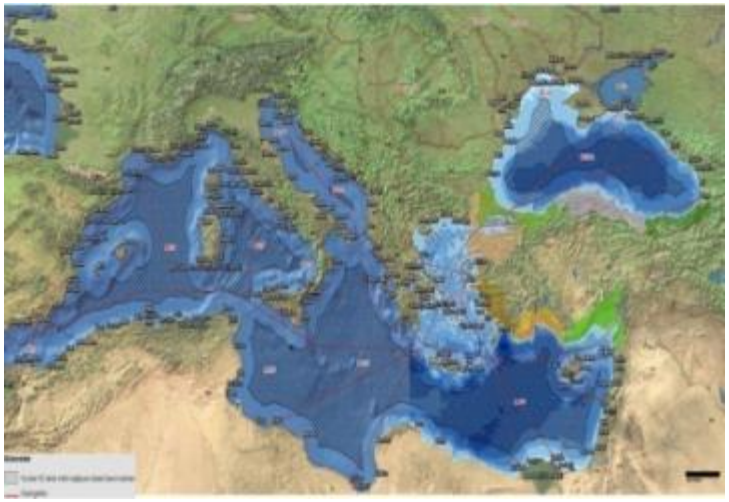
Ballast Water Risk Assessment System



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Outline

- Short information about scope and targets of the ongoing project,
- Risk Assessment methodologies,
- GloBallast methodology,
- Short information about the system.

Ballast Water Risk Assessment

- The ballast water risk assessment (BWRA) is a tool used to determine the risk of biological invasion between the source port and the recipient port.

Ongoing project; Developing of Ballast Water Risk Assessment System

- Turkey has been developing an ArcGIS-based Ballast Water Risk Assessment system that will be used as a tool in the ports during to the Ballast Water Management implementations.
- The system is being prepared based on the Globallast BWRA methodology.
- The study is started in May-2010 and will be completed in May-2011.

The main targets of the System

- to reduce/minimize the introduction, and/or domestic spread of harmful species,
- to reduce the numbers of vessels subject to BW controls and monitoring by using more selective applications,
- to use a user-friendly management tool for assessing risk of transfer of unwanted marine organisms by ballast water.

The system can be used;

- as a decision support system in the ports for making a decision the ship coming to the port whether it has a risk or not for port marine environment.

- granting to the exemptions according to Regulation A-4 of the convention.

Ballast Water Convention and Risk Assessment

- Regulation A-4 of the Convention stipulates that a Party or Parties, in waters under their jurisdiction, may grant exemptions to any requirements to apply regulation B-3 or C-1, but only when they are granted based on the **Guidelines on risk assessment** developed by the Organization.

Ballast Water Convention and Risk Assessment

Regulation A-4 *Exemptions*

A Party or Parties, in waters under their jurisdiction, may grant exemptions to any requirements to apply regulations B-3 or C-1, but only when they are:

.1 granted to a ship or ships on a voyage or voyages between specified ports or locations; or to a ship which operates exclusively between specified ports or locations;

.2 effective for a period of no more than five years subject to intermediate review;

.3 granted to ships that do not mix Ballast Water or Sediments other than between the ports or locations specified in paragraph 1.1; and

.4 granted based on **the Guidelines on risk assessment** developed by the Organization.

GUIDELINES FOR RISK ASSESSMENT UNDER REGULATION A-4 OF THE BWM CONVENTION (G7)

There are three risk assessment methods outlined in these Guidelines for assessing the risks in relation to granting an exemption in accordance with regulation A-4 of the Convention:

- Environmental matching risk assessment (Qualitative)
- Species' biogeographical risk assessment (Qualitative)
- Species-specific risk assessment (Quantitative)

Environmental matching risk assessment

- based on salinity and temperature sensitivity/selectivity of the species.

Normally, each aquatic organisms lives the marine areas in which is suitable to their salinity and temperature tolerances. And, natural barriers including temperatures, currents or salinity gradients generally restrict the movement of aquatic species. Species can only live in fresh waters, saline waters or brackish waters.

Human related introductions - Activities around the globe including international shipping, aquaculture or boating provide 'vectors' that help aquatic species relocate. After being introduced, domestic activities including recreational boating can unknowingly spread species.

Environmental matching risk assessment

- compares environmental conditions including temperature and salinity between donor/source and recipient regions.

- the degree of similarity between the donor and recipient regions provides an indication of the likelihood of survival and the establishment of any species transferred between those locations.

Species' biogeographical risk assessment

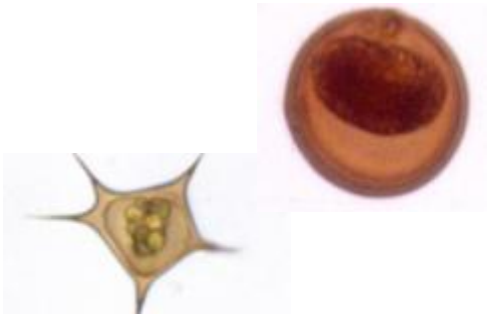
- compares the biogeographical distributions of nonindigenous, cryptogenic, and harmful native species that presently exist in the donor and recipient ports and biogeographic regions.

- Overlapping species in the donor and recipient ports and regions are a direct indication that environmental conditions are sufficiently similar to allow a shared animal and plant species.

Species-specific risk assessment

- compares individual species characteristics with the environmental conditions in the recipient port, to determine the likelihood of transfer and survival.

- Species-specific risk assessments use information on life history and physiological tolerances to define a species' physiological limits and thereby estimate its potential to survive or complete its life cycle in the recipient environment.



