



Global
Environment
Facility



2007 Black Sea TDA

General Comments

- Larger than 1996 TDA - contains information from a broader range of analyses
- Differently structured than 1996 TDA to help identify where individual pieces of information lie
- Major effort to gather available information
- 66 contributing specialists
- Blue boxes to compare changes with 1996 TDA

Structure

- Description of the Region
 - Socio-economic situation
 - Governance/management/stakeholders
 - Environmental status – water resources, chemistry & biology
 - Geography
 - Public perception
- Transboundary problems
- Hot-spots analysis
- Governance analysis
- Stakeholders analysis



Transboundary Problems

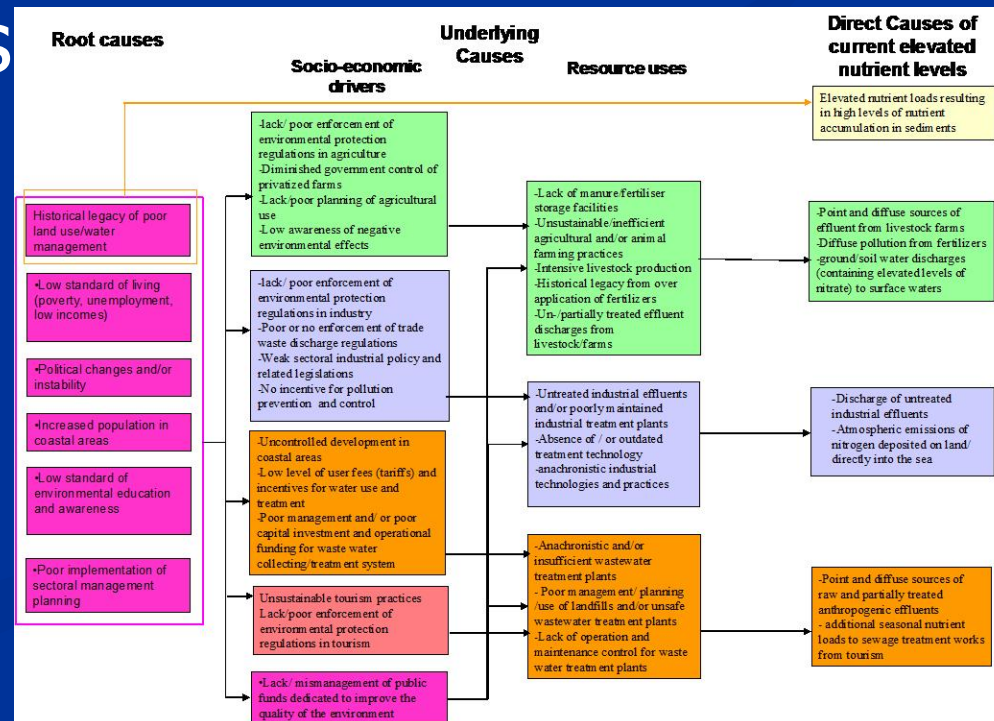
Transboundary Problem	Median Score	Priority
Decline in natural resources (e.g. fish stocks)	3.0	High
Nutrient over-enrichment/eutrophication	3.0	High
Chemical pollution	3.0	High
Habitat and biodiversity changes	2.0	Moderate
Alien species introduction	2.0	Moderate
Coastal erosion	1.0	Low
Changes in the flow regime of rivers	1.0	Low

Problems - Contents

- Description
- Env't'l impacts and socio-economic implications
- Linkages with other problems
- Causal chain analysis

