries for ratification and implementation of the IMO BW Convention. It covers most aspects of BW management including awareness raising, risk assessment, surveys and incursion response, policy and legislation development, regional cooperation, funding sustainability, and compliance monitoring and enforcement.
- WWF
  - WWF participated in the IMO work leading to the adoption of the Ballast Water Convention, and is aiming to focus effort on international promotion of ratification of the convention.
- IUCN
  - Global Marine Programme has been supporting the process of BW Convention development at the IMO, and associated guidelines. Formed partnership with GloBallast which will carry on into the Partnerships phase.
- GISP
  - Training and capacity building initiatives including ballast water management
- FOEI
  - Friends of the Earth International worked closely with GloBallast in support of planning and strategy, and give ongoing support to the processes associated with the BW Convention at IMO.
- WHO
  - Information on disease outbreaks.

2.1.2 Regional

- APEC

  - Introduced Marine Pest (IMP) Management Framework includes, measures for BW management.
  - Developed comprehensive analyses of capacity to address ballast water issues at the economy level, including gap analysis. Provided suggested options to address gaps. These include training programs, information exchange and further R & D.
- ICES
  - ICES/IOC/IMO Working Group on Ballast and Other Ship Vectors (WGBOSV) – See http://www.ices.dk
- OSPAR
  - Scoping study for ballast water management, accomplished on behalf of the North Sea States.
- IUCN
  - Regional efforts in some areas addressing BW issue (e.g. MAP)
- UNEP Regional Seas Programmes
  - SPREP Biosecurity Strategy currently being developed
  - CEP (under development), ROPME, MAP, HELCOM addressing BW management

HELCOM example:
Ballast water issues have been addressed in the Baltic Sea for more than ten years: several scientific institutes in the Baltic Sea countries have been working on the issue and the data on invasive species in the Baltic Sea is registered in a Baltic-wide database (http://www.ku.lt/nemo/mainnemo.html). So far about one hundred introductions of non-indigenous organisms have been registered in the Baltic Sea.

Development of the International Convention for the Control and Management of Ships' Ballast Water and Sediments (Ballast Water Convention) in IMO gave a new impetus to the activities of the Helsinki Commission's ballast water issue. Discussions have been held in relevant working groups as well as on the Commission level and it has been decided to proceed with the development of the HELCOM action plan to ensure a rapid and harmonized implementation of the Ballast Water Convention in the Baltic Sea, taking into account similar activities within other international fora. It has been also decided to seek possible participation of HELCOM in the GloBallast Partnerships project.

Even in case of a rapid entry into force of the Ballast Water Convention, the ballast water treatment onboard of all ships will not be in operation within approximately the next ten years and ballast water exchange, which is the main alternative to the onboard treatment, is a very limited management method in the Baltic Sea. Therefore, taking into account well established HELCOM cooperation it has been agreed that one of the ways forward in the Baltic Sea could be a risk assessment based management of ballast water. To discuss the first steps a workshop "Ballast water introductions of alien species into the Baltic Sea" was held in Palanga, Lithuania, February 2005. The outcome of the Workshop can be found on the HELCOM website (http://www.helcom.fi/shipping/ballast/en_GB/ballast/).

HELCOM project on Risk assessment of ballast water mediated introductions:
Taking into account the results of the Palanga Worksop and in order to efficiently use available resources it has been decided to start with an overall assessment of the risk of ballast water mediated introductions in the Baltic Sea. To fulfil the task, a project was launched by the 17th meeting of the HELCOM Heads of Delegations on 15 June 2005.

Main goals of the project:

- *to quantify the risks of introduction of alien species to the Baltic region through ship's ballast water and sediments;*
- *to propose measures for reducing these risks;*
- *to identify actions to facilitate the implementation of the International Convention for the Control and Management of Ships' Ballast Water and Sediments.*

Scope of the project:

1. *Analysis of present and future shipping patterns in the Baltic Sea. This study will provide information necessary for quantifying and understanding the possible risks of introduction of alien species in ballast water to and within the Baltic Sea. The analysis will be based on available shipping statistics and, if available, information about ports of call previous to entry into the Baltic Sea where ballast water uptake may have occurred, the destination ports of vessels leaving the Baltic Sea (to determine the possible contribution of Baltic species to other areas), the type of vessel and estimates of amounts of ballast water transported.*
   The overall analysis of shipping patterns based on shipping statistics will be used for selection of representative ports/areas to be used for further study, which results will be then extrapolated to cover the whole Baltic Sea (as far as scientifically reasonable).

2. *Identification of potential source regions that pose a high risk of donating invasive alien species to the Baltic Sea, through analysis of environmental similarity for the Baltic Sea region/ports. This analysis will be used to determine the likelihood that a species that is introduced from the donor or source region will be able to survive and reproduce in the new environment. The environmental similarity analysis will be carried out applying the matching climate & salinity approach and comparison of bioregions using the GloBallast Database (covering some 350 harbours, their salinity conditions etc) as well as other relevant information.*

3. *Identification of shipping traffic which pose high risk for the introduction of invasive alien species to the Baltic Sea. Identification and feasibility analysis of the specific measures which could be applied for the management of ballast water of each group/type of high risk vessels.*
   This analysis will be carried out by taking the most important risk factors into consideration (area of origin in relation to the conditions of the receiving port, duration of the voyage, results obtained under Tasks 1 & 2 above).