GloBallast BWRA-Methodology

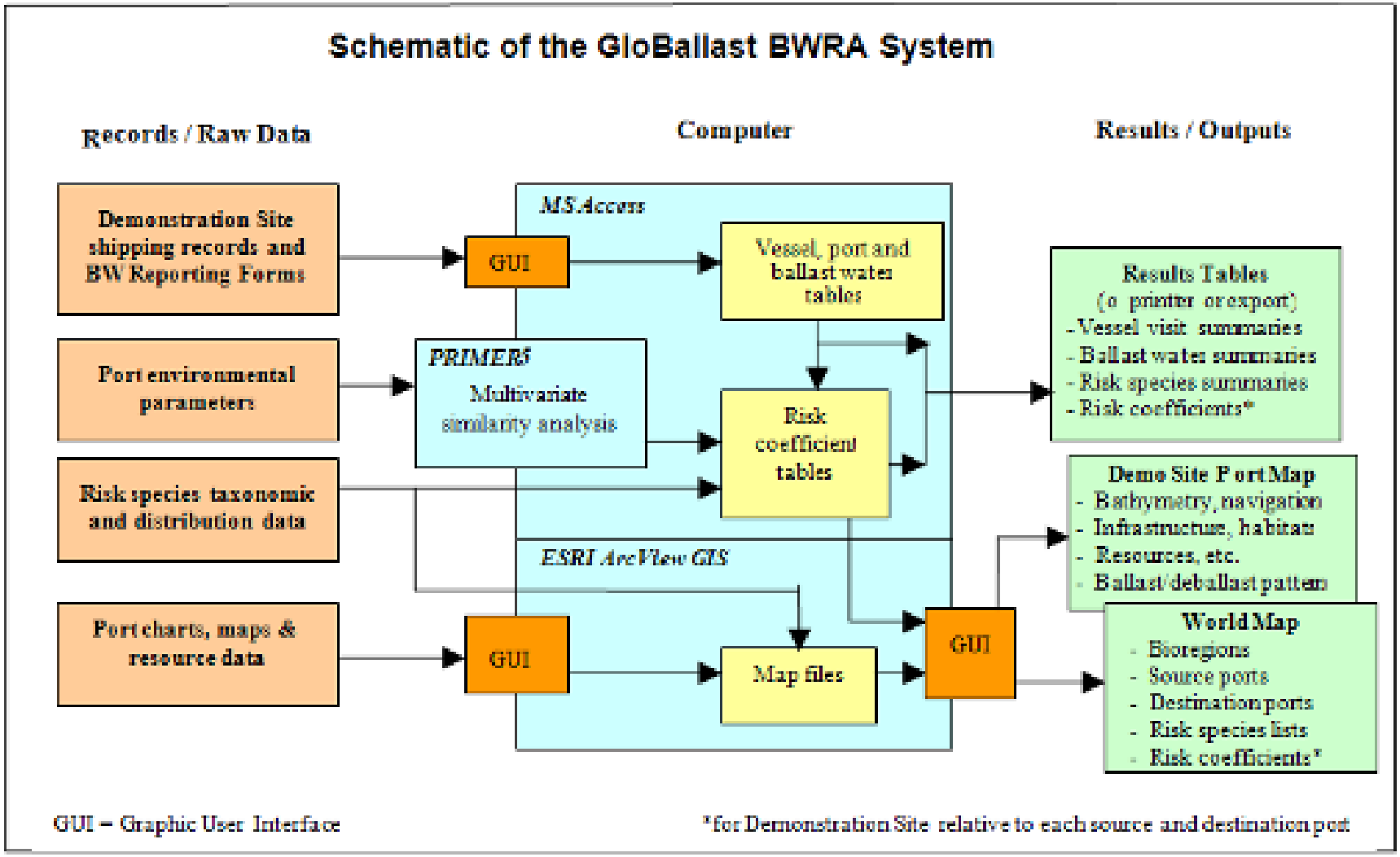
- This methodology is a semi-quantitative risk analysis methodology for assessment of a source port risk relative to worldwide ports which shipping activities taken place to this source port and to identify the high risk tank discharges with respect to a demonstration site's present pattern of trade.

GloBallast BWRA-Methodology

- The database calculates the Relative Overall Risk (ROR) of a potentially harmful introduction for all source ports.

- The ROR value for each source port represents a proportion of the threat posed to the recipient port as result of its currently trading pattern.

GloBallast BWRA Methodology



system uses historical shipping data, environmental data, and non-indigenous species (NIS)

GloBallast BWRA Methodology

The coefficients and the risk reduction factors

Frequency of ships discharging BW from each Source Port	(C1) Percentage of all BW tank discharges
Amount discharged from each source port	(C2) Percentage of total BW volume dischaged
Similarity between the recipient port and all source port	(C3) Environmental matching coefficient
Percentage of all available risk species in each source port	(C4) Coefficient of risk species threat
Ballast Water Storage Time (Voyage duration)	(R2) Risk reduction factor for long voyages time - reduction weightings to C4
Tank Volume	(R1) Risk reduction factor for small tank volume - reduction weightings to C2

Necessary data

C3: Port environmental parameters (34 parameters)

1. Port type (T-Jetty, Breakwater, in Bay, in eustuary, river, tidel creek)
2. Mean water temperature during warmest season (°C)
3. Maximum water temperature at warmest time of year (°C)
4. Mean water temperature during coolest season (°C)
5. Minimum water temperature at coolest time of year (°C)
6. Mean day-time air temperature recorded in warmest season (°C)
7. Maximum day-time air temperature recorded in warmest season (°C)
8. Mean night-time air temperature recorded in coolest season (°C)
9. Minimum night-time air temperature recorded in coolest season (°C)
10. Mean water salinity during wettest period of the year (ppt)
11. Lowest water salinity at wettest time of the year (ppt)
12. Mean water salinity during driest period of year (ppt)
13. Maximum water salinity at driest time of year (ppt)
14. Mean spring tidal range (metres)
15. Mean neap tidal Range (metres)
16. Total rainfall during driest 6 months (millimetres)
17. Total rainfall during wettest 6 months (millimetres)
18. Fewest months accounting for 75% of total annual rainfall
19. Distance to nearest river mouth (kilometres; negative value if upstream)
20. Catchment size of nearest river with significant flow (square kilometres)