- Immediate
- Underlying
- Root

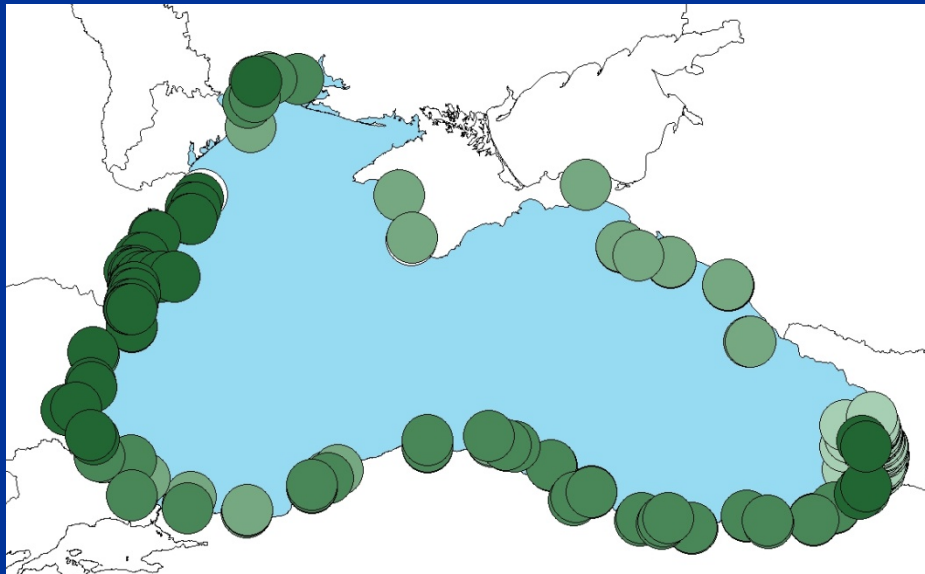
- Knowledge gaps



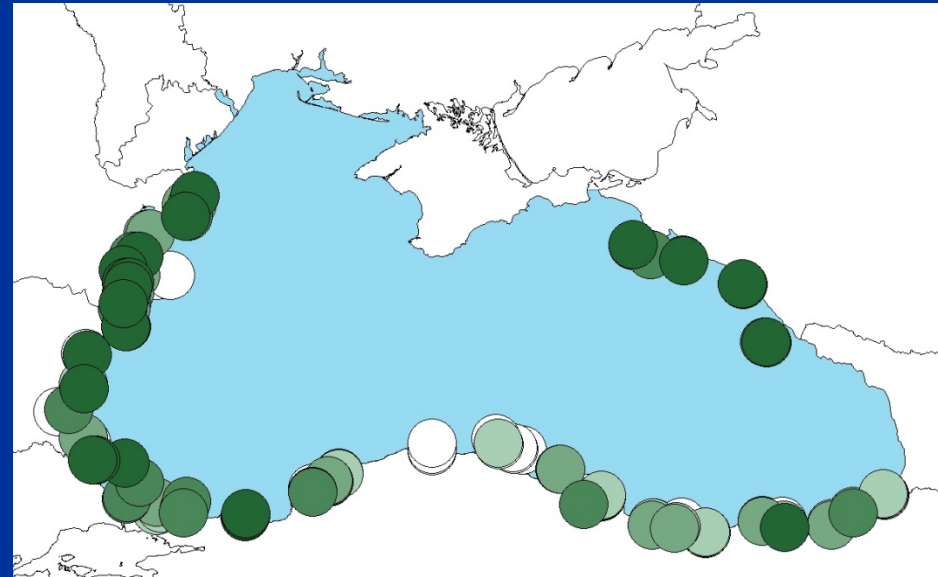
Eutrophication (1)

 Nutrient concentrations:

Nitrate



Phosphate



Eutrophication (2)

Nutrient budget (tonnes):

Nutrient source (tonnes)	DIN	%DIN	PO ₄ -P	%PO ₄ -P
Direct discharges from large UWWTPs	6,120	1	2,150	8
Direct discharges from large industrial sources	1,180	0	250	1
River loads	497,590	52-68	20,043	70
Istanbul Strait	29,000	3-4	6,000	21
Kerch Strait	?	?	?	?
Atmospheric deposition	203,040-431,460	28-45	0	0
Total	736,930-965,350	100	28,443	100


Eutrophication (3)

- 60% of DIN and 70% of PO_4 from rivers
- Direct discharges from large municipal/ industrial plants are only 2% of the river DIN and 13% of the river PO_4 load
- The Danube accounts for about 88% of the river DIN load and 50% of the PO_4 load
- Atmospheric deposition of N may approach river loads
- Need to update/harmonise monitoring protocols

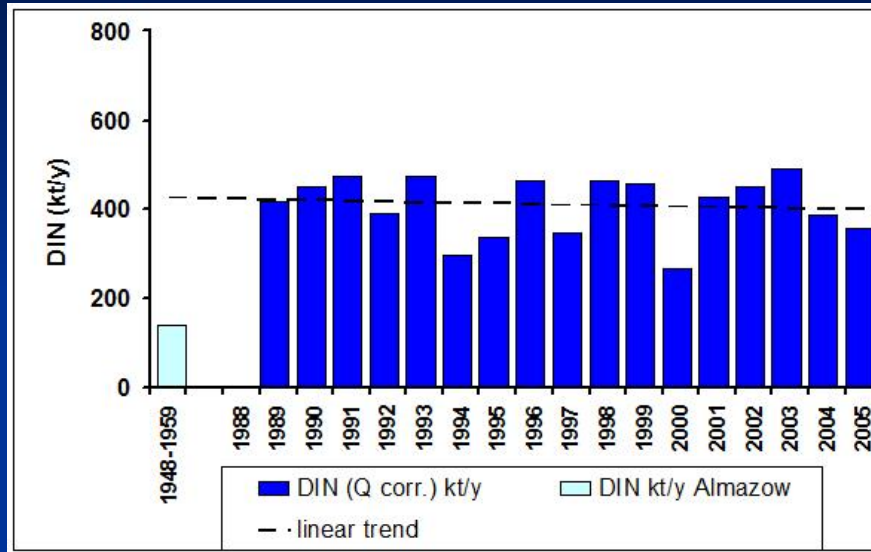
Eutrophication (4)

