



13th Japanese – German Symposium  
Marine Research  
The Importance of Oceans for Mankind



**Coastal Area Utilization for  
Marine Resource Development  
and Environment Conservation**

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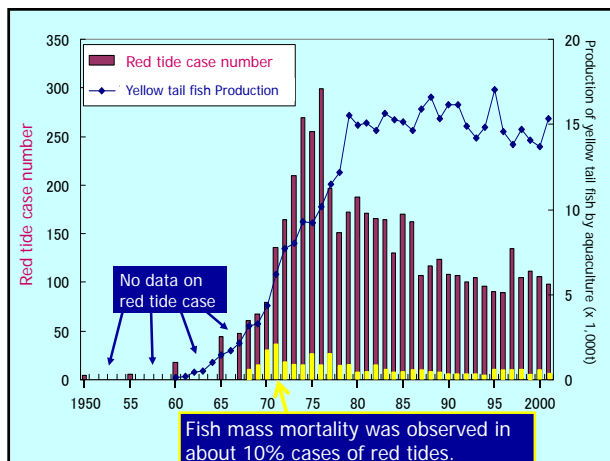
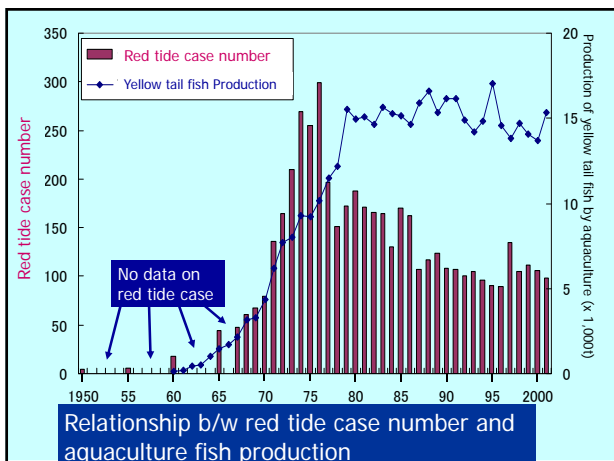
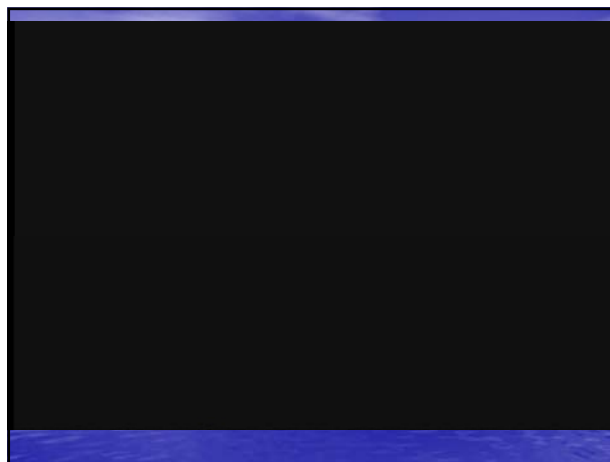
May 17, 2008 at Rostock