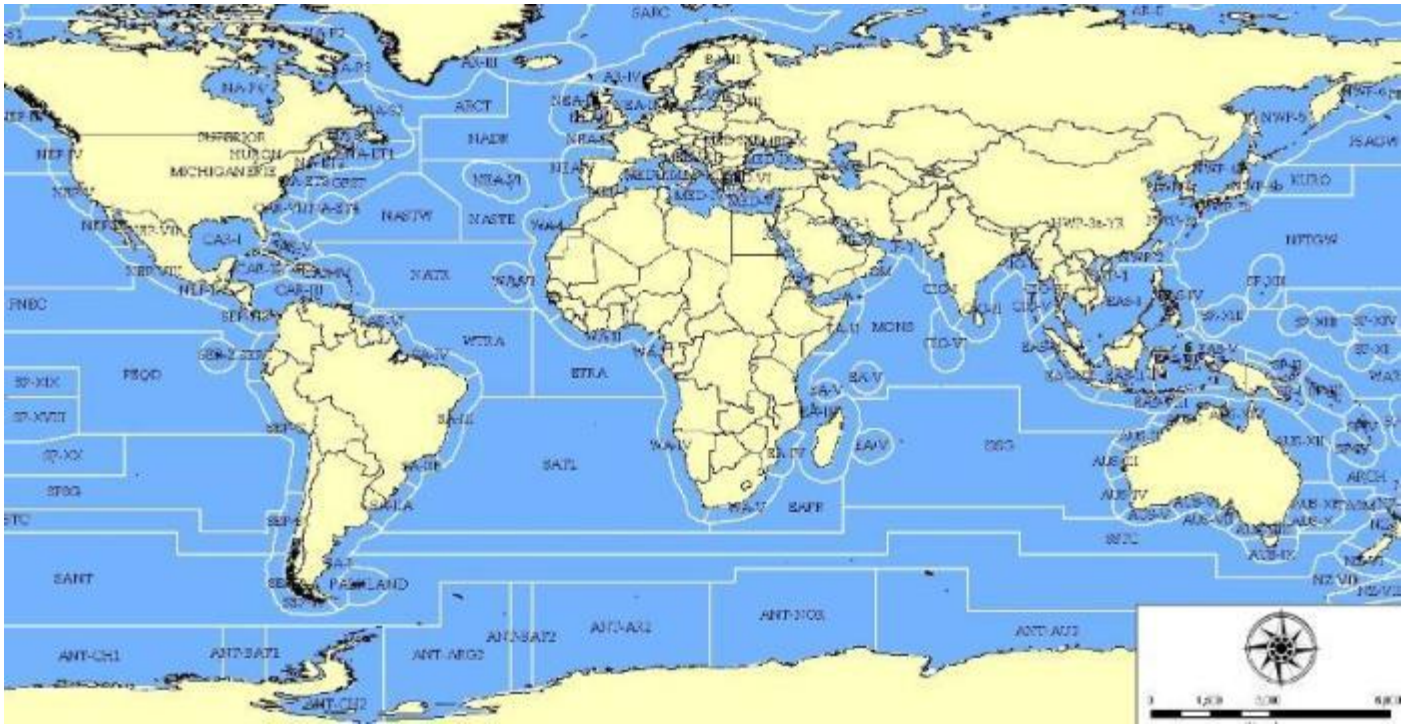
Necessary data

C3: Port environmental parameters (34 parameters)

21. Smooth artificial wall
22. Rocky artificial wall
23. Wooden pilings
24. High tide salt marsh/lagoon, saline flats or sabkah
25. Sand beach
26. Shingle, stony or cobble beach
27. Low tide mud flat
28. Mangrove fringe/mangrove forest
29. Natural rocky shore or cliff
30. Subtidal firm sandy sediments
31. Subtidal soft muddy sediments
32. Seagrass meadow
33. Rocky reef or pavement
34. Coral reef (with carbonate framework)

C4: Risk Species - world bioregions

IMO-GloBallast divides the world into 204 bioregions.



Bioregions represent environmentally similar geographic areas. If a species is found established in one part of a bioregion, there is a good chance it can spread via natural or human

Data quality

Port parameters

- Ports coordinates
- Environmental parameters

The most difficult is;
to find reliable water temperature and salinity data, particularly for identifying the averages, maxima and minima for ports in or near estuaries and rivers

Invasive species records for ports and bioregion

- Port baseline survey
- Scientific studies

Significant knowledge gaps on the global distribution of many native, cryptogenic and introduced species

Ballast Water Risk Assessement System

Advantages of the system

- The system includes all risk coefficients and risk reduction factors in the globallast methodology but without using 4 different programmes.
- multivariate similarity analysis can be undertaken by using port environmental database as indipendently from primer programes,
- web-based system compatible with Arc-GIS,
- worldwide port environmental database suitable for new editing and adding
- harmful aquatic organisms database suitable for new editing and adding.

Ballast Water Risk Assessement System

Background data for Risk Assessment

C1 - ballast bater discharge frequency

C2 - ballast water discharge volume

R1 – tank volume

R2 -voyage time

Port workers

Port Environmental Database for C3

Physical oceanography expert

Risk species database for C4

Species expert – marine biologist

Data sources

Ballast Water Reporting Form

or

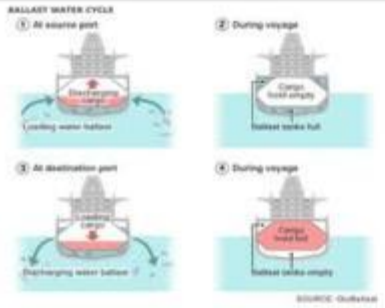
Shipping records

- Scientific publications
- Port publications
- Climate databases
- National tide-tables
- Satellite images (google earth)
- NOAA (National Oceanographic Data Center)
- Lloyd's- Ports and Terminals Guide

- Scientific publications
- Port baseline surveys
- Invasive species databases worlwide