4. *Identification of further measures for reducing or ameliorating the risks identified in risk assessments;*
   - *Ships coming from outside Europe;*
   - *European costal traffic (BW exchange in the North Sea (not in accordance with IMO criteria, in coordination with the North Sea States) should be evaluated as an option);*
   - *Traffic within the Baltic Sea*

5. *Identification of the areas/ports of special interest (if any) where separate risk assessments should be made.*

6. *Elaboration of the proposals for the methodologies for risk assessments to be used to for the Baltic Sea region. This evaluation should be based on the outcome of Task 1-3 and 5.*

7. *Assessment of the needs and proposals for monitoring of invasive species and port baselines surveys in the Baltic taking into account current monitoring programs within HELCOM and the EU and development of relevant Guidelines at the IMO*

8. Development of proposals for a common structured procedure for species specific assessment to be used in developing a "black list" of harmful or potentially harmful alien species that are especially undesirable to be introduced to the Baltic Sea. Based on the results of Tasks 1 and 2 and studies of the literature, identify species, which if introduced with shipping from potential source regions, risk causing harm to biological diversity, human health and socio-economic values.

Experience of other national and international risk assessments e.g. IMO GloBallast, DNV (the Scoping Study for a ballast water management, accomplished on behalf of North Sea states), BITIS etc. as well as IMO Ballast Water Management Convention and relevant guidelines should be taken into account when carrying out the project.

Further steps:
The project is expected to deliver intermediate reports to the meetings of the Nature Protection and Biodiversity Group (HELCOM HABITAT) and the Maritime Group (HELCOM MARITIME) by 16 September 2005 and for the Monitoring and Assessment Group (HELCOM MONAS) by 14 November 2005. The final report of the project is expected by 1 February 2006 and will be discussed at the annual meeting of the Helsinki Commission.

Proposals for further steps will be elaborated by appropriate HELCOM working bodies in cooperation with the North Sea States based on the outcome of the project.

2.1.3 National

National Approaches being taken:

- USA
  - Federal legislation consistent with IMO Guidelines, with State by State regulations sometimes much more stringent
  - Aquatic Nuisance Species Task Force, with Regional Panels
- Australia
  - BW exchange requirements are in place for international vessels, and developing similar for domestic vessels
    - Looking at species-specific risk based approach for domestic vessels
  - Uses risk based system with target species approach (currently based on list of 11 species)
  - Planning to update legislation in light of new IMO Convention
- New Zealand
  - Under National Biosecurity Strategy
  - Vessels Code of Practice
  - BW exchange requirements with safety exemption, except in cases where BW is sourced from high risk areas (where target species exist).

- Other national-level initiatives have been developed in Chile, Canada and Brazil
- Tools for verification of Ballast Water exchange (NZ, Australia, Singapore, US coast guard)
- Compliance Monitoring tools for development of molecular and immuno-fluorescent probes (Australia, NZ)

2.2 BIO-FOULING

The problem associated with the fouling on ships hulls, and various other areas of vessels and marine craft/objects (e.g. oil rigs, barges, dredges, rafts etc.) that are moved between marine environments has been well documented. There is concern that the recent Anti-fouling Convention adopted by the IMO, banning use of certain toxic elements in hull coatings, will serve to increase the problem of species transfer from biofouling.

Recently, more attention has been focused on the significant role of small vessels (e.g. yachts) that travel freely between international ports and often are associated with significant fouling problems.

In many areas commercial and private vessels are permitted to conduct in-water cleaning of organisms from their hulls. Small industries have developed around this need. This practice has been banned in areas where recognition of the threat has been made.

The passive presence of ships and marine objects associated with biofouling also comprises a serious threat. Management related to this problem has been nonexistent at international levels. Nationally, and to some extent regionally, efforts are being made to address development of options to minimize the biofouling threat.

2.2.1 International

- IMO
  - Most appropriate organization for development of international regulations for commercial ships
- UNICPOLOS
  - United Nations Open-ended Informal Consultative Process on Oceans and the Law of the Sea provides an opportunity to discuss the gaps in international management of marine IAS and all vectors
- IOC
  - The Intergovernmental Oceanographic Commission is engaged in marine and coastal management initiatives appropriate for adaptation to include biofouling initiatives

2.2.2 Regional

Activities involving biofouling management at the regional level have been limited, but include the following:

- ICES working group assessing regional opportunities for management
- SPREP
  - The South Pacific Regional Environment Programme has included biofouling management in its developing regional action framework
- APEC
  - Work undertaken through the Asia Pacific Economic Cooperation has included biofouling management measures when developing the regional management framework for APEC Economies.

2.2.3 National

Research and regulations at national-level includes:

- New Zealand
  - Research on in-water hull cleaning techniques for ships. Research on brushcart use to minimize escapement of species during cleaning.
  - Inspections of recreational crafts/yachts, marina cleaning services
    - With voluntary hull cleaning program
- Australia
  - Draft protocol on small international vessels (up to 25m)
    - Voluntary from October 2005, followed by mandatory requirements
  - Addressing best management practice for vessels/craft associated with fishing, recreation, aquaculture, drilling rigs barges etc.
  - Research into improving effectiveness of anti-fouling coatings etc.