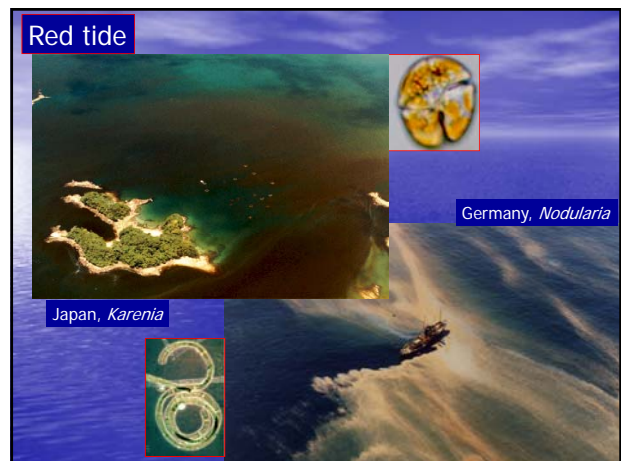
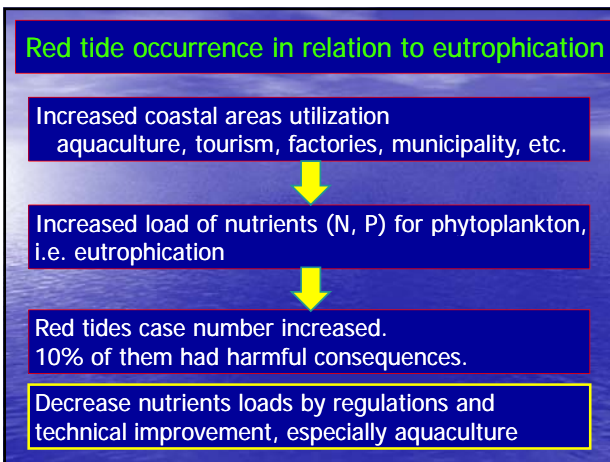
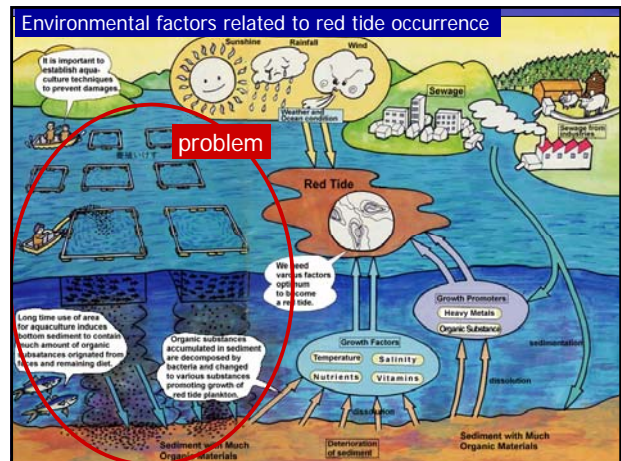
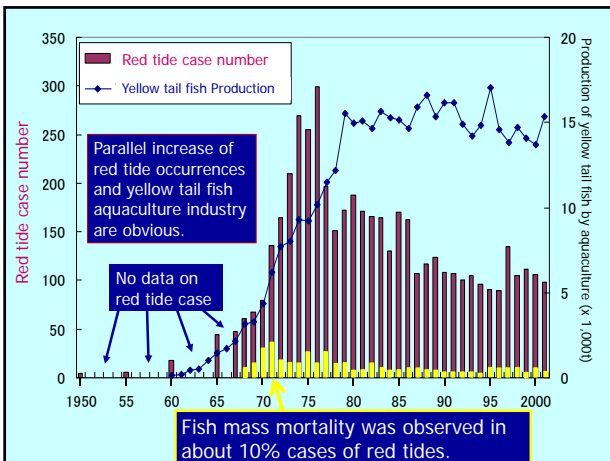


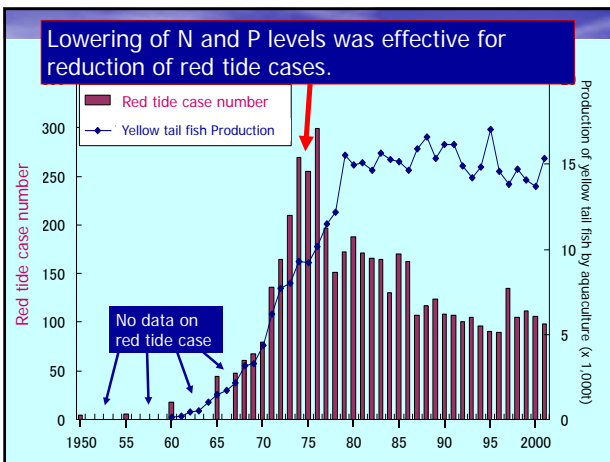
Bird's-eye View of Seto Inland Sea (courtesy of Asia Air Service)

east – west: 450 km, north – south: 15-55 km  
area: 23,203 km<sup>2</sup>, average depth: 38.0 m  
shoreline: 6,868 km, 700 islands

Fish aquaculture industry became active since 1960s.