Ballast Water Risk Assessement System

Main Menu | Reporting | Route Analysis | PORT DATA



BALLAST WATER REPORTING FORM SYSTEM

BALLAST WATER RISK ANALYSIS SYSTEM

HARMFUL AQUATIC ORGANISM SYSTEM

Ballast Water Risk Assessement System

Ballast Water Risk Assessement System

Ballast Water Risk Assessement System

BALLAST WATER REPORTING FORM MANAGEMENT PORTAL

MAIN PAGE | EXIT

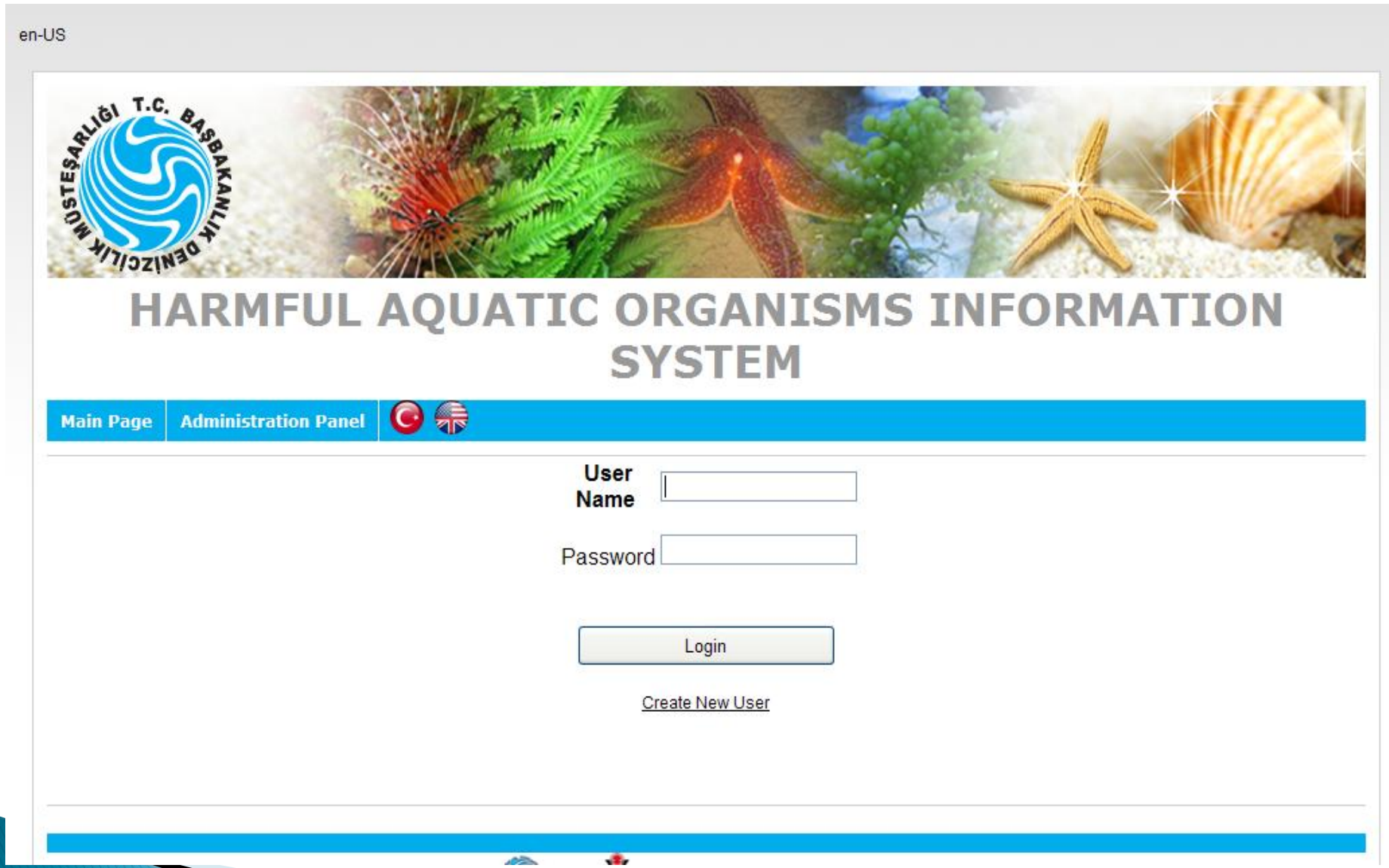
Tank Code	AP	Tank No			
BALAST ALIM (BW SOURCE)		BALAST DEĞİŞİM (BW EXCHANGE)		BALAST BASIMI (BW DISCHARGE)	
Source date		Exchange date		Discharge date	
Source Port and Country	Seçiniz	Exchange Coordinates	Seçiniz	Dscharge Port and Country	Türkiye
					Seçiniz
Temperature	0 C	Salinity	0	Salinity	0
Volume of BW		Exchange Vol.	0	Discharge Vol.	0

Listeye Ekle

Onaya Gönder

Kod	Alım T	Alım Limanı	Sck	Sck Birimi	Değ. T.	Değ. Limanı	Değ. Miktarı	Değ. Tuz	Bas. T.	Bas. Limanı	Bas. Miktarı	Bas. Tuz	Değiştir	Sil
AP	12/28/2010	Durres	2				0.00000	0.00000	2/1/2011	Botaş	44.00000	2.00000		