2.3 INTENTIONAL INTRODUCTIONS - MARICULTURE, FISHERIES & AQUARIA

Intentional importation of marine species for private, commercial or scientific purposes has been responsible for some catastrophic invasions. This occurs due to subsequent release or escape of foreign species. Species are transferred for a variety of reasons, often with minimal controls or assessment of risk. Due to the broad range of sub-vectors the authorities with responsibility for managing such introductions are varied, and in many cases may be non-existent. A summary of sub-vectors is outlined below:

- Fisheries
  - Live bait
  - Sea Ranching
  - Stocking
  - Gear stock or food movement
  - Discarded nets, traps, trawls
  - Discard live packing materials
  - Release of transgenic species
  - Live food trade
- Mariculture/Aquaculture
  - Discarded live packing materials
  - Introduced genotypes
  - Intentional release for stock enhancement
  - Unintentional release
  - Unintentional release of associated pathogens or parasites – could be associated with frozen food
- Aquaria
  - Ornamentals – plant and fish
  - Public aquaria
  - Research uses
- Other
  - Biocontrol importations

2.3.1 International

- FAO
  - Code of Conduct for Responsible Fisheries (CCRF)
    - Articles 7 and 9 apply to introduced species

  - Technical Guidelines for Responsible Fisheries
  - Database on Introductions of Aquatic Species
  - Pathogen and disease control through quarantine
  - Governance training
    - Committee on Fisheries (COFI)
  - Precautionary approach
- ICES – Code of Practice on the Introduction and Transfers of Marine Organisms (2003)
  - While initially designed for ICES member countries concerned with the North Atlantic and adjacent seas, countries across the globe are encouraged to implement this code of practice.
  - Includes aquarium-related transfers
  - Addresses GMO's
  - Includes appendices on:
    - Information requirements
    - Risk assessment
    - Quarantine measures
    - Monitoring
- IUCN – Developed a project on aquaculture in Chile, focusing on developing methodologies for risk assessment and surveys/monitoring. The objectives of this effort have international scope, however the pilot study is focussed nationally (see national section)

2.3.2 Regional

- FAO – Asia Regional Technical Guidelines and the Beijing Consensus
  - Tools for management of introduced pathogens through transboundary movement of live aquatic animals
  - Regional Fisheries Management Organizations
- APEC – Introduced Marine Pest Management Framework
  - Addresses issues related to aquaculture and aquaria species and offers regional wide and economy specific actions.
- Asia-Pacific – Network of Aquatic centers for Asia-Pacific

2.3.3 National

- TNC

  TNC staff have been involved in efforts to ensure that the best science is used to determine whether Asian oysters will be invasive prior to a decision being made about their introduction. TNC is determining how best to contribute to efforts that prevent introduction and spread of marine invasives and is testing approaches at several sites to mitigate the impacts of invasive species in the marine environment.
- Chile – Department of Agriculture (Fisheries)

  Chile has developed comprehensive sanitary and importation regulations. Currently reviewing The Regulation for novel imports for species for aquaculture purposes and the Regulation for habitual importation of species for aquaculture.

  They are currently undertaking a project on aquaculture with IUCN, financed by Total Elf Foundation. This project is aimed at increasing public awareness of the marine pest problem and developing methodologies to detect and control escapes of exotic species from aquaculture facilities. The project started in February and will finish about the end of 2005.

- Others (Australia, New Zealand, USA etc.)
  Tend to work on prohibited list type approach, which is authorized under quarantine, agriculture, fisheries or similar regulations. Introductions of new species must be permitted through an EIA/RA process, usually with stakeholder input.

    - Australia currently has a national policy on translocation of live aquatic organisms, and a group researching options to prevent IMPS through ornamental fish introductions.

3.0 POST-BORDER MANAGEMENT

Although prevention is paramount to any marine IAS management regime, it is essential that post-border and incursion response management frameworks are developed for cases where species can be detected at low enough population levels for controls to be instituted. Post-border management relies on the ability to detect an introduced species as part of survey or monitoring regimes. Legal and institutional frameworks must be in place, as well as necessary funding arrangements, for any subsequent response to be mounted. Some options may be available for controlling or eradicating a new species, or mitigating its impacts, however further research in this field is required.

Much progress has been made in developing post-border management strategies at national levels within a few countries. More international and regional effort is necessary to further develop this area of marine IAS management so as to provide a comprehensive toolbox of options for detecting and addressing marine incursions.

3.1 Early Detection / Rapid Response

3.1.1 Surveys & Monitoring

Baseline biological surveys and ongoing monitoring for alien species detection form vital components of marine IAS management strategies. Implementation involves national or local-level projects, with benefits extending regionally and internationally. Surveys and ongoing monitoring have been promoted to some degree internationally, and extensively within certain countries.

- The GloBallast programme
    - Pilot countries conducted demonstration port survey projects in South Africa, India, Brazil, China, Ukraine and Iran, and in many cases replication throughout these countries and regions is underway.
- National port survey efforts
    - Australia – baseline biological surveys completed for 35 out of 65 ports, covering main vessel traffic, ongoing monitoring program under development
- IUCN
    - Pilot project in Seychelles to survey coral reef areas.
    - Pilot project in Chile to survey/monitor aquaculture facilities.

