No 2 February 2015

Project

BALMAS newsletter

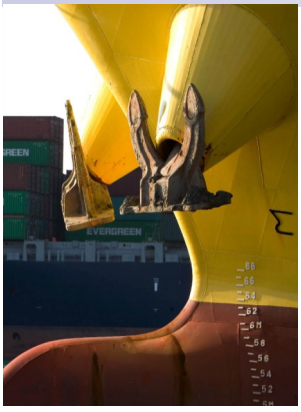


Photo: courtesy of Port of Koper administration

Inside this issue:

Foreword

Dear reader,

Already well settled in the new year, we welcome you to have a look at the 2nd BALMAS project Newsletter! We hope that you are finding our Newsletters interesting and useful. In the past year, several workshops have been organised to successfully elaborate the knowledge and common approaches of ballast water management issues. In the 2nd Newsletter you will find an overview of the latest information about BALMAS project achievements which form the basis for upcoming activities in the last year of BALMAS project implementation.

All BALMAS project partners are fully committed to follow and reach BALMAS project objectives to enhance Adriatic sea protection. In the upcoming months, BALMAS project partners will present results of port baseline surveys for 12 ports, prepare and start with monitoring activities of ports, start with ballast water sampling on vessels, conclude analyses of shipping patterns and ballast water discharge assessment, set-up core elements of risk assessment and decision support system.
All results of BALMAS project will be available on the BALMAS project website (www.balmas.eu) on the Knowledge Centre. Thus, readers are welcome to visit the BALMAS project website to follow our achievements and future work.

Wish you a pleasant reading of the 2nd BALMAS Newsletter!

Leon Gosar

BALMAS project Coordinator

Andreja Popit

BALMAS project Manager for the Lead Partner, the Institute for water of the Republic of Slovenia

Port of Koper Container terminal *Photo: V. Flander Putrle*

Internet GIS application BALMAS AIS

Within the activity Analyses of shipping patterns in the Adriatic Sea an internet geographic information system (GIS) application called BALMAS AIS was developed. The application serves for reviewing and sharing of results of the GIS analyses conducted on historical Automatic Identification System (AIS) data (from January 2012 onwards). That includes marine traffic density and path lines of vessels recorded by the AIS system in the Adriatic Sea, with the ability of tracking vessel routes.

The BALMAS AIS application will be continuously updated every three months, when additional GIS data will be added. At the end of activity, the scope of GIS data will cover a period of almost four years: January 2012 – October 2015.

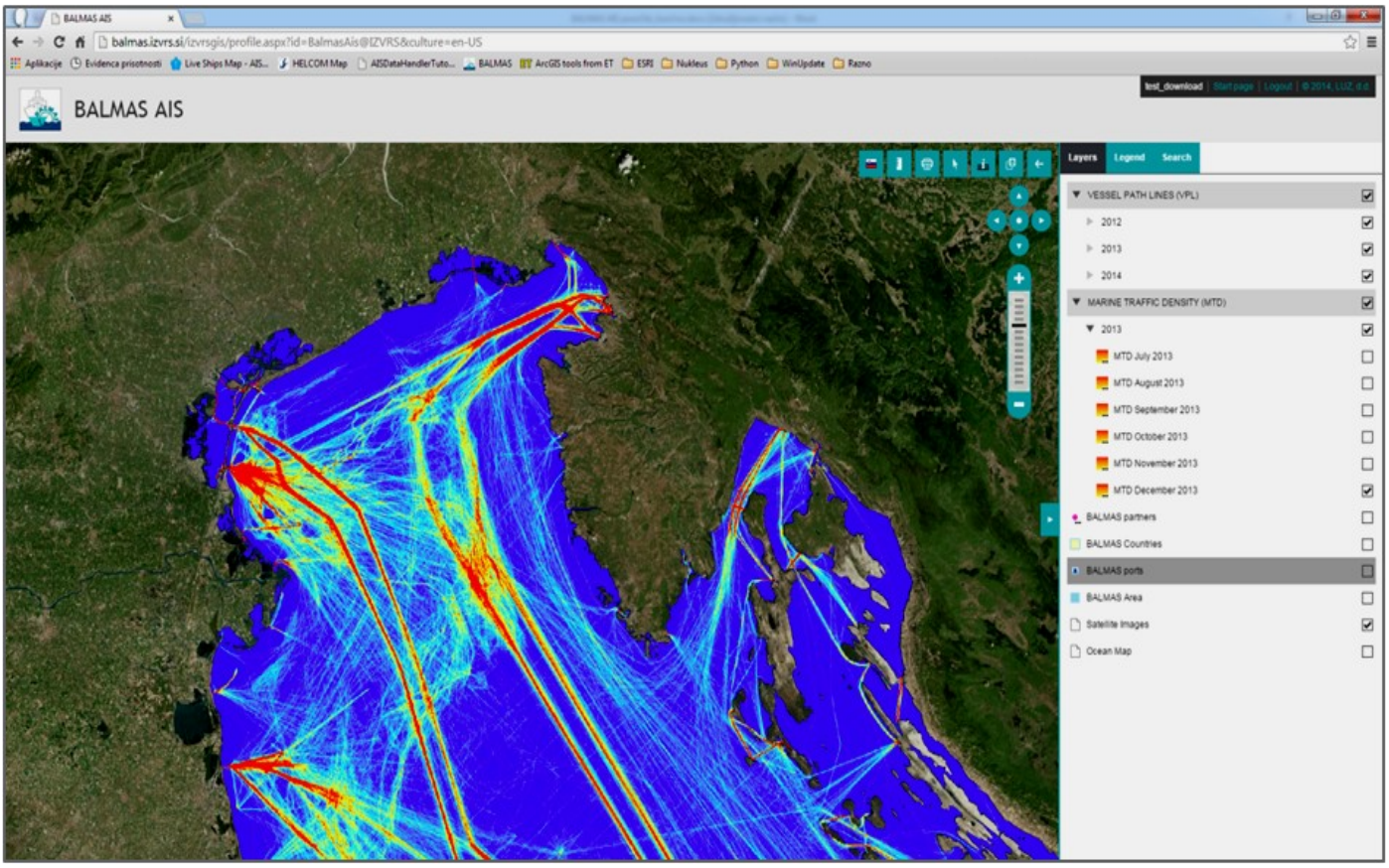
BALMAS AIS application with the presented GIS data will help in establishing ballast water management practices and discharge patterns analyses for the whole Adriatic Sea area, in accordance with the International convention for the control and management of ships' ballast water and sediments, 2004.