Ballast Water Risk Assessement System



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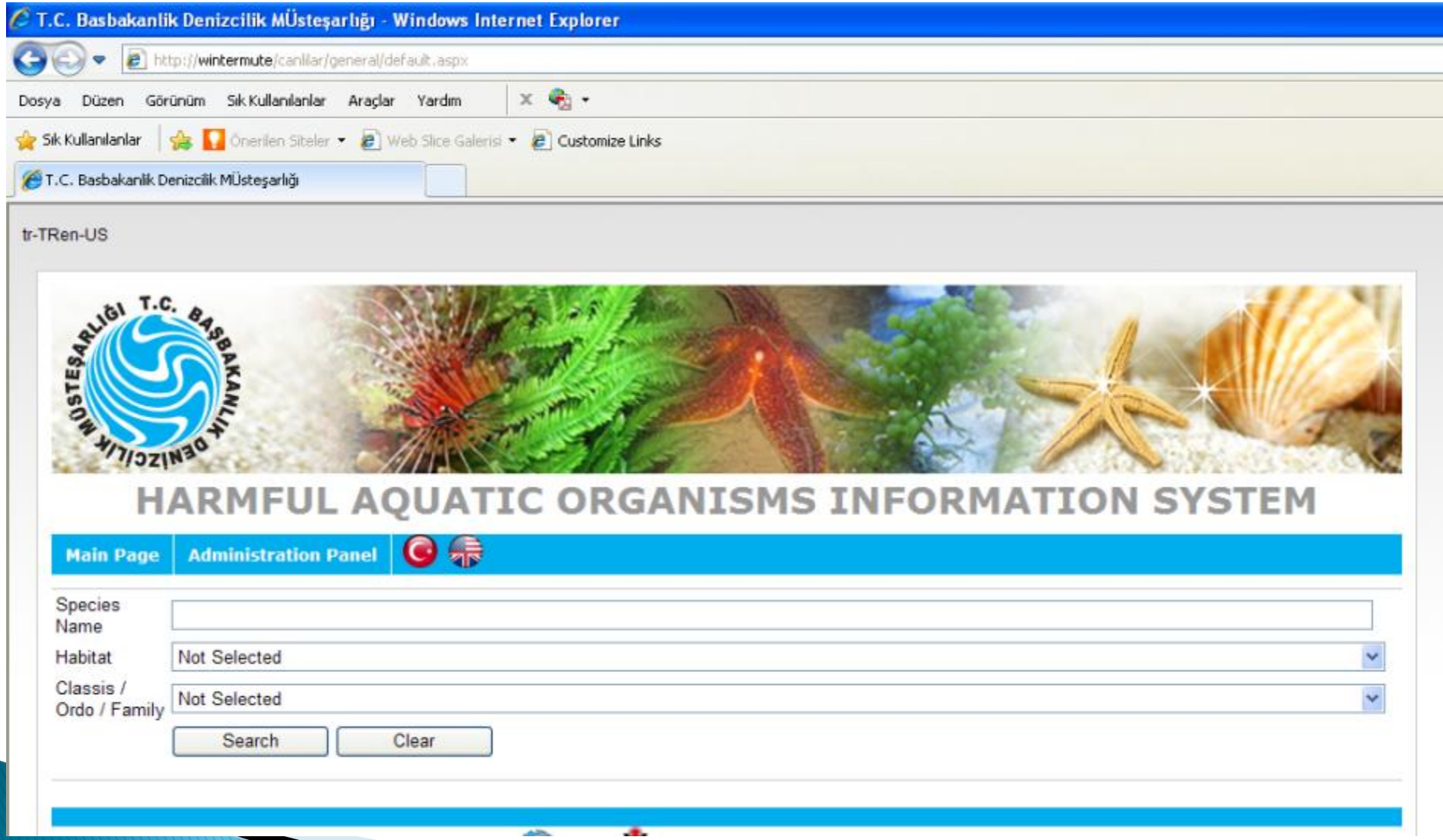

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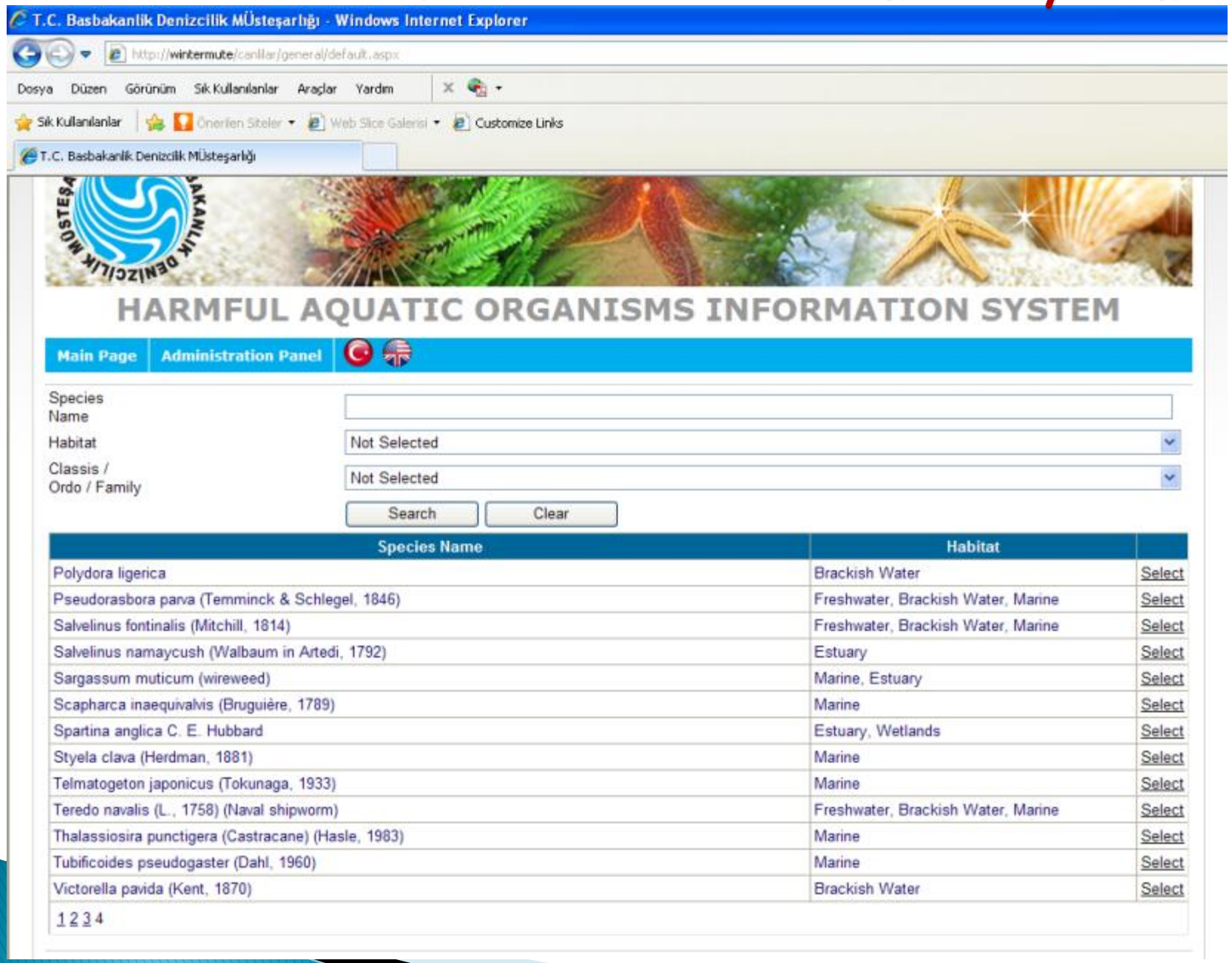