- 60% of DIN and 70% of PO_4 from rivers
- Direct discharges from large municipal/ industrial plants are only 2% of the river DIN and 13% of the river PO_4 load
- The Danube accounts for about 88% of the river DIN load and 50% of the PO_4 load
- Atmospheric deposition rates of N may approach river loads
- Need to update/harmonise monitoring protocols

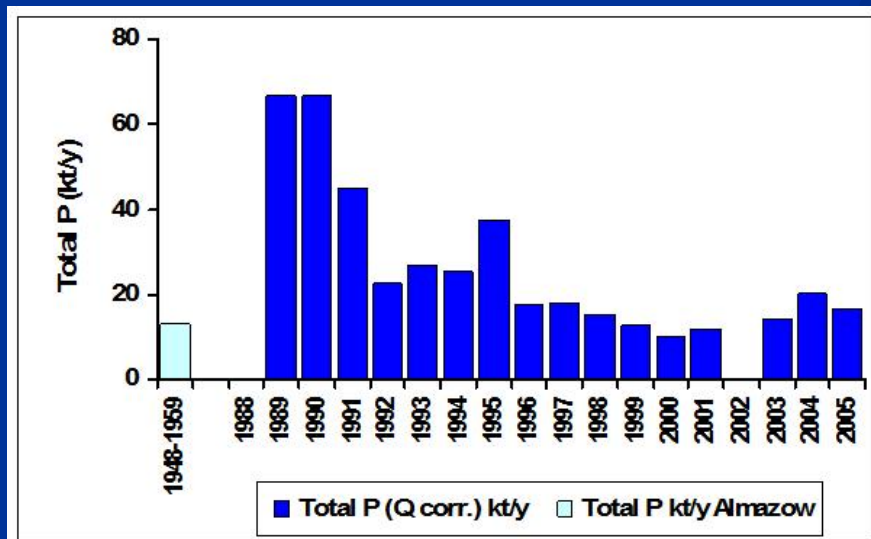
Eutrophication (5)

 Nutrient emissions to the Danube have been substantially reduced over the last 15 years: nitrogen emissions by about 20% and phosphorus by almost 50%