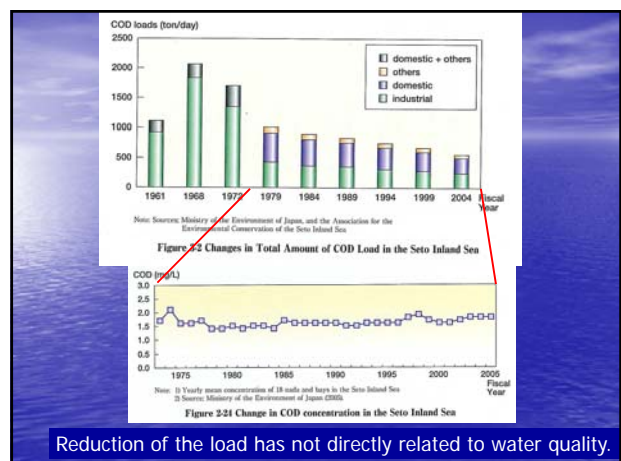
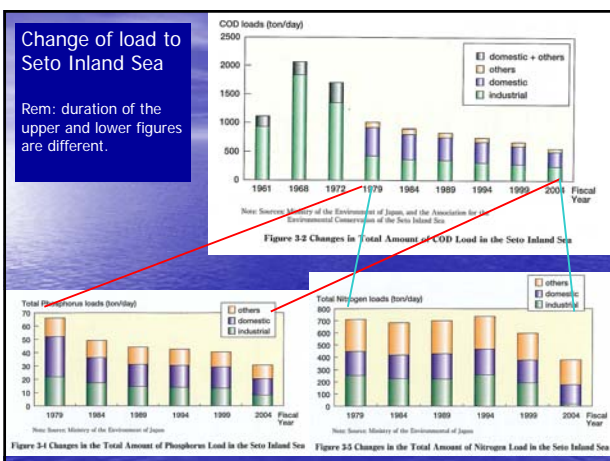
Countermeasures (management) for elimination of red tide occurrences

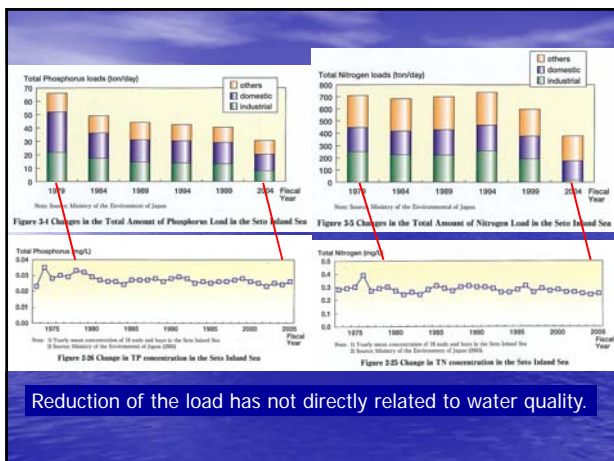
Indirect:

1. Water and sediment quality improvement through regulations
2. Water and sediment quality improvement by projects of rehabilitation
3. Improvement of aquaculture technology
4. Management and info. exc. net work

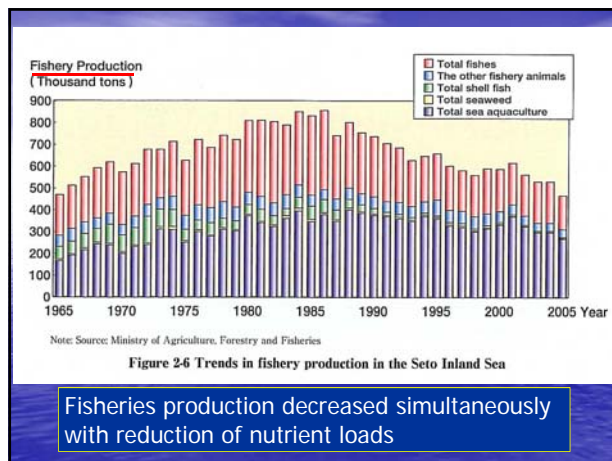
Direct:

1. Spray of clay
2. Filtration
3. Chemicals etc.

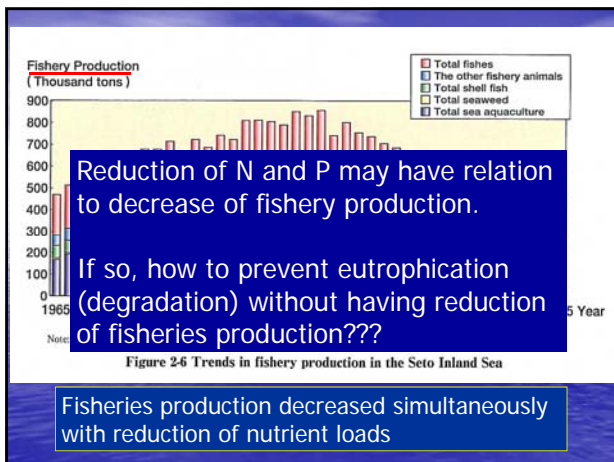




Reduction of the load has not directly related to water quality.