Protocols, methods, standardization

- CSIRO Marine Research (formerly CRIMP)
    - Port survey protocols developed, widely implemented
- GloBallast Programme

  - International standardisation of protocols through extensive implementation of surveys based upon CRIMP protocols.
  - Workshop output on technical guidance for improvement of survey methodologies.
- IUCN
  - Developing survey methodologies for other introduction pathways than BW, and areas of high biodiversity. Based on pilot projects; coral reefs in Seychelles, and aquaculture in Chile.
- International Plant Protection Convention (IPPC) - International Standards for Phytosanitary Measures (ISPMs), which provide guidance on recording and reporting the presence of IAS (with relevance to marine species)
  - ISPM No. 6, Guidelines for Surveillance
  - ISPM No. 8, Determination of pest status in an area

3.1.2 Emergency Response

Contingency planning

Contingency planning for responding quickly to border incursions forms an important part of a national management plan. Design of such plans has been handled nationally within a few countries, specifically New Zealand and Australia. International best practices for design and implementation of such plans are not yet available for marine systems.

Funding

An adequate response (contingency) plan requires pre-arranged institutional and funding support. Funding for response actions has also been organised at the national and local levels. There is currently no international or regional mechanism designed to support emergency incursion response efforts.

3.2 Eradication / Control / Mitigation

Research has been ongoing internationally around the various options in the available arsenal for combating invasions. These can be separated into different categories as follows:

- Physical (removal, alteration etc.)
- Chemical
- Biological (biocontrol, genetic manipulation)

Much of this research is conducted at national levels, with some support given from regional or international sources. Although some best practice management options have been made available, more are needed in the seemingly insurmountable challenge to reverse marine invasions.

International efforts in support of this need include:

- GloBallast
  - Training course includes development of incursion response plans
- GISP
  - Toolkit gives some options for control, eradication, mitigation
  - Training course includes development of incursion response plans
- IPPC – ISPMs

- ISPM No. 9, Guidelines for pest eradication programmes – Could be considered when developing an eradication programme for marine species

National-level research initiatives to develop options or strategies include:

4.0 CROSS-CUTTING ISSUES

4.1 Training & Capacity Building

4.1.1 IAS Management

- GloBallast Partnerships
  This pending programme is currently in the PDF-B phase for GEF funding. It is being modeled on the successful 5 year GloBallast Programme, and will continue to take a prescribed approach to initiating BW management in developing regions, including the following areas training and building capacity:

  - Project implementation
  - Technical cooperation
  - Training course on Ballast Water Management
  - Training Course on Port Survey Implementation

- GISP / UNEP Regional Seas
  - Training Course on Marine Invasive Species Management
    - Development of course, and pilot delivery

  - GEF capacity building project, currently in PDF-B phase for GEF funding. This project is designed to focus generally on invasive species management in developing countries, and will address marine IAS management accordingly.

4.1.2 Taxonomy

Taxonomic expertise is essential to marine invasive species management, especially with respect to:

- Generation of baseline species data
- Identification of new species arrivals (detection)
- Screening of species importations (inspections)

Though much institutional attention has been focused on increasing taxonomic capacity in the marine sciences, the objectives associated with IAS management have not been adequately recognized or supported. Target initiatives or organizations for new projects and collaborations may include:

- Global Taxonomy Initiative (GTI)
- BioNET
  Collaboration with Consortium for Oceanographic Research and Education (CORE) in planning a global project on Marine organisms. The project will be an expansion/scaling up of the Census of Marine Life project.
  Established LOOPs for taxonomic support: Caribbean (CARINET), Northern, East, West and southern Africa (NAFRINET, EAFRINET, WAFRINET and SAFRINET respectively), South East Asia (ASEANET), East Asia (EASIANET), the Andean Countries (AndinoNET) the South Pacific (PACINET) and Europe (EuroLOOP).

Proposed LOOPs awaiting government endorsements: South Asia and Mesoamerica.

- Census of Marine Life (CoML)
  The Census of Marine Life is a growing global network of researchers in more than 70 nations engaged in a ten-year initiative to assess and explain the diversity, distribution, and abundance of marine life in the oceans -- past, present, and future.

  Within CoML - wide recognition of the need for taxonomic capacity building and that this may be most cost-effective by funding in the southern hemisphere and developing countries. Planning GEF style project focusing on southern oceans.
- DIVERSITAS (UNESCO, SCOPE, IUBS)
  Established in 1991, with the goal of developing an international, non-governmental umbrella programme that would address the complex scientific questions posed by the loss of and change in global biodiversity.
- Catalogue of Life initiative
  This is a joint effort of Species 2000 and ITIS.
- GBIF (Global Biodiversity Information Facility) www.gbif.org.

4.1.3 Research Capacity

Novel research is required to develop management options and enhance best practice methodologies for various aspects of marine IAS management, including:

- BW treatment technologies
- Compliance monitoring for BW exchange and treatment verification
- Risk assessment methodologies
- Biocontrol and eradication methods
- Survey methods and protocols

Efforts to date are related to national-level project, however resulting products and best practices are available for adoption or incorporation into other national or regional strategies. Examples include the following:

- IUCN
  - Development of best practice methodologies, designed for national-level implementation
    - Aquaculture surveys (monitoring) and risk assessment (Chile)
    - Biodiversity hotspot (coral reef) surveys (Seychelles)
- CSIRO Marine Research, Australia
  - Control / eradication research
  - Risk assessment methodologies
  - Compliance monitoring research for BW exchange and treatment
  - Port survey protocols (CRIMP)

4.2 Awareness Raising

The need for and value of targeted awareness raising concerning issues associated with marine IAS management have been widely recognized. Various programmes have undertaken projects to help raise awareness at international, regional, national and local levels.