Screen record: Area covered by Marine Traffic Automatic Identification System Courtesy of: marinetraffic.com/ais

Gašper Zupančič

BALMAS project environmental and GIS expert for the Lead Partner, the Institute for water of the Republic of Slovenia

"BALMAS AIS application with the presented GIS data will help in establishing ballast water management practices and discharge patterns analyses "



Screen record: Marine traffic density in north Adriatic Sea, as displayed on the BALMAS AIS internet application.

Cargo ship moored at the port area
Photo: V. Bernetič

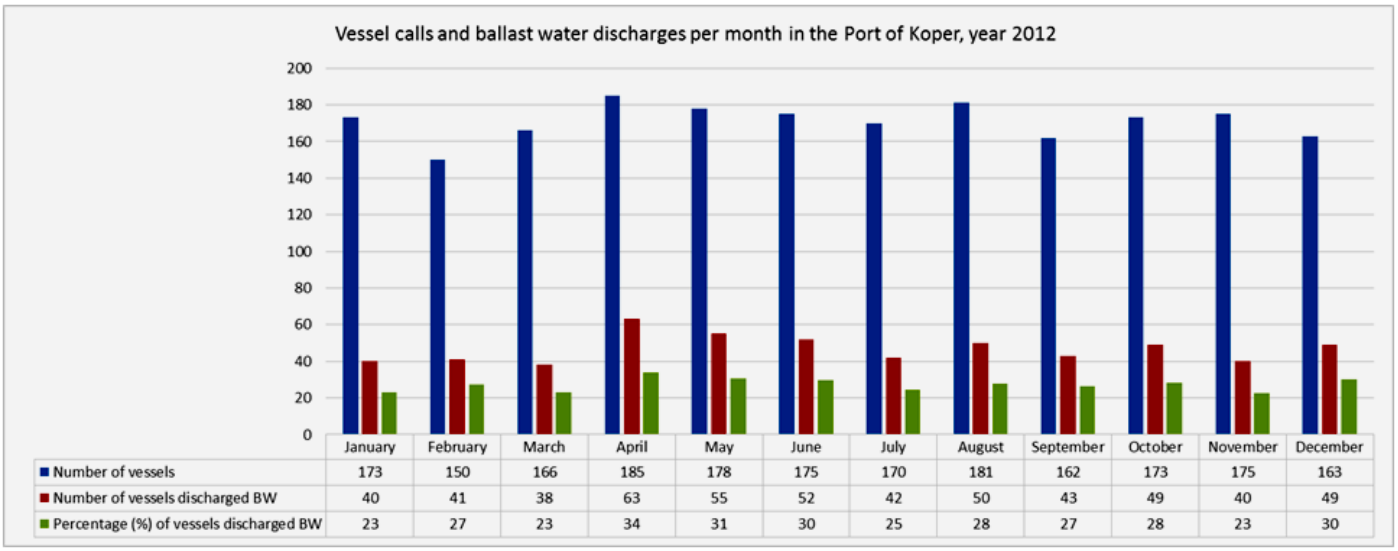
BALMAS Ballast water discharge assessment

Ballast Water Reporting Form (BWRF) content has been introduced in relevant Adriatic ports to collect information about present ballast water discharges. The BWRF data include information about vessels main characteristics (vessel name, IMO number, type of vessel, vessel arrival data and time, vessel tonnage, last and next port of call), vessels operations (loaded/discharged quantity and type of cargo) and ballast water management operations (number of tanks, total ballast water capacity volume, ballast water volume on board, BW sources, BW management practices, BW discharges). Data from BWRF were used for design of Ballast Water Discharge Database (BWD database) and further assessment of ballast water discharges in selected ports. Ballast Water Discharges Assessment (BWDA) method was identified and improved to assess past discharges for Port of Koper (see figure 1). Developed BWDA method will be used also for other ports and enable studies of Ballast Water Management (BWM) issues and the optimization of BALMAS BWM decision support system.