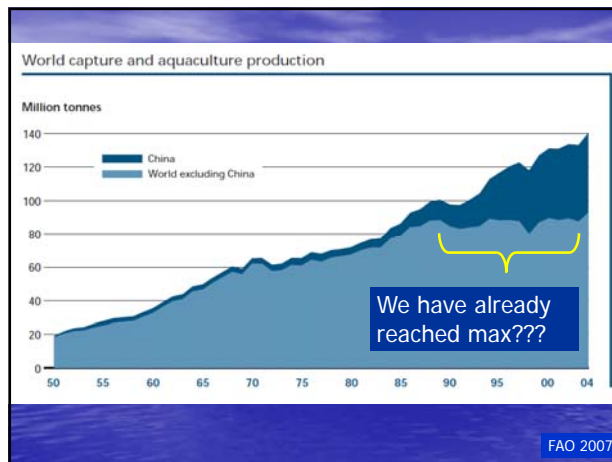
Fisheries production decreased simultaneously with reduction of nutrient loads



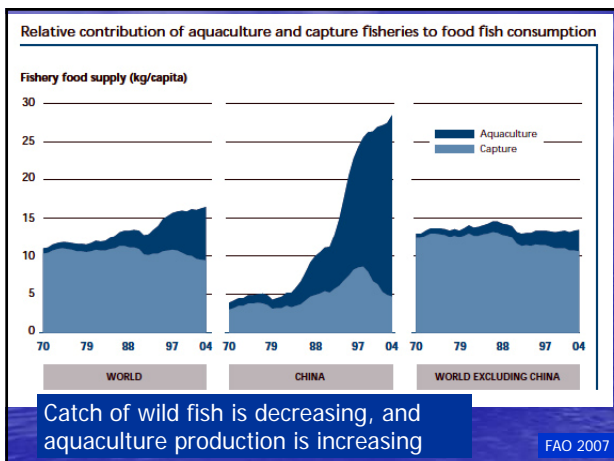
Reduction of N and P may have relation to decrease of fishery production.

If so, how to prevent eutrophication (degradation) without having reduction of fisheries production???

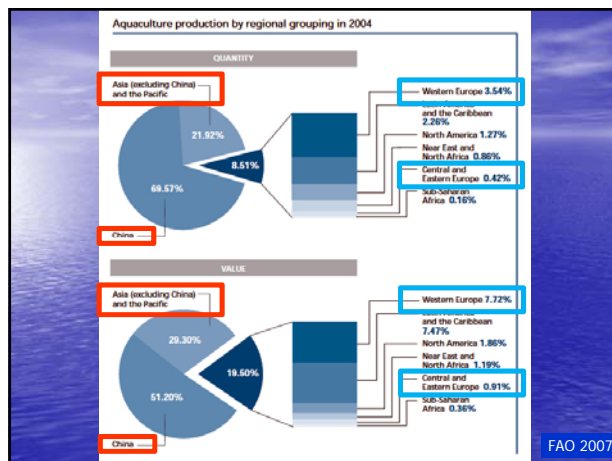
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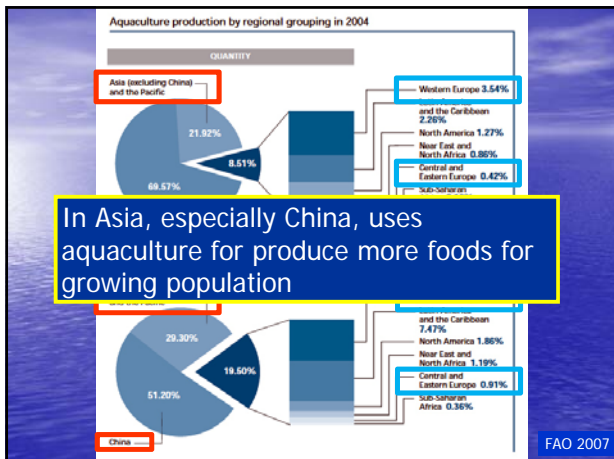


We have already reached max???