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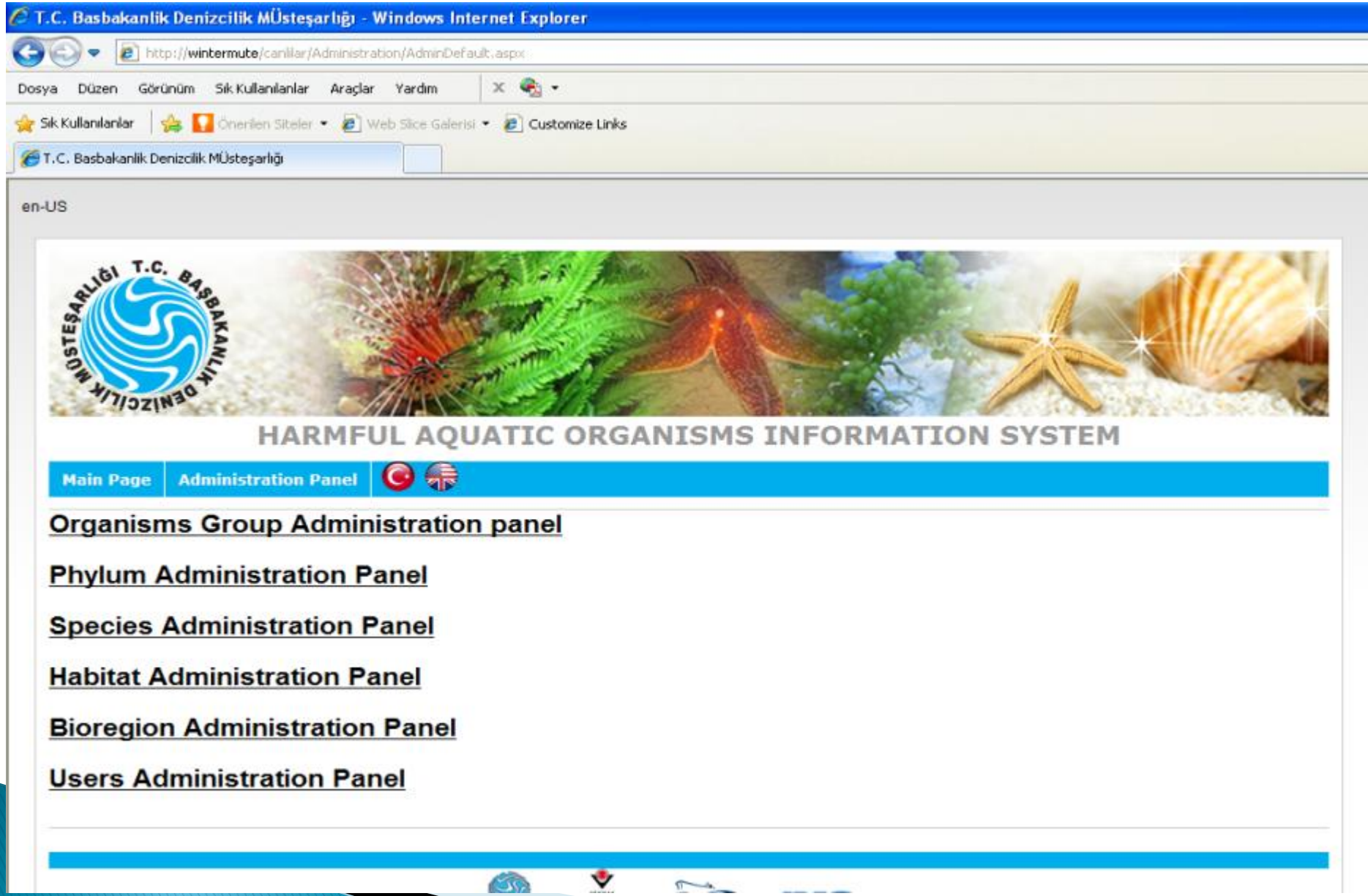