Ludvik Penko

for the Lead Partner, the Institute for water of the Republic of Slovenia

"Data from BWRF were used for design of Ballast Water Discharge Database (BWD database)"



	January	February	March	April	May	June	July	August	September	October	November	December
Number of vessels	173	150	166	185	178	175	170	181	162	173	175	163
Number of vessels discharged BW	40	41	38	63	55	52	42	50	43	49	40	49
Percentage (%) of vessels discharged BW	23	27	23	34	31	30	25	28	27	28	23	30

Figure 1: Reported vessel arrivals and ballast water discharges per month in the Port of Koper per year 2012 (only cargo vessels).

"Developed BWDA method will be used also for other ports and enable studies of Ballast Water Management (BWM)"

Panoramic view of Port of Koper Container and Ro-Ro terminal
Photo: V. Bernetič

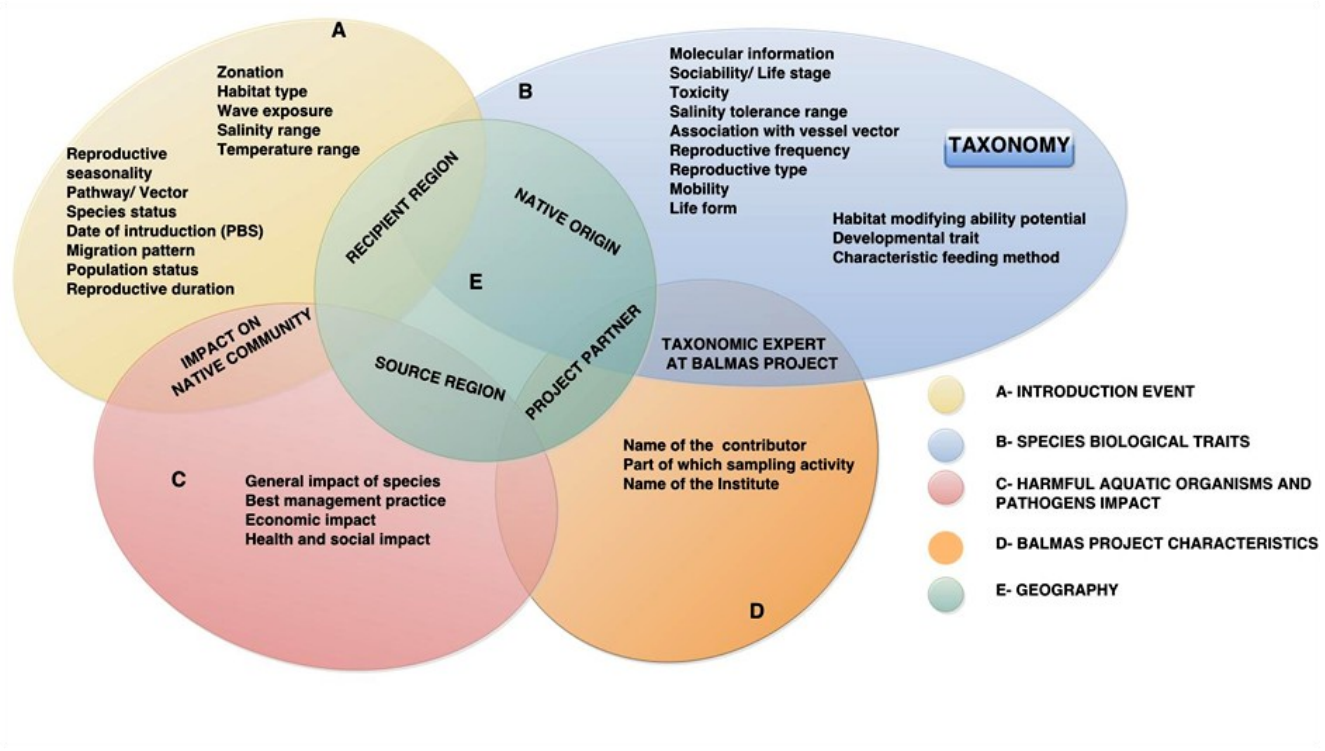
BALMAS Harmful Aquatic Organisms and Pathogens

A preliminary port baseline survey (PBS), which includes taxonomical identification of all present organisms, is one of the main goals of BALMAS project. It is crucial to identify present species in ports in order to clearly specify what are currently present native or non-indigenous species and who are and will be potential intruders in the Adriatic Sea, introduced by ballast water or other meanings of introduction. Whether these organisms are harmful or have a record history of harmful events will be crucial for successful management of harmful aquatic organisms and pathogens (HAOP) prevention. The list of species together with 57 attributes that describe each and one of them, with the most apprehended information we have about their potential impact, will be more than useful for future ballast water management. The database will be of essential use for BALMAS risk assessment and early warning system within the Adriatic Sea to provide comprehensive and reliable data.

BALMAS project partners will fully contribute their expertise and joint their forces within the taxonomy experts group. The results from all BALMAS sampling activities: port baseline surveys (PBS), monitoring activities and ballast water sampling will be included in

Net plankton sampling in the Port of Koper

Photo: V. Flander Putrle



Scheme: Module structure of the BALMAS HAOP database

the BALMAS HAOP database. The BALMAS HAOP database itself is built upon a structurally well-designed AQUANIS (Information system on aquatic non-indigenous and cryptogenic species- Marine Vectors project) database. All BALMAS sampling results will be stored in a format which allows a flexible data search in BALMAS HAOP database to meet the information needs of all stakeholders, authorities and agencies. A linkage to other European databases addressing HAOPs will be established.