Catch of wild fish is decreasing, and aquaculture production is increasing





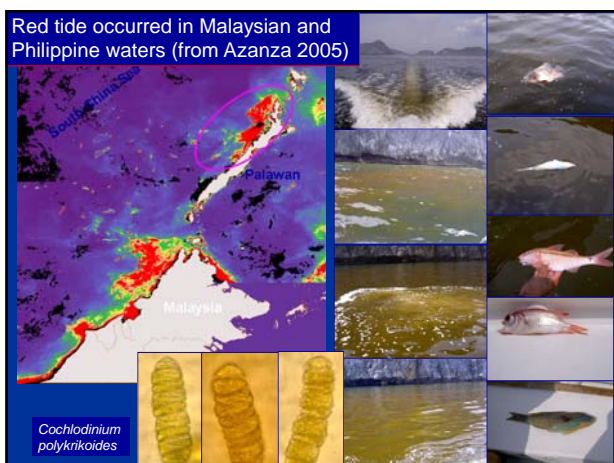
### Top ten aquaculture producers of food fish supply: quantity and emerging growth

Producer	2002 (Tonnage)	2004 (Tonnage)	APR (Percentage)
<b>Top ten producers in terms of quantity, 2004</b>			
China	27 767 251	30 614 968	5.0
India	2 187 189	2 472 335	6.3
Viet Nam	703 041	1 198 617	30.6
Thailand	954 567	1 172 866	10.8
Indonesia	914 071	1 045 051	6.9
Bangladesh	786 604	914 752	7.8
Japan	826 715	776 421	-3.1
Chile	545 655	674 979	11.2
Norway	550 209	637 993	7.7
United States of America	497 346	606 549	10.4

**Text Box:** Top 7 are Asian countries. 5 of the 7 are from Western Pacific countries.

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Oyster farms in Manila Bay

Oysters



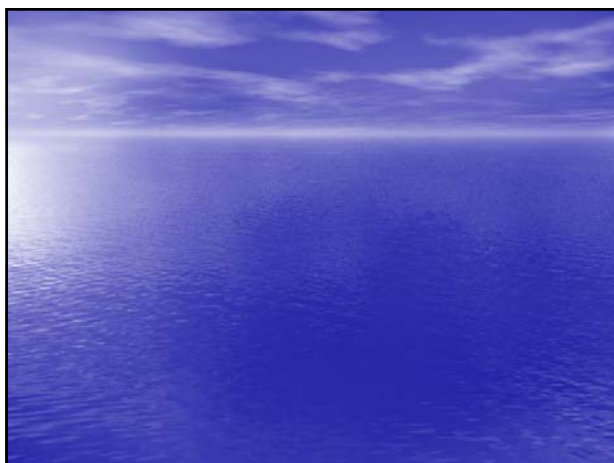
Clipping of Newspaper in the Philippines

Now in Asia, especially in developing countries in western Pacific region, needs to consider ways of coastal area utilization with setting relevant policies and regulations.

It implies involving farmers and private sectors in decision making, which may require clarifying costs and benefits of aquaculture industry as well as defining rights and duties at all levels.

EAA: ecosystem approach to aquaculture strive to balance various societal objectives.

**We need sound environment  
And we need sustainable food production  
Problem is how to manage???**



**Ballast water**

Ballast water is used to keep stability of a ship, and to facilitate loading and unloading cargos into a ship.

A ship without enough ballast water is very unstable

During cargo operation the height of ships is kept same by ballast water charging/discharging.