- IMO – Office of Ballast Water Management
  - Clearing house mechanism, taken over from GloBallast Programme
- GloBallast Partnerships

This planned programme will continue to implement awareness raising activities as per the various needs associated with BW management

- GISP
  General awareness raising at the global level. This involves production and dissemination of various materials and products, maintenance of website and publication of newsletter etc.
- IUCN
  Awareness raising at global and regional levels through global marine program and regional programmes. This involves production and dissemination of various materials and products, maintenance of website etc.
- ISSG – Invasive Species Specialist Group
  Maintenance of Aliens-L listserver, and publication of Aliens newsletter.
- FAO
  Dissemination of materials related to published codes of conduct etc.
- IPPC
  ISPM No. 17, Pest reporting
- BioNET
  In a special focus on the critical role of taxonomy in preventing, controlling and mitigating the impact of invasive alien species, BioNET published a set of case studies - Taxonomy targeting invasives - in collaboration with the Global Invasive Species Programme and the Invasive Species Specialist Group of IUCN, the World Conservation Union. The publication can be found at: http://www.bionet-intl.org/opencms/export/sites/default/caseStudies/pdf/ TTIfinal.pdf

4.3 Databases & Information Sharing

- GISP Website
  - Located online at www.gisp.org this website has up-to-date information on management, global events and activities and search capacity for invasive species issues.
- GISIN
  - A new Web site for the Global Invasive Species Information Network (GISIN) is online at http://www.gisinetwork.org. All of the GISIN publications including the Baltimore Declaration, the Proceedings, and the List of Online IAS Information Systems are available for download from this new Web site. The new GISIN Web site helps advertise the network and its mission.
- Global Invasive Species Database, managed by the ISSG
- FAO Database on Introductions of Aquatic Species
- GAISIS
  Global network of database connectivity
- CIESM
  - The CIESM Atlas of Exotic Species is the first attempt to provide a comprehensive, group by group, survey of recent marine "immigrants" in the Mediterranean, which is undergoing drastic and rapid changes to its biota.

Potential for future collaboration:

- GOOS/IOC
  - Marine invasives will become a more important aspect of GOOS in the future, especially coastal elements of GOOS.

GAPS IN INTERNATIONAL MANAGEMENT OF MARINE INVASIVE SPECIES

Pathways or Vector	Regulatory and Institutional Framework	Management Measures/ Best Management Practices	Capacity Building Needs	Research Needs	Info Sharing	Awareness
Unintentional Vectors						
Biofouling – commercial, fishing and recreational vessels, and offshore & coastal moveable structures	• There are no international or regional frameworks available • The IMO should be taking the lead role on the international level under a single instrument that addresses all sectors. FAO and RFMOs must be engaged with regards to fishing vessels • Need to engage Regional Seas Progs, which provide regional platforms/ frameworks to assist with coordination and implementation • In the majority of nations there is no registration. No ability to track these vessels • Tourism organizations should be more involved in this sector • At the regional level there are some frameworks under development which need further assessment and	• Few best practices exist and less inherent incentive to comply • Current best practices are focused on economic incentives. There is a need for more focus on the environmental protection side • Awareness of existing best practices available is low • Sub vectors are different (gear and accessories etc.) which need special focus • Need for an approach which treats the vessel and activity as a whole •	• Existing training courses on marine IAS need more material/resources regarding this sector of biofouling • Lack of identification of training needs • There is a general need for more capacity building on biofouling • Targets groups: people at the dry docks, the commercial divers and regulators, fishing operators, owner/operators	• Threat analysis of biofouling from the different sectors (subvectors) • Risk assessment methods for the different sectors (sub vectors - commercial, recreational, fishing vessels, oil & gas structures, barges, dredges, floating docks, tugs etc) • Alternative anti-fouling techniques • Alternative safe in-water cleaning techniques • Understanding of common pathways and congregation points	• The existing information on dry docks and commercial diving is not available for use by regulators • Regulatory framework should include information sharing/management issues • Species specific risks associated with bio-fouling should be part of information sharing frameworks and shared amongst nations	• There is a need to communicate the real, continued and increasing risks associated with bio-fouling • Inclusion of socio-economics in awareness of biofouling issues • There is a high priority need to target the oil and gas industry

Pathways or Vector	Regulatory and Institutional Framework	Management Measures/ Best Management Practices	Capacity Building Needs	Research Needs	Info Sharing	Awareness
	possible replication					
Biofouling – Marine Debris	• There is a regulatory framework for debris (MARPOL) but lack of implementation (including lack of waste reception facilities in ports) and no link to IAS			• Need for research to link marine IAS to marine debris		• General lack of awareness, specifically in relation to the marine IAS association with marine debris
Tourism	• No are no international or regional frameworks available	• Lack of management measures or best practices targeting marine IAS transfers	• Need for engagement of tourism industry regulators • Need training tools			• Need awareness packages targeting various sectors (eg fishers, divers etc.)
Canals	• There is no international regulatory framework available.	• A lack of technological, engineering and management solutions	• Need for mainstreaming the marine IAS issue into canal development/ design, including vessels as vector	• Need for technological/ engineering solutions	• Need for links with aquatic groups managing freshwater canal developments and associated species invasions	• Generally low awareness of association between canals and marine IAS problems • Need for case studies
Ballast Water	• Convention is not yet into force • Regional seas and coastwise transport not covered • continued reliance on the practice of ballast water exchange and lack of more effective alternative measures • The review and approval process for new technology is unlikely to meet the time frames	• Need for compliance and enforcement systems and protocols • Gaps in domestic and coastwise transfers and enclosed regional seas • The available management measures for sediments are not as well developed as for BW, and the adequacy of these	• Need for general application of lessons learned	• Focus is mostly on ship based solutions, need for more consideration of shore based solutions such as reception facilities • Transit shipping/ballast water exchange at sea/impact assessment • Alternative ballast discharge zones (Regional Seas)	• Compliance control • Enforcement • Sediment sub vectors • Transit shipping/ballast water exchange at sea/impact assessment	• Awareness of the current state of R&D related to ship-board treatment technologies