Teja Muha

for the Lead Partner, the Institute for water of the Republic of Slovenia

"BALMAS project partners will fully contribute their expertise and joint their forces within the taxonomy experts group"

Port baseline survey activities

Net plankton sampling in the Port of Koper

Photo: V. Flander Putrle

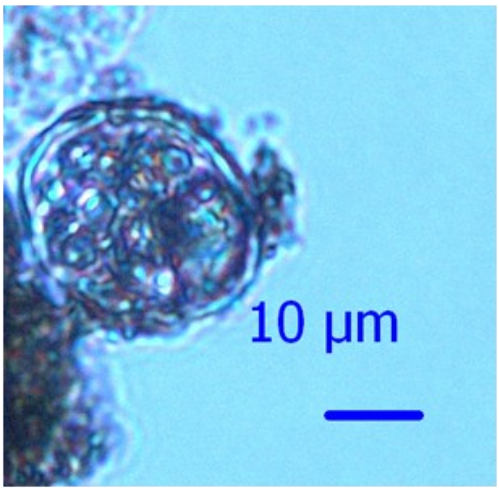
The general goal of the Port baseline survey (PBS) is to provide information about the presence and possible negative effects of Harmful aquatic organisms and pathogens (HAOP) in ports and surrounding areas as hotspots of ballast water (BW) discharges. In order to attain the main goal, PBS including biological community in water column and sediment is performed in the following ports: Bari, Ancona, Venice, and Trieste in Italy; Koper in Slovenia; Pula, Rijeka, Šibenik, Split and Ploče in Croatia; Bar in Montenegro; and Durres in Albania. PBS Protocol which defined the selection of stations, parameters, sampling frequency, methods of sampling, methods of sample analyses and reporting the results are agreed among partners and written in the frame of the project. In the first year of the project, sampling for PBS is finished at almost all planned harbors and data analyses are in progress. A cross border network of qualified taxonomists is established to ensure quality of data analyzed. Purposes of PBS are:

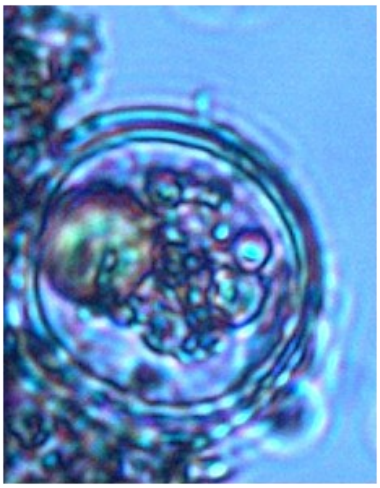
1. to inform port authorities and lead agencies responsible for BW Management about the current position with respect to HAOP species within the port and surrounding areas,

2. to prepare an inventory of aquatic plants and animals inhabiting the port and adjacent areas including their distribution and relative abundance,

3. to guide the development of BW Management strategies and measures applicable to the port and visiting ships and

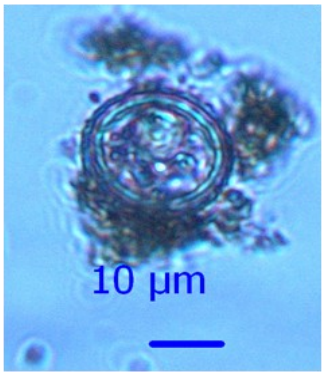
4. to provide a baseline of biological data on which future changes in aquatic communities will be evaluated.





Cysts of dinoflagellate Alexandrium minutum collected in Šibenik harbour

Photo: Ž. Ninčević Gladan



In the port of Šibenik the most abundant dinoflagellate cysts was ***Alexandrium minutum*** *wi*th abundance 130 cysts per gram of dry sediment. ***Alexandrium minutum*** is an armored, marine, planktonic dinoflagellate. It is a widely distributed species associated with toxic Paralytic Shellfish Poisoning blooms in coastal regions.

"A cross border network of qualified taxonomists is established to ensure quality of data analyzed"

In order to improve the species identifications and allow determinations until species level the scanning electron microscope (SEM) is been purchased in the Institute of oceanography and fisheries, Split. Training course including sample preparation and photomicrography was held in January 2015. All analyzed samples are kept as a reference for future analyses of undetermined species under SEM.