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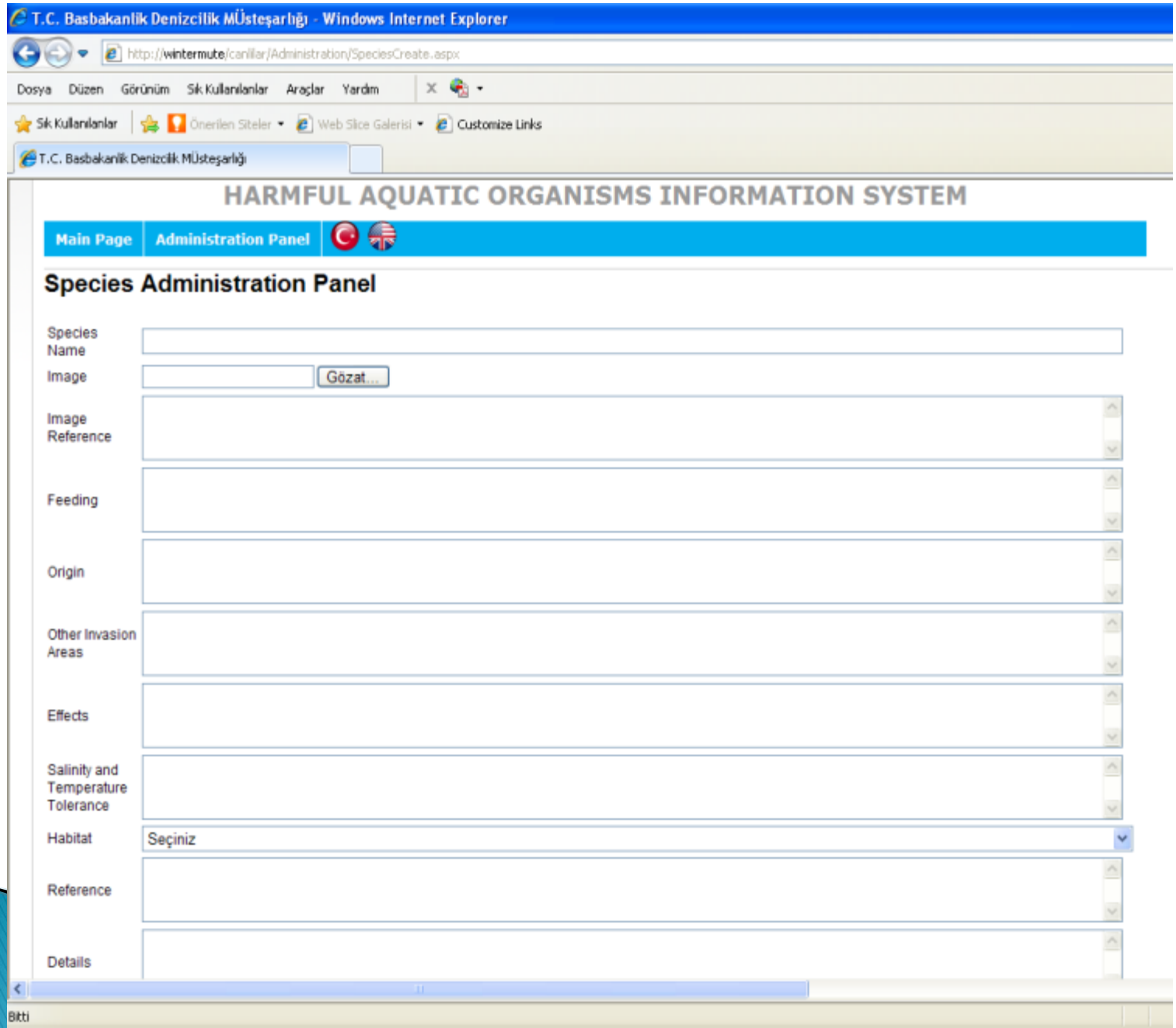
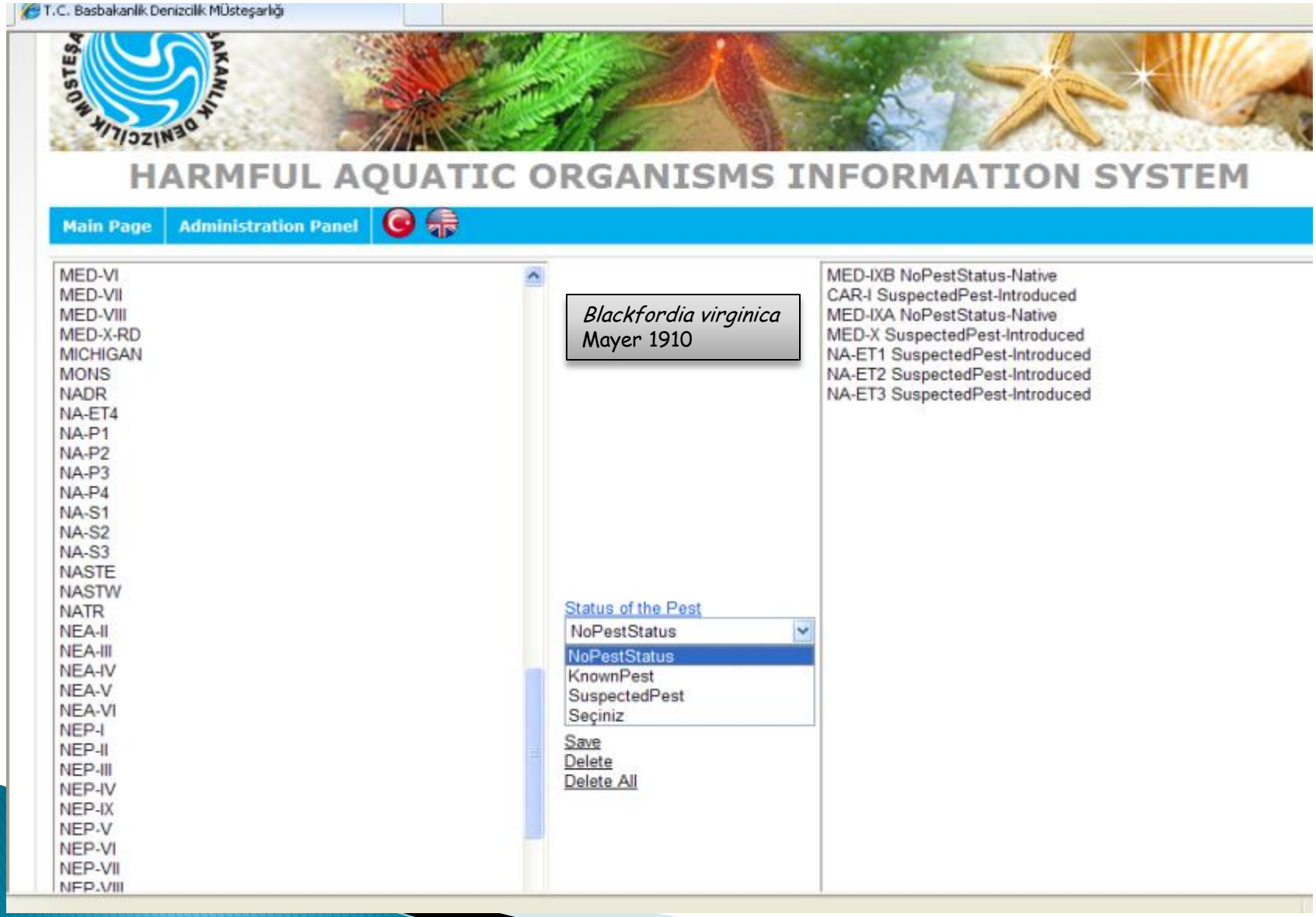