Pathways or Vector	Regulatory and Institutional Framework	Management Measures/ Best Management Practices	Capacity Building Needs	Research Needs	Info Sharing	Awareness
		measures is mixed – under the London Convention management is adequate, under Ballast Water Convention mgt is not adequate				
Intentional Vectors						
Fisheries/Aquaculture - this includes the following areas: Fisheries: • Live bait • Sea ranching • Stocking • Gear stock or food movement • Discarded nets, traps, trawls • Discard live packing materials • Release of transgenics • Live food fish Aquaculture: • Discarded live packing material • Introduced genotypes • Intentional release for stock enhancement • Unintentional release (pathogen, parasite and other organisms)	• ICES Code is perceived as very top down and needs to work more with the users of the codes • Need for more uptake by developing countries of the ICES Code (IUCN conducting a review) • Impact assessment needs to have social, economic and environmental impacts incorporated • Need guidelines on how to use the ICES Code or any codes for introductions • Need protocol of translocation of marine species that is binding • Need to clarify and develop the role of certification schemes • Lack of regulatory framework for	• ICES Code of Conduct needs to made more practical for developing countries, particularly the quarantine section – need to develop a process to achieve this • Need to highlight alternatives if countries can't implement certain parts of the ICES Code • ICES Code – weakest at cost/benefit analysis of introductions • FAO contradiction - promoting use of IAS in aquaculture	• Need intervention/ workshop amongst AID agencies on IAS and aquaculture • Need to clarify/assess capacity building needs	• Need information on poverty and the impacts of invasive species (with respect to MDGs) • Study on the benefits and risk of using native v. non-native aquaculture • Develop risk assessment methodology that is applicable in a timely fashion • Economic valuation methodologies – need a review of what has been done already	• Increased sharing of risk profiles of marine alien species • GISIN and other existing initiatives need to be implemented	• Need to develop guidance for Industry, NGOs, national governments • Need to develop awareness of the impacts from introducing the live bait and packing material – work with internet sites where possible

Pathways or Vector	Regulatory and Institutional Framework	Management Measures/ Best Management Practices	Capacity Building Needs	Research Needs	Info Sharing	Awareness
– could be associated with frozen bait	mariculture					
Aquaria/Ornamentals	• Lack of regulatory framework for ornamentals	• Support on-going initiatives that industry is taking (eg NZ/ Australia BMPs) • Implement existing guidance • Need to support/assess pathogen/parasite work undertaken under APEC/Network of Aquaculture Centers for Asia-Pacific (NACA)			• GISIN and other existing initiatives need to be implemented	• Need to target Industry, Govt sector, NGOs for awareness on disposing plants and pets (Marine Aquarium Council/ Pet Industry Joint Advisory Council)
Research as a vector		• International guidance for responsible practice such as moving equipment, vessels, etc. – covering intentional and unintentional introduction • Species movements for scientific research should be subject to the same codes of conduct as other vectors			• GISIN and other existing initiatives need to be implemented	
Biocontrol as a vector		• Plant pest guidelines, ICES/EIFAC Codes for biocontrol could be source for			• Inventory of biocontrol agents being used • GISIN and other	• Public perception of the issues

Pathways or Vector	Regulatory and Institutional Framework	Management Measures/ Best Management Practices	Capacity Building Needs	Research Needs	Info Sharing	Awareness
		tools/guidance for other sectors as well			existing initiatives need to be implemented	
Post-Border Management						
Risk Profiling		• Species association with vectors and pathways	• Need for training	• Non market valuation methods (to include economic, environmental social and cultural/spiritual values)	• Impact assessments and case studies	
Surveys & Monitoring	• Model legislation	• Cost evaluation and comparison for different methods, with trade-offs • Baseline methods for non-port marine environment • Further baseline surveys conducted globally • Menu of monitoring options • Molecular diagnostic tools	• Need for training			• Use of community detection mechanisms
Eradication & Control Options	• Model legislation	• Updating CRIMP toolbox • Need new tools including containment options • Management alternatives for species with no eradication options (eg HAB's)	• Need for training	• Containment, eradication and control options • Research into mitigation of impacts from species and response actions	• Sharing of info on relative success of various approaches • Contingency planning	• Awareness templates

Pathways or Vector	Regulatory and Institutional Framework	Management Measures/ Best Management Practices	Capacity Building Needs	Research Needs	Info Sharing	Awareness
Taxonomy			• General need for capacity in marine taxonomy		• Need for stock-take of regional expertise and capacity • Specimen sharing for risk profile species within regions for rapid identification • Taxonomic clearing house	
Other / Crosscutting						
		• There is a general need for funding for international and regional IAS projects	• Need more specific, specialized training courses for all different disciplines associated with marine IAS • Online education program	• Risk assessment methodologies for unintentional introductions • Understanding global change and marine invasives • Assessing legal and policy impacts • Knowledge of institutional capacity • Understanding pathway changes • Need review of existing research efforts	• Need clearing house mechanism for marine invasive species generally, linked to all databases, sites, etc.	• Regulatory framework with mechanisms and incentives for awareness raising, information sharing

ACTION POINTS OF JOINT WORK PLAN ON MARINE INVASIVE SPECIES

NOTE: This draft action plan at present comprises suggested actions or activities. These have not necessarily yet been formally endorsed by the various responsible agencies. As a result, in many cases, target dates have not yet been set. The draft will form the basis for ongoing discussions amongst the agencies concerned.