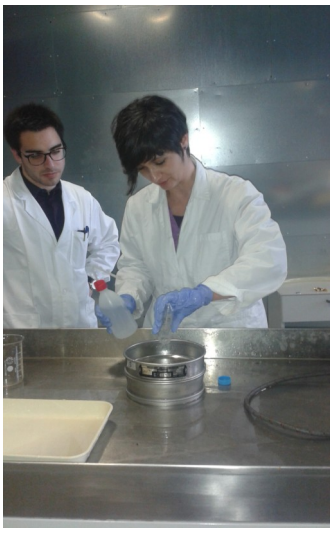
Živana Ninčević Gladan

Institute of Oceanography and Fisheries, Split, Croatia

Second Workshop about dinoflagellate cysts sampling and processing techniques took place in the lagoon of Venice

The 2nd Workshop about dinoflagellate cysts sampling and processing techniques was performed in Venice, Italy from 11th till 12th of November 2014. The scope of the workshop was to address issues about processing dinoflagellate cysts samples (i.e. cysts treatment and recognition) and to share knowledge among project partners. Researchers from the CNR-ISMAR - Venice (dr. Mauro Bastianini and dr. Stefania Finotto), OGS Trieste (dr. Elena Di Poi), University of Montenegro Kotor (dr. Dragana Drakulović and dr. Darinka Joksimović) and Rudjer Bošković Institute – Center for Marine Research, Croatia (dr. Romina Kraus and Nataša Kužat) were involved in the workshop.
Dinoflagellate cysts are forms known to be able to be transported with ballast water, which can cause introduction of invasive species. Resting cysts are traditionally associated with the sexual cycle of dinoflagellates induced by particular triggers such as changes in temperature and nutrients. Many species may spend longer periods resting in the sediment than active in the water column. Resting stages also constitute a reservoir of HAOPs, which increases the survival potential of the populations. Thus, dinoflagellate cysts have great ecological importance and act as "seed banks", comparable to those found in terrestrial ecosystems. The encysted forms may remain viable for up to 100 years.

The first day was dedicated to the sampling, preparation of the chemical solvents, sample sieving and purification.
The second day was dedicated to the observation of the samples under the microscope, procedure revision, sampling strategy for the coming field work.



Sample treatment for dinoflagellate cysts determination

The main results achieved during the workshop were:

i) employment of the same method for processing the dinoflagelate cysts samples;

ii) realization of a network to share results and address problems regarding the determination of dinoflagellate cysts;

iii) sharing of references about the dinoflagelate cysts taxonomy to face the problem of a still sparse and scattered literature in this field.

"Many species may spend longer periods resting in the sediment than active in the water column"

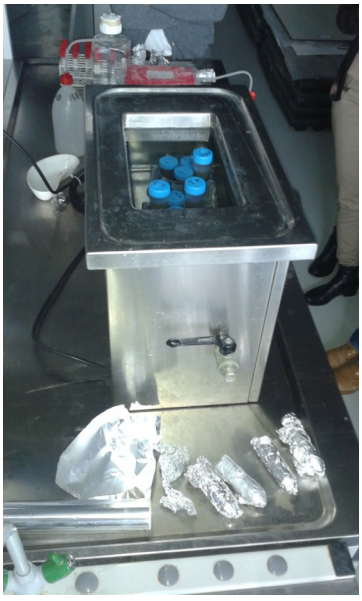
Elisa Baldrighi
Institute of Marine Science (CNR-ISMAR), Ancona, Italy

Mauro Bastianini

Institute of Marine Science (CNR-ISMAR), Venezia, Italy

Sample treatment for dinoflagellate cysts

Photos by Nataša Kužat and Romina Kraus



Rudjer Bošković Institute activites

Fig. 1: An article about the project BALMAS and engagement of Croatian researchers published in daily Croatian newspapers Slobodna Dalmacija.

"Being a scientific institution, CMR-RBI continuously develops and includes new research methodologies "

Center for Marine Research of the Rudjer Bošković Institute (CMR-RBI) is one of five Croatian partners included in the project BALMAS, coordinated by dr. Romina Kraus. Main project BALMAS objective, to enable protection of the unwanted risk to the environment and humans from the transfer of harmful and invasive species as well as other damages that could originate from the ballast waters, makes it interesting for general public. Therefore one of project partners obligations is dissemination of project outputs (Fig. 1).

CMR-RBI is a national scientific institute, pursuing a multidisciplinary oceanological study of the northern Adriatic. As such, it is responsible for the research in Rijeka and Pula, two Croatian ports in this region (from the total of twelve Adriatic ports included in project).

In order to investigate the current state of biodiversity and environmental conditions in the ports, i.e., perform Port Baseline Survey of the ports Rijeka and Pula, CMR-RBI team of scientists and associates set on a three day journey to perform measurements and collect samples during September and December of 2014 (Fig. 2).

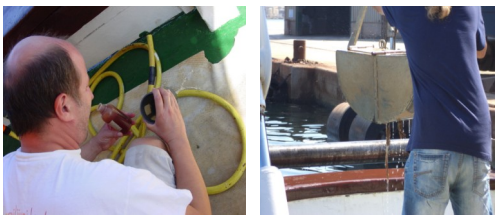


Fig. 2: PBS sampling by RBI-CMR team

Due to demanding and time-consuming procedure of fouling and sediment collection of the flora and fauna samples at the several locations in the ports, this part of PBS lasted for additional several days (Fig.3).

All samples were taken by CMR-RBI divers, dr. Andrej Jaklin and Darko Ferenčević, according to the BALMAS PBS Protocol.