DIN

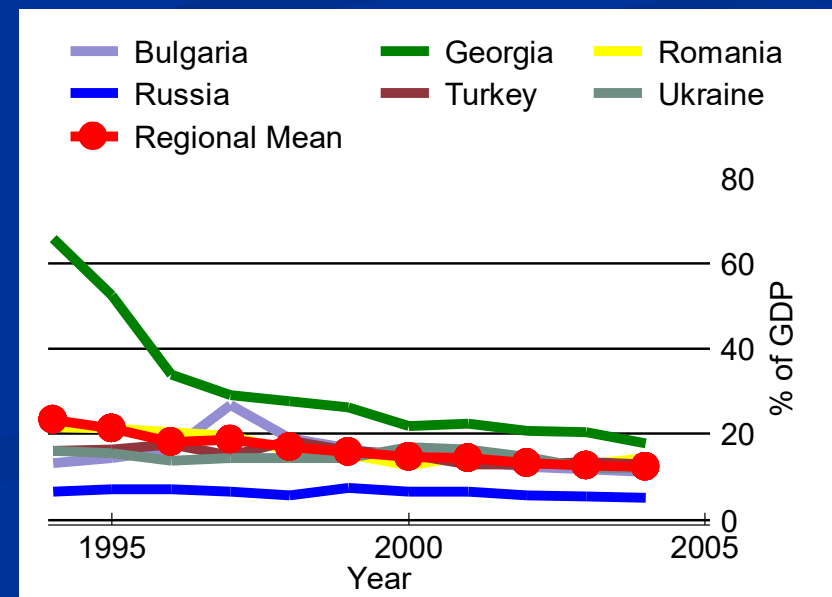


Total P



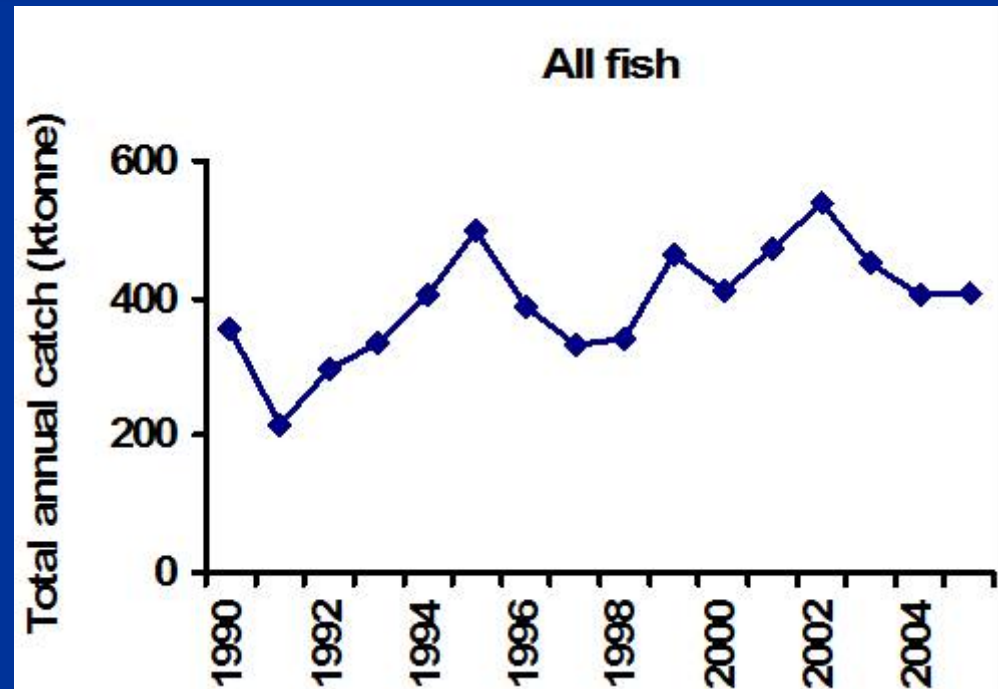
Eutrophication (6)

-  Livestock numbers in 2004 were about two-thirds of those present in 1997, and about one-third of the numbers recorded in 1998
-  Likewise, inorganic fertiliser application rates in Romania in 2004 were about one-third of what they were prior to the collapse of the Soviet Union



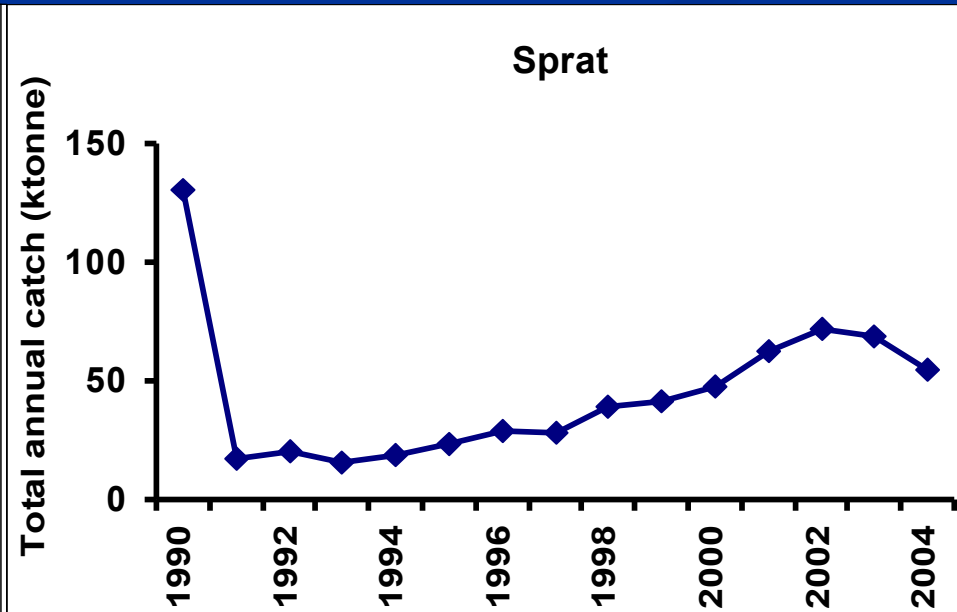
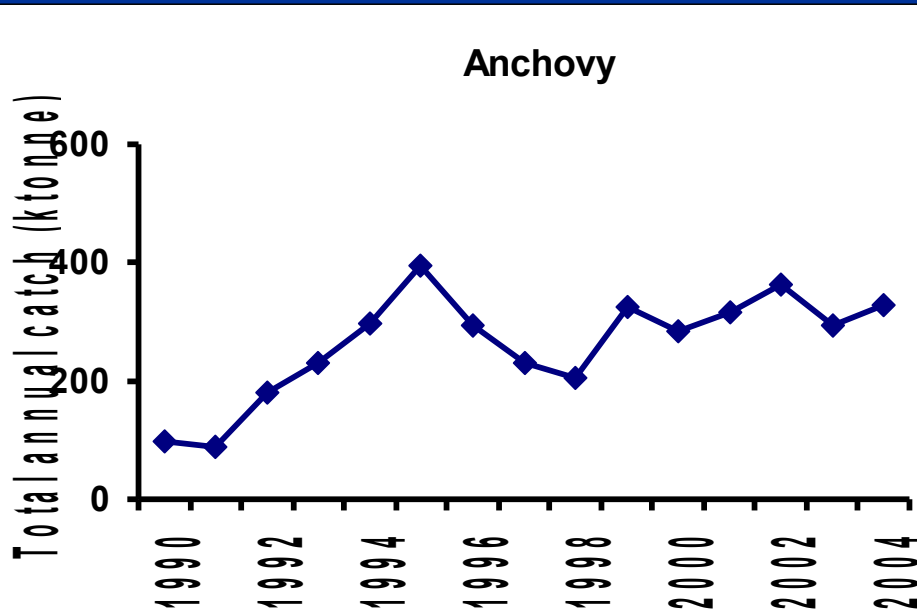
Changes in MLR (1)