Ballast Water Risk Assessement System



T.C. Basbakanlik Denizcilik MÜsteşarlığı - Windows Internet Explorer

http://wintermute/canlilar/general/Details.aspx?no=24

Dosya Düzen Görünüm Sik Kullanılanlar Araçlar Yardım

Sik Kullanılanlar Önerilen Siteler Web Slice Galerisi Customize Links

T.C. Basbakanlik Denizcilik MÜsteşarlığı

HARMFUL AQUATIC ORGANISMS INFORMATION SYSTEM

Main Page | Administration Panel

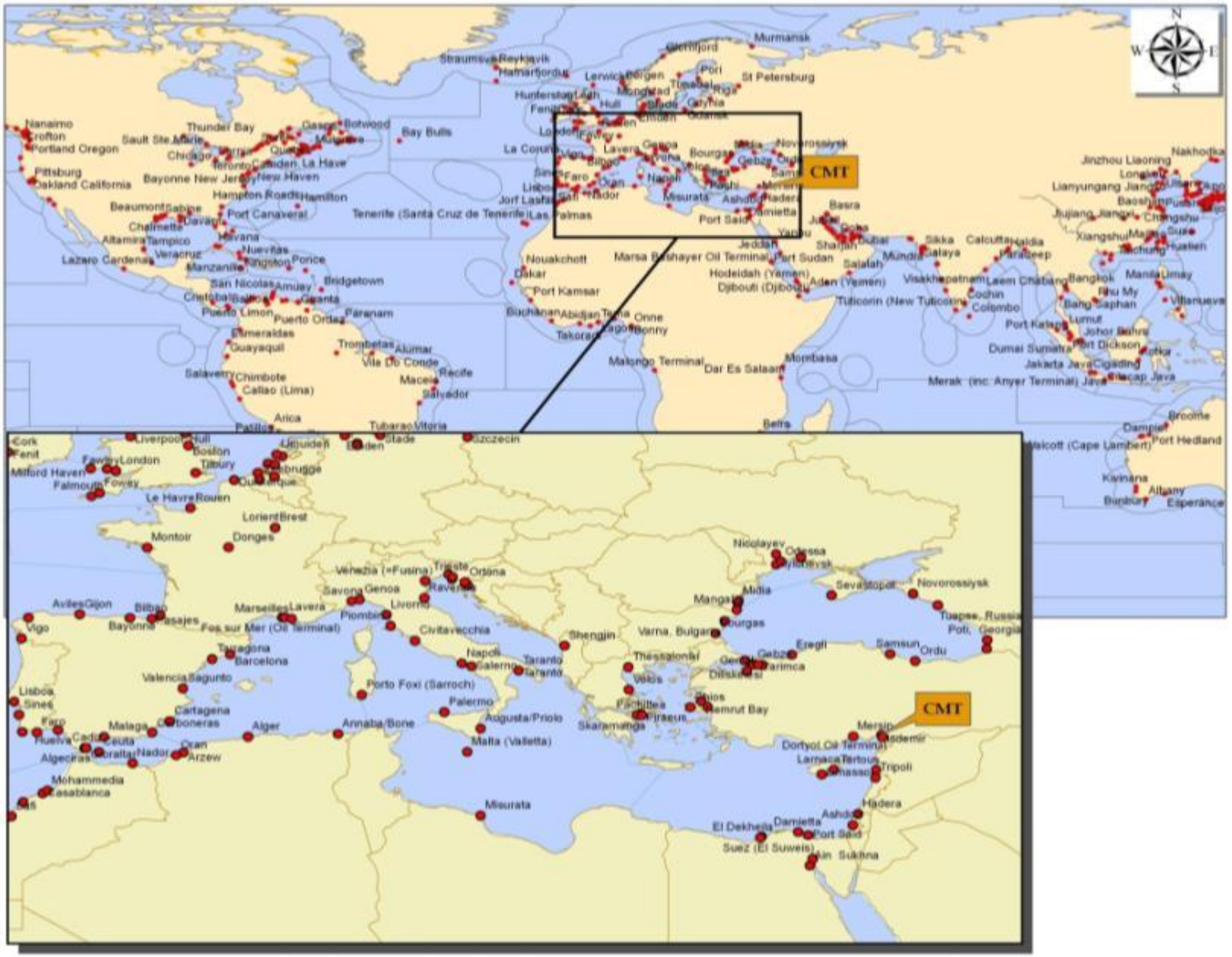
http://nas.er.usgs.gov/queries/FactSheet.aspx?speciesID=80

Species Name	Balanus improvisus (Darwin 1854), Acorn(white) barnacle
Feeding	Filter-feeding
Effects	They can dominate the community by competing for space and food. They change the habitat, fouling blue mussels and oysters. Sharp shells on the beach may cause human injuries. It causes fouling of water intake pipes and heat exchangers, underwater constructions and ships' hulls.
Distribution	
Origin	North East Atlantic Ocean (coasts between Florida and Nova Scotia)
Distribution Areas	
Reference	http://en.wikipedia.org/wiki/Balanus_improvisushttp://www.corpi.ku.lt/nemo/alien_species_directory.html http://www.frammandearter.se/0/2english/pdf/Balanus_improvisus.pdf Alexandrov, B. Preliminary results of investigations the problem of exotic species invasion into the Black Sea on the Odessa port example, GloBallast, 6th Country Project Task Force (CPTF) of Ukraine Meeting, 2002. M. Levent ARTÜZ, 2005, Denizlerimizin iki yeni misafiri Mya arenaria, Linnaeus, 1758 ve Balanus improvisus (Darwin, 1854) http://www.europe-aliens.org/speciesFactsheet.do?speciesId=50128#
Salinity and Temperature Tolerance	The temperature range is 0-30°C; optimum conditions for free swimming larvae is ~14°C. It does not reproduce in fresh water. It has optimum activity at 6-30 PSU and maximal larval settlement is found in mid-salinities. They can stand 0.3 - 0.4 mg/l concentration of NH4. Lives up to the splash zone, does not tolerate desiccation. The minimum oxygen concentration < 1 ml/l.
Details	It has colonised many parts of the world's oceans as a biofouling agent on the hulls of ships.[2] It was one of the first recorded introductions to the Baltic Sea, having been found in Sweden and Lithuania in 1844, the Elbe estuary in 1854 and Great Britain in the 1880s. Sessile, mainly estuarine and brackish-water.
Habitat	Freshwater, Brackish Water, Marine
Organism Group	Cirripedia
Introduction vector	Transported as a fouling organism on ship's hulls, or as planktonic larvae in ballast water; it is also common as an epibiont on imported oysters.

Bitti

Başlat Gelen Kutusu - ... Windows Ge... BWRA- split Ballast Water Ri... Internet Exp...

Ballast Water Risk Assessement System- Port Database



Port database of the system

- 1951 ports coordinates worldwide has been validated.
- environmental parameter for approximately 900 ports has been completed.

Thank you for attention ..