Fig. 3: Preparation for work and sampling by divers for the PBS

In addition to PBS in the ports, CMR-RBI will investigate circulation pattern in the region which will facilitate prediction of possible transport of released ballast waters and possible introduction of invasive alien species contained within them around the northern Adriatic

Although majority of research methods necessary for implementation of the project are routine work for the CMR-RBI staff, some methods are specific for ballast waters, so the staff attended two workshops in order to familiarise them with the new methods. "Ballast Water Sampling and Analysis (BWS&A) Workshop" was organised by the Institute for Water of the Republic of Slovenia from Ljubljana, Slovenia and hosted by the National Institute of Biology – Marine Biology Station, in Piran, Slovenia, where three staff members learned about sampling and research methods of ballast waters (Fig. 4). At the "Zooplankton Counting Workshop for BWS" held by dr. Olja Vidjak from the Institute of Oceanography and Fisheries in Split, Croatia, two staff members were demonstrated how to measure and count live zooplankton in BW samples (Fig.4).

Being a scientific institution, CMR-RBI continuously develops and includes new

(Continued on page 8)

... Rudjer Bošković Institute activites

Selfie by N. Kužat

Photo by N. Kužat

"CMR-RBI will investigate circulation pattern in the region which will facilitate prediction of possible transport of released ballast waters and possible introduction of invasive alien species"

(Continued from page 7)

research methodologies.

One of new methods that is currently being implemented in CMR-RBI is also vital for project BAMAS and so to gain additional practice two staff members participated in the "Practical Workshop - Dinoflagellate Cyst purification and identification" held by dr. Mauro Bastianini from the ISMAR - Istituto di Scienze Marine in Venezia, Italy.

Photos by Olja Vidjak

Fig. 4: Nataša and Ivan participating in workshops in Piran and Split.

Romina Kraus

Center for Marine Research of the Rudjer Bošković Institute, Croatia

Cooperation of shipowners in BALMAS project

Crude oil tanker washing off eventual bottom mud residues from the anchor and chain Photos: courtesy of microportal.net

Mare Nostrum, Croatian Shipowner's Association has disseminated a questionnaire to BALMAS partners, respective shipyards and GLOBALLAST partners in order to determine BWM sediment management practice for shipyards and BWM options for vessels.

We are in continuous analysis of ballast water discharge patterns, BWM technologies and will contribute expertise about vessels perspectives in BWM options for ports and sediment disposal practice.

The Association has invited Mr. Igor Radic and Mrs. Dubravka Lulic Krivic representing Ministry of Maritime affairs, Transport and Infrastructure to a BALMAS meeting held in Mare Nostrum headquarters in January 2015, where the information on shipping routes downloaded from CIMIS system and BALMAS AIS application where analyzed.

Sandro Vidas

Mare Nostrum-CSA, Croatia

Development of an Early Warning System

The Italian National Institute for Environmental Protection and Research (ISPRA) is coordinating the activities related to the development of an Early Warning System (EWS) for the Adriatic Sea, which is one of the main outputs expected from the project BALMAS. The work is carried out in close collaboration with CNR (Italian National Research Council), the Rudjer Boškovic Institute-Center for Marine Research (Croatia), the Institute for Water of the Republic of Slovenia and the Italian Ministry of Infrastructure and Transport – Coast Guard Headquarters. The general goal of this Work Package is to increase the control of ballast water by developing an EWS for vessels to prevent loading of ballast water with critical biological conditions, as well as for warning local relevant maritime authorities and environmental protection agencies to enable an early response and an implementation of remediation measures. Such warnings are envisaged both in the IMO *International Convention for the Control and Management of Ships' Ballast Water and Sediments* (Regulation C-2) and in the EU Marine Strategy Framework Directive (Descriptor 2 – Non indigenous species), with different scopes. The BALMAS EWS is being developed to be applied for both legal instruments, by taking into consideration the different information and decision making needs (Fig. 1).

The following activities have been concluded and reports have been produced:

i) a Review of previously developed EWS,

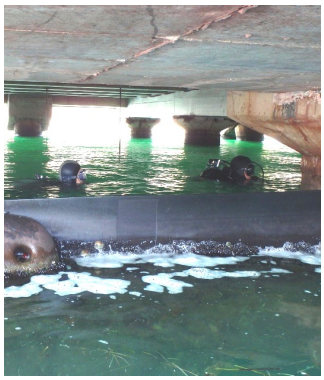
ii) Links between the EU Marine Strategy Framework Directive (MSFD), the UNEP-MAP Mediterranean Strategy on Ballast Water Management and the Adriatic Early Warning System, and

iii) the Review of potential impact of species and their categorization.

A specific workshop on EWS was held during the 2nd BALMAS meeting in Split (8-10 April 2014), a subsequent workshop was held in Venice in June 2014 on common principles between the EWS and Risk Assessment, and a general discussion on categorization criteria for species to be included in the warning was held at the 3rd BALMAS meeting in Kotor (7-9 October 2014). The two remaining activities are related to Rapid responses and remediation measures for relevant authorities and Developing and testing EWS. Testing implementation options of the Adriatic EWS will be concluded in June 2015.