- Turkey responsible for ~80% of total Black Sea catch
- Total landings appear to be increasing; still only about half the levels recorded in the 1980s



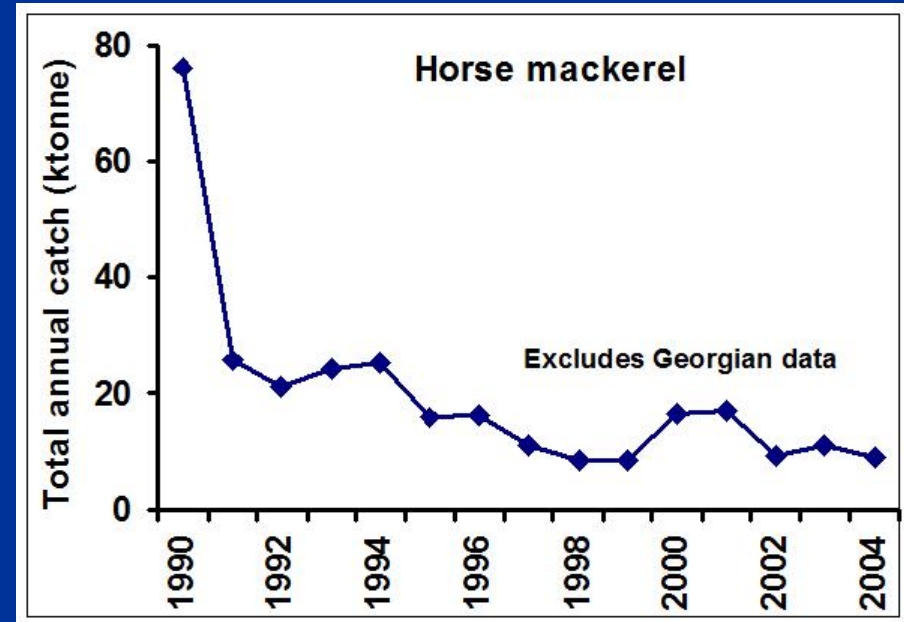
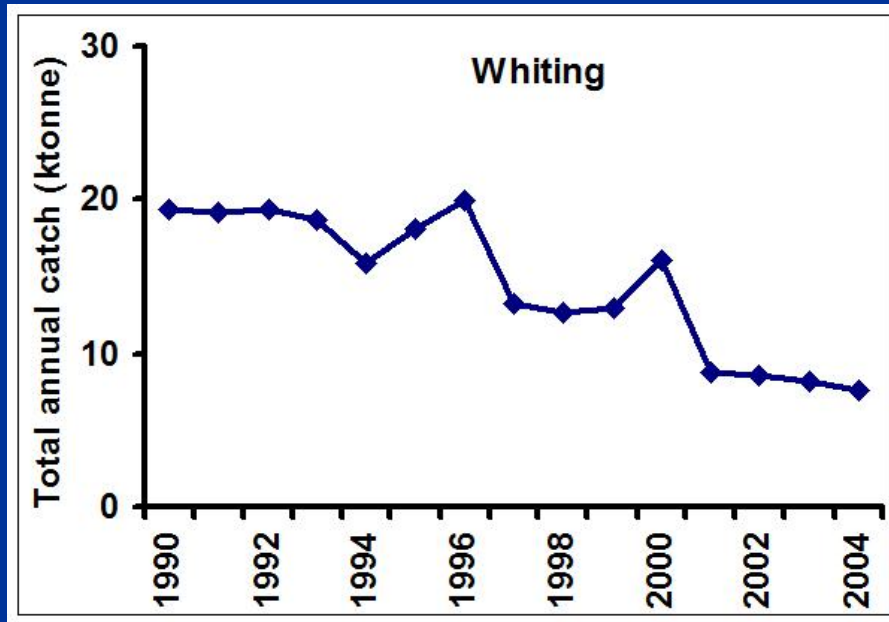
Changes in MLR (2)