Pathways or Management Sector	Identified Gap	Proposed Actions	Responsible / Lead Agencies	Target Date
IAS MANAGEMENT - PREVENTION				
Biofouling	Regulatory framework	▪ Develop regulatory framework ▪ Urge IMO member states to raise as matter of urgency ▪ Develop and submit a proposal for an international convention on biofouling ▪ Incorporation into ongoing regional activities ▪ Marine debris to be addressed under pollution regulations	IMO/FAO (international), UNEP-RS/ RFO's (regional) CBD Group of countries supported by JWP UNEP-RS IMO	
	Best management practices & research	▪ Identify current management/research initiatives and how best to share the outcomes ▪ Development of new management options for national and regional implementation addressing all subvectors ▪ Consolidate, improve & disseminate Best Practice Guidelines (different ones for different sectors/ subvectors) ▪ New research into general role of biofouling in marine bioinvasions globally, including threat analysis of subvectors and assessment of common pathways and congregation points ▪ Assessment of risk associated with species and respective impact analysis ▪ Incorporation of biofouling management issues into existing regional structures ▪ Development of alternative anti-fouling techniques ▪ Development of alternative safe in-water cleaning techniques	GISP GISP UNEP-RSP's to undertake assessments at regional level UNEP-RS to introduce at global meeting IMO	2006 2006/7
	Capacity building	▪ Develop training courses/modules for specific target groups on respective sectors	GISP	

Pathways or Management Sector	Identified Gap	Proposed Actions	Responsible / Lead Agencies	Target Date
	Information sharing & awareness	▪ Establish a clearing house mechanism for biofouling research, best practices and information ▪ Develop targeted awareness programmes for all biofouling sub-vectors ▪ Raise awareness of marine debris vector within all marine IAS initiatives ▪ Development/dissemination of material on marine debris as a vector	GISP GISP, IMO, UNEP RS UNEP RS	2006/7
Tourism	Best management practices & Research	▪ Develop best practice guidelines and training modules in collaboration with diving tourism industry (eg PADI Project AWARE) and MPA managers		
	Information sharing & awareness	▪ Awareness packages for recreational fishers ▪ Raise awareness of risks associated with transfer of marine souvenirs and ornamentals ▪ Include in training for MPA managers		
Canals	Best management practices & Research	▪ Research on environmental barriers for management ▪ Promote use of EIA's (including IAS) prior to canal construction ▪ Conference on canals and marine IAS		
	Information sharing & awareness	▪ Assessment of river basin transfers and management protocols ▪ Targeted awareness raising for funders (World bank, regional development banks)	Consultation with UNEP-RS (MAP)	
Ballast Water	Regulatory and Institutional Framework	▪ Support national efforts towards ratification of new IMO Convention	UNEP-RS, WWF	Late 2005, 2006
	Best management practices & research	▪ Full implementation of GloBallast Partnerships to aid developing regions in all aspects of ballast water management ▪ Support for research on treatment technologies and shore-based solutions	IMO, GEF, UNDP, UNEP-RS IMO/GloBallast	2007 2006-7

Pathways or Management Sector	Identified Gap	Proposed Actions	Responsible / Lead Agencies	Target Date
		▪ Support for development of treatment technology testing and certification practices ▪ Impact assessment for transit shipping, ballast water exchange at sea ▪ Research into alternative ballast discharge zones ▪ Analysis of sediment sub-vector	IMO/GloBallast IMO/GloBallast, UNEP-RS UNEP-RS, IMO GloBallast	2005-6 2007 2006 2007
	Information Management	▪ Development of systems for compliance control and enforcement information sharing	IMO/GloBallast, UNEP-RS	2007
	Capacity Building	▪ Further development, updating and implementation of training courses on ballast water management	IMO/GloBallast, UNEP-RS, LME's, GISP	2006-2011
Fisheries & Aquaculture	Regulatory and institutional framework	▪ Review of the uptake of the ICES Codes by developing countries ▪ Impact assessment, including economic and environmental impacts ▪ Development of binding protocol for translocation of marine species ▪ Development of regulatory framework for mariculture, including risk assessment methodologies	IUCN FAO FAO, IUCN	
	Best management practices & research	▪ Develop process to revise ICES Code of Conduct to better address developing regions and cost/benefit analysis, including guidelines to increase ease of uptake ▪ Development of rapid species-level risk assessment methodologies ▪ Development of economic valuation methodologies, including review of current tools	ICES, FAO	
	Capacity building	▪ Workshop to be held amongst AID agencies on IAS and aquaculture/mariculture ▪ Assessment of general capacity building needs ▪ Development of training modules for specific target groups	FAO, GISP FAO, WHO, GISP	
	Information sharing & Awareness	▪ Assessment of information on poverty and impacts of invasive species ▪ Assessment and dissemination of risk profiles for marine	GISP GISP	