Erika Magaletti

Italian National Institute for Environmental Protection and Research



Scuba divers during sampling the Port of Koper sediment Photo: M. Orlando Bonaca

"The general goal of this Work Package is to increase the control of ballast water by developing an EWS for vessels to prevent loading of ballast water with critical biological conditions"

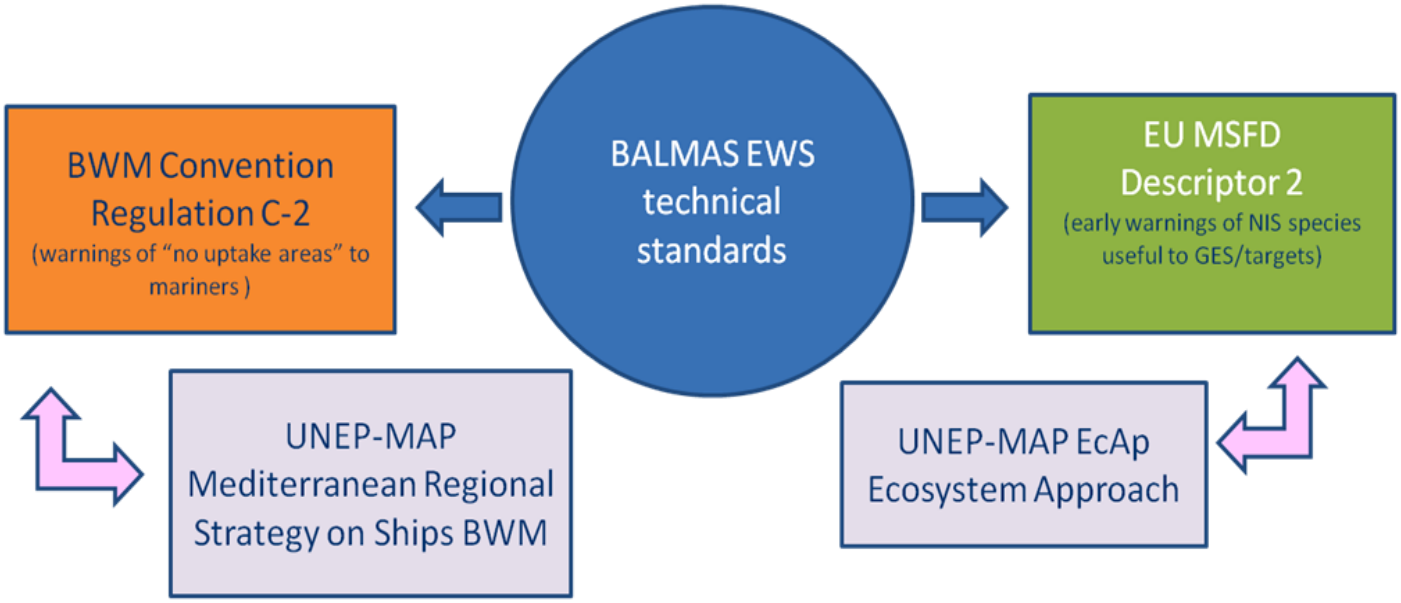


Fig. 1 : Schematic diagram of the links between the BALMAS Early Warning System (EWS) and relevant legal instruments.

Implementation of the Ballast Water Management Decision Support System

In the last period, within the activities of the implementation of the Ballast Water Management Decision Support System (BWM DSS), coordinated by the Italian Coast Guard Headquarters, we investigated how to feed this system with the large amount of information. The collection of that information will have to correctly support the decision-making process carried out by the competent Authorities of each Adriatic Country. In the details, it was explored how:

A) to implement the BWRS (Ballast water reporting system) information system to support the reporting in advance on BW operations from vessels as well as the collecting of the information in order to allow the Adriatic Maritime Authorities to implement a common operating procedure to gather and exchange the BW operations related information regarding the vessels which call the selected 12 Adriatic relevant ports (Trieste, Venice, Ancona, Bari, Koper, Pula, Rijeka, Šibenik, Split, Ploce, Bar and Durres) as available in each national system.

B) to collect the available data concerning the ship's static and dynamic information as well as its voyage related data (i.e. vessel name, IMO number, flag, call sign, MMSI, ship's type, actual position, speed over ground, course, draught, destination, ETA, hazardous cargo, etc.) as available in each national Vessel Traffic Management Information System (VTMIS).

In order to define a common procedure to collect the BW information as well as to identify a common operating procedure to exchange and store in the BWM DSS the above mentioned information related to the ships, a specific questionnaire has been disseminated to some project partners (Croatian Ministry of the Maritime affairs, Transport and Infrastructure, Montenegrin Maritime Safety Department, Agriculture University of Tirana) and other stakeholders (i.e. Slovenian Maritime Administration, Albanian Inter-institutional Maritime Operational Centre - IMOC).

Thus, information were collected both on the systems and procedures managing the BW operations in the Adriatic Countries and on the vessel traffic management information systems implemented by the Adriatic Countries, including the management of the information related to the Adrirep Mandatory ship Reporting System (as established by the IMO Res. MSC 139 (76) adopted on 5 December 2002).

The information will be used to develop a suitable wok plan to implement the Ballast Water Management Decision Support System.

Cosmo Forte

Italian Coast Guard Headquarters

Plankton sampling in the port area
Photo: S. Pigozzi

"Information were collected both on the systems and procedures managing the BW operations in the Adriatic Countries and on the vessel traffic management information systems"

Cosmo Forte at BALMAS Info Day, Trieste, December 5th 2014
Photo: E. Di Poi

Financial Sustainability of Ballast Water Management

Picture courtesy of sailorsdiaries.blogspot.com/

"Any of possible self-financing option selected at the end of BALMAS project, will not result in an environmental and economic disadvantage"

Financial sustainability is an important part of planning the Ballast Water Management System for Adriatic Sea protection. Firstly, because it will enable a long-term and efficient implementation of ballast water management measures and its enforcement and it will be based on polluter pays principle.