Picture is not as rosy as previous slide suggests - landings of some species increased (e.g. anchovy, sprat)



Changes in MLR (3)

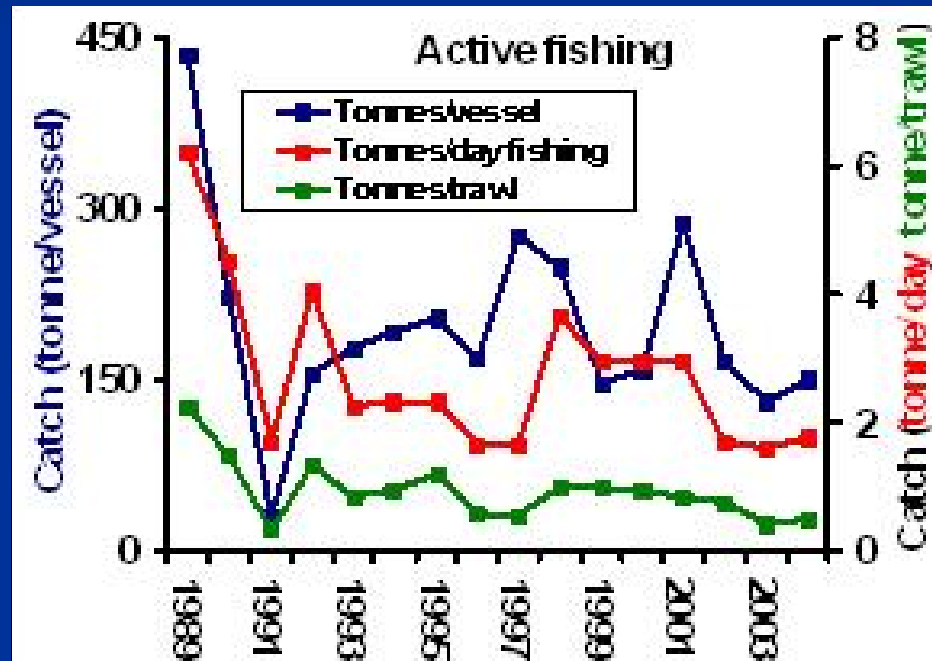
But landings of other species have decreased (e.g. whiting, horse mackerel)



Moreover, landings data underestimate catches

Changes in MLR (4)

- Catches/landings tell a very incomplete story; fishing effort has to be considered



Changes in MLR (5)