Pathways or Management Sector	Identified Gap	Proposed Actions	Responsible / Lead Agencies	Target Date
		IAS ▪ Implementation of GISIN ▪ Development of awareness programme targeting various sectors	FAO, GISP, IUCN	
Aquaria/Ornamentals	Regulatory and institutional framework	▪ Development of regulatory framework for ornamental species transfers		
	Best management practices & research	▪ Implementation of existing guidance	UNEP-RS	
	Awareness	▪ Development of awareness programme targeting various sectors	GISP	
Research-related transfer/introductions	Management measures, best practices	▪ Development of international codes of conduct/best practices for responsible research activities including equipment and vessel movements		
Biocontrol-related transfer/introductions	Information sharing & awareness	▪ Develop inventory of biocontrol agents being used and researched for potential use ▪ Development of targeted awareness raising mechanisms	GISP	
IAS MANAGEMENT - GENERAL				
Post-Border Management	Best management practices & research	▪ Compilation and evaluation of existing tools (guidelines, methodologies, legal tools and instruments) as best practice manual ▪ Gap analysis (to include research, tools and implementation practices) ▪ Development of a model implementation plan for post-border management, and associated guide with implementation options. ▪ Demonstration of development and implementation within pilot country or region ▪ Develop updated sampling protocols to include ports and	GISP	

Pathways or Management Sector	Identified Gap	Proposed Actions	Responsible / Lead Agencies	Target Date
		non-port areas ▪ Development of new biocontrol and eradication methods	GloBallast, IUCN, GISP	
	Capacity building	▪ Training course on port survey implementation	GloBallast, GISP, UNEP RS	
	Information sharing & awareness	▪ Development of a clearing house mechanism on marine Biosecurity (metadata) ▪ Compilation of lessons learned from existing experiences		
Other / Crosscutting	Training & capacity building needs	▪ Develop & deliver general course on marine IAS ▪ Support and development of taxonomic training initiatives ▪ GEF supported global capacity building project on invasives, to include marine species management ▪ Initiative to develop network of experts ▪ Development of an online education programme on invasive species management	GISP & UNEP RS BioNET, GISP, IUCN, UNEP-RS, GloBallast GISP, GEF IUCN, ISSG GISP, UNEP-RS	
	Research	▪ Collation of information on impacts of marine IAS in relation to poverty and understanding impacts to under-developed countries (as per MDG's) ▪ Assessment into role of global change (climate change, urbanisation, natural disasters etc) in marine invasive species management issues ▪ Development of contemporary economic and non-market valuation methodologies to inform cost-benefit analyses ▪ Comprehensive review of existing efforts in marine IAS management	GISP, IUCN, CBD GISP	

Pathways or Management Sector	Identified Gap	Proposed Actions	Responsible / Lead Agencies	Target Date
			GISP	
	Awareness raising	▪ Working with all stakeholders, with consideration of socio-economic and environmental impacts, to increase awareness of marine IAS threats, and to identify options for management and prevention ▪ Review and adaptation of existing communication products (all media) ▪ Implementation of regional awareness projects using existing platforms/structures	GISP UNEP-RS, GEF, GISP, IUCN	
	Information sharing & databases	▪ Development of a clearing house mechanism for marine IAS	GISP	
	Funding/financing	▪ Proposal for new GEF project focusing specifically on marine IAS within the "Biodiversity" portfolio ▪ Assessment of donor-country funds available for regional use on marine IAS ▪ Scoping study to investigate private sector industry funding options ▪ Development of collaborations with academic and research agencies on GEF targeted research areas ▪ Development of public awareness product on marine IAS to engage donors	UNEP-RS GISP GISP GISP, UNEP-RS	

Annex III

LIST OF PARTICIPANTS IN THE WORKSHOP ON THE JOINT WORK PROGRAMME ON MARINE AND COASTAL INVASIVE ALIEN SPECIES

Mr. Adnan Awad, Global Invasive Species Programme

Ms. Reinouw Bast-Tjeerde, International Plant Protection Convention

Mr. Alex W. Brown, Undersecretariat for Fisheries, Chile

Mr. David Coates, Secretariat of the Convention on Biological Diversity

Ms. Lisa Drake, The Nature Conservancy

Ms. Souha El Asmi, Mediterranean Action Plan

Ms. Alexis Gutierrez, National Oceanographic and Atmospheric Administration, USA

Mr. Chad L Hewitt, Ministry of Agriculture and Forestry, New Zealand

Mr. Ryan Hill, Secretariat of the Convention on Biological Diversity

Ms. Lynn Jackson, GISP

Mr. Henry Lear, Fisheries and Oceans Canada

Mr. Colin Levings, Fisheries and Oceans Canada

Ms. Imène Meliane, IUCN Regional Office for South America

Mr. Sefanaia Nawadra, South Pacific Regional Environment Programme (SPREP)

Mr. Steve Raaymakers, Independent Consultant, Ecostrategic Consultants

Mr. Mathieu Régnier, Secretariat of the United Nations Convention on Biological Diversity

Ms. Lucie Rogo, Bionet International

Mr. Muthian Thangaraja, Regional Organization for the Protection of the Marine Environment (ROPME)

Ms. Hanneke van Lavieren, UNEP Regional Seas Programme

Ms. Alessandra Vanzella-Khouri, UNEP Caribbean Environment Programme

Ms. Marjo Vierros, Secretariat of the Convention on Biological Diversity

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