### Most harmful unwanted organisms in the world

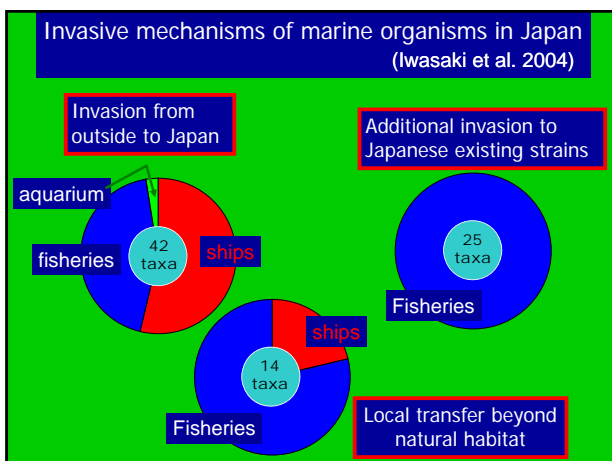
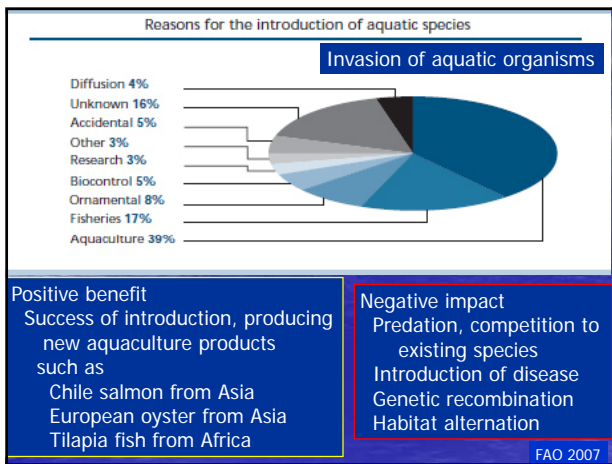
## Ten of the Most Unwanted

Marine plants, animals and microbes are being carried around the world attached to the hulls of ships and in ships' ballast water. When discharged into new environments, they may become invaders and seriously disrupt the native ecology and economy. Introduced pathogens may cause disease and death in humans.

The species presented here are for illustrative purposes only. Their introduced range may be greater than reported. There are countless other examples of invasive species throughout the world.

### Invaded area and their origin of 59 major cases (From Focus on IMO)

Origin	Invaded Area						Total
	Asia	Oce	N.Am	S.Am	Eur	Afr	
Asia	3	5	17	1	1	1	28
Oceania	0	0	1	0	0	0	1
North Am.	0	0	0	1	5	0	6
South Am.	0	0	3	0	0	0	3
Europe	1	1	15	0	0	1	18
Africa	0	1	0	0	2	0	3
<b>Total</b>	<b>4</b>	<b>7</b>	<b>36</b>	<b>2</b>	<b>8</b>	<b>2</b>	<b>59</b>



### Guidebook of aquatic invasive organisms

At the time of enforcement of law to prohibit bring the invasive organisms into Japan, this book was published.

Most of organisms in the book are those in freshwater environment, quite few in marine. Published in 2005.

**Table 1**  
World fisheries and aquaculture production

	2000	2001	2002	2003	2004	2005 <sup>1</sup>
<i>(Million tonnes)</i>						
<b>PRODUCTION</b>						
TOTAL CAPTURE	95.6	93.1	93.3	90.5	95.0	93.8
TOTAL AQUACULTURE	35.5	37.9	40.4	42.7	45.5	47.8
<b>TOTAL WORLD FISHERIES</b>	<b>131.1</b>	<b>131.0</b>	<b>133.7</b>	<b>133.2</b>	<b>140.5</b>	<b>141.6</b>

**Table 2**  
World fisheries and aquaculture production, excluding China

	2000	2001	2002	2003	2004	2005 <sup>1</sup>
<i>(million tonnes)</i>						
<b>PRODUCTION</b>						
TOTAL CAPTURE	78.6	76.6	76.7	73.8	78.1	76.7
TOTAL AQUACULTURE	10.9	11.9	12.6	13.8	14.9	15.4
<b>TOTAL FISHERIES</b>	<b>89.5</b>	<b>88.4</b>	<b>89.3</b>	<b>87.5</b>	<b>93.0</b>	<b>92.1</b>

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**International Convention for the Control and Management of Ships' Ballast water and Sediment**

Diplomatic Conference for Adoption: February 9-13, 2004 after 14 yrs. of complex negotiation

Marine Environment Protection Committee (MEPC) is now making 15 Guidelines referred to the Convention for uniform application of the conference.

<http://www.imo.org/HOME.html>  
Then "Convention" in the "Quick Links" and "Ballast Water Management", in order to know the outline of the Convention.  
Also Globallast Program homepage "<http://globallast.imo.org/>" is useful.