A questionnaire has been prepared, in order to gather information on national specifics regarding institutional, policy and financial aspects.

In addition, information of financial approaches worldwide has been gathered to insure financial sustainability of ballast water management. Up to now, some financial approaches were collected and are currently being analysed. Noted financial approach are Direct fee/ User charge (Payment on delivery of service), Contract (Between the service provider and the ship owner or organisation, or between several parties, including government and intermediate organisations), Costs of service included in port dues/charges (Costs are included in the existing port dues/charges), Fixed fee (Costs for a specific service are separated from port dues as a surcharge) and Combined approach (Every vessel pays a fixed charge plus an extra charge dependent on the type of service).

In term to define the appropriate financing approach and to analyse application feasibility for identified financial option, each participating country should be under the consideration of analysing costs of Development of new legislations, regulations or rules to implement BWM Convention, Costs for implementing new management and control requirements, Inspection for Compliance monitoring and enforcement (CME), sampling and laboratory tests, Marine monitoring system, Sediment facilities, Eradication/Control measures for harmful aquatic organisms and pathogens.

Each participating country will also have to ensure that any of possible self-financing option selected at the end of BALMAS project, will not result in an environmental and economic disadvantage to the Adriatic region.

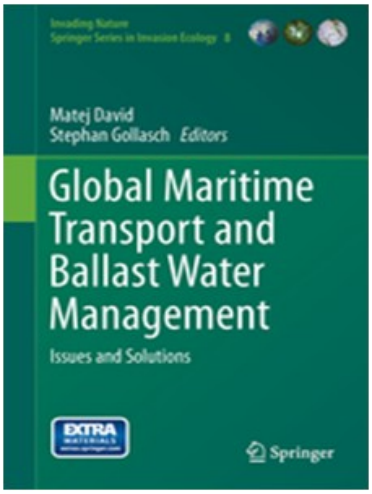
Urška Kocijančič

for the Lead Partner, the Institute for water of the Republic of Slovenia

Port of Koper panoramic view *Photo: courtesy from Port of Koper authorities administration*

New book

»Global Maritime Transport and Ballast Water Management: Issues and Solutions«



Invading Nature - Springer Series in Invasion Ecology, Vol. 8
David, Matej, and Gollasch, Stephan (Editors)
ISBN 978-94-017-9367-4
2015; XV, 306 p; 99 illus.; 71 illus. in color.

For more information please visit: *http://www.springer.com/environment/environmental+management/book/978-94-017-9366-7*

Quite a long time passed by between the first Ernst Haeckel´s note »on the processes determining the distribution of plankton in the oceans« (1890), the first indication that ships act as an introducing vector (published by Ostenfeld in 1908), Charles Elton´s study in 1958 »on the ecology of invasions by animals and plants« and the first sampling of ballast water, that was performed by Medkof J.C. and Scribner E.A. in 1973. In 1985 James T. Carlton published a review work »Transoceanic and interoceanic dispersal ...« in Oceanogr. Mar. Biol. Annu. Rev., and in 1993 the outstanding Science article »Ecological roulette...«. The recent Maiju Lehtiniemi´s et al. article »Dose of truth...« published in Marine Policy (2015) is co-authored by the editors of this book. These are some of milestones in research concerning early warning and risk assessment of the »ballast water invisible passengers« - those planktonic stowaways of rapidly increasing maritime transport.

This Springer series´ book is the first comprehensive overview of the possible solutions to the complex issue of Ballast Water Management (BWM) which outlines consequences and implications of the ballast water potential to cause harm, following the provisions of the BWM Convention (International Convention for the Control and Management of Ships' Ballast Water and Sediments). A sustainable ballast water management, built up on new scientific research outcomes and practical experience, is proposed.

The editors and authors are scientists of different disciplines in maritime and marine research involved in the policy making processes at the highest international (IMO – International Maritime Organization), national and regional levels. Their present contributions reflect the industry, administration and academic views regarding ballast water management. The book is expected to be of primary interest to students and scientists in various fields, including maritime transport, naval architecture, biology, decision and policy making, at national and international levels related to the shipping industry and environmental protection. Authors paid attention to address wider public with the goal to raise awareness of this complex subject.

The book introduces the reader to the ballast water issue from maritime transport to biological aspects, and it gives detailed new insights of ballast water management. At last but not at least it offers recommendations for an efficient ballast water management, including decision support systems as the latest unique approach and tool in this field.

Vlado Bernetič and Mateja Grego

National Institute of Biology, Marine Biology Station Piran, Slovenia

Port of Koper Container terminal
Photo courtesy from Port of Koper administration

Compiled and edited at MBS Piran - NIB by dr. Vesna Flander Putrle, dr. Mateja Grego, and Vlado Bernetič

More about:
http://www.balmas.eu/
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REPUBLIC OF SLOVENIA
GOVERNMENT OFFICE FOR DEVELOPMENT AND EUROPEAN COHESION POLICY

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