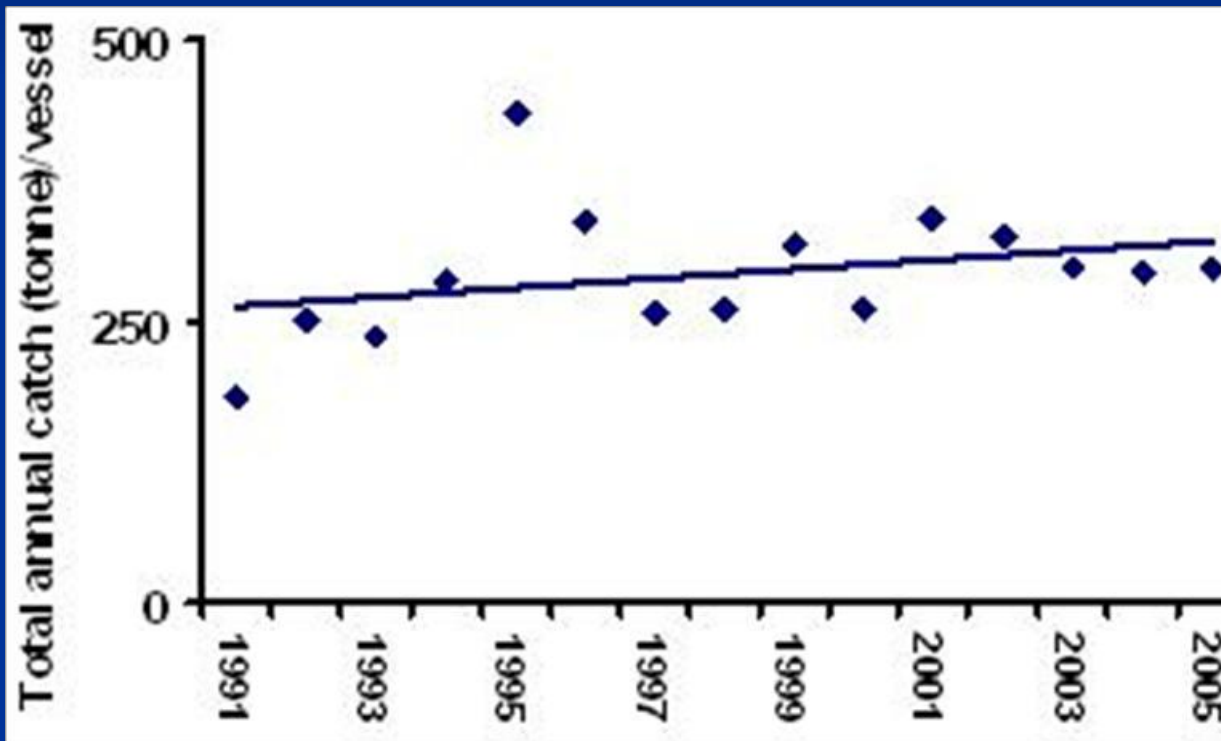
So do changes in types of fishing gear used



Romanian data

Changes in MLR (6)

🌐 No useful regional measure of unit effort



Vessels >12 m

Changes in MLR (7)

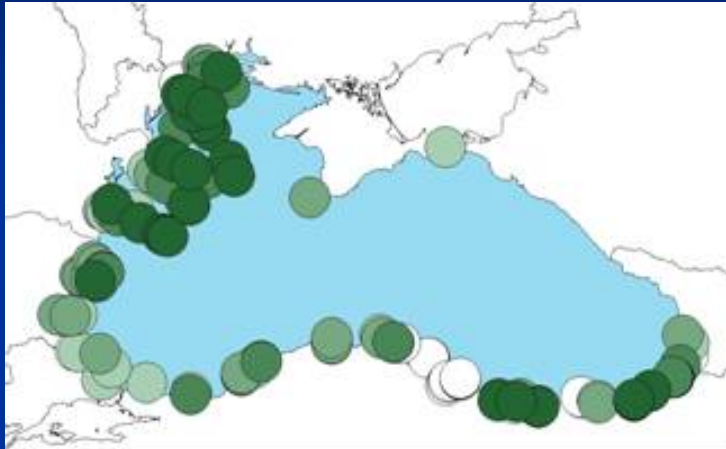
- Some countries set TACs, but landings data is questionable and illegal fishing is a problem
- Exacerbated by a lack of regionally agreed national fishing zones in all Black Sea countries
- No regionally agreed stock assessment methodology
- Existing national stock assessments are often out of date

Chemical Pollution (1)



Status maps:

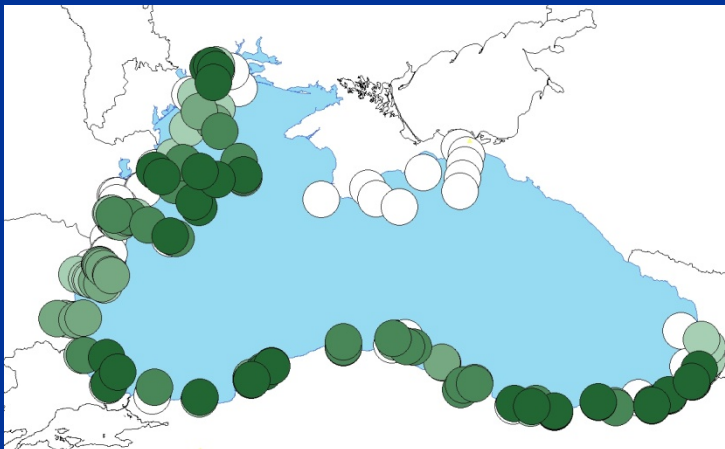
Chromium



Copper



Total Organic Carbon



Total HCHs



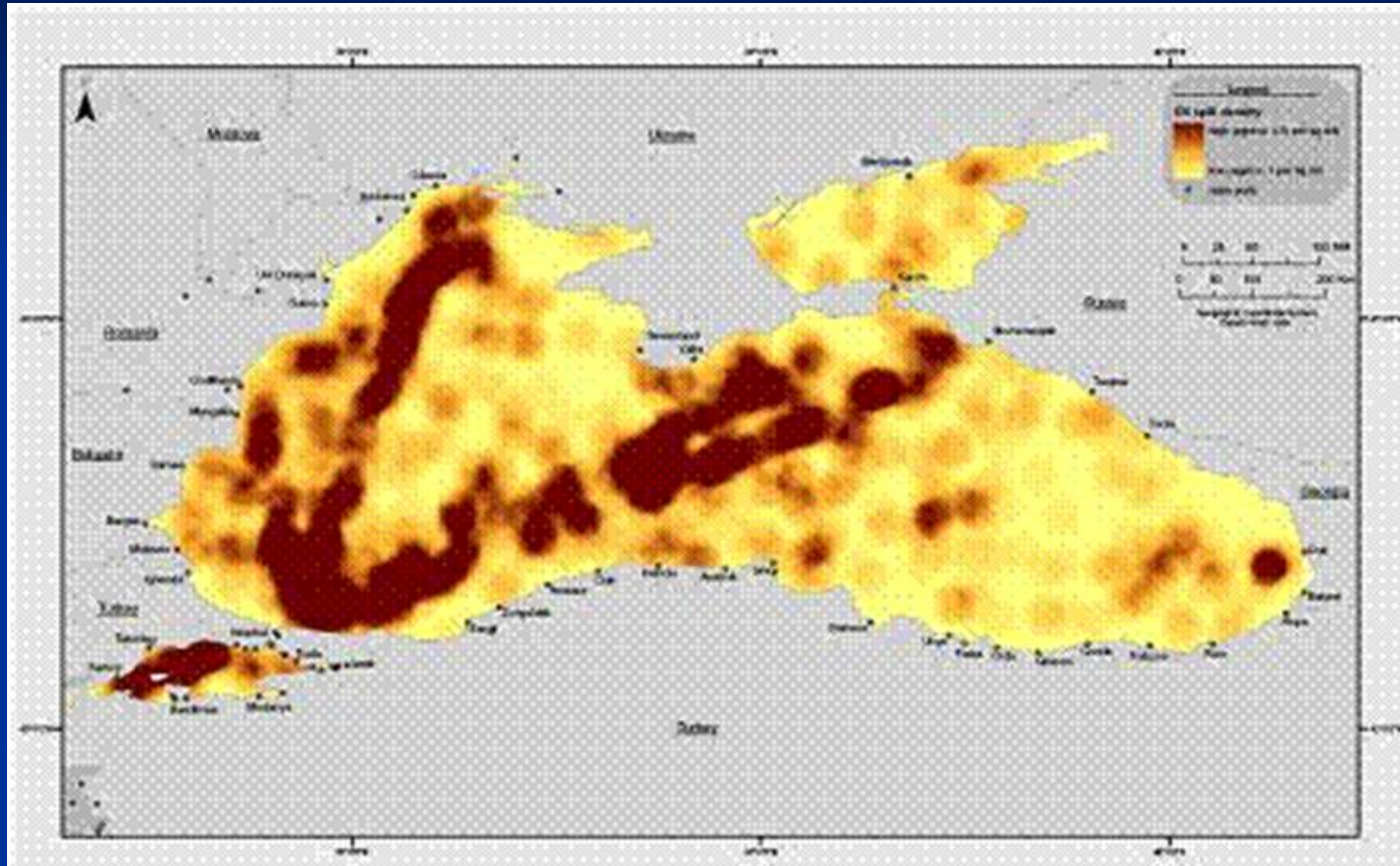
Chemical Pollution (2)

- Chemical pollution underlies the transboundary biological problems
- Loads data is too inconsistent to present a regional overview, except for BOD
- Monitoring data, particularly for organics, requires a huge amount of work
- BSIMAP is not working. Some countries very good; others much worse

Chemical Pollution (3)

- Emphasis of monitoring should be on concentration monitoring in the Sea
- Very little bioaccumulation/body burden data available
- Concerns raised over some POPs
- Geological origins of some heavy metals
- Local investigations required to identify sources
- Increased concerns over oil from shipping and offshore installations

Chemical Pollution (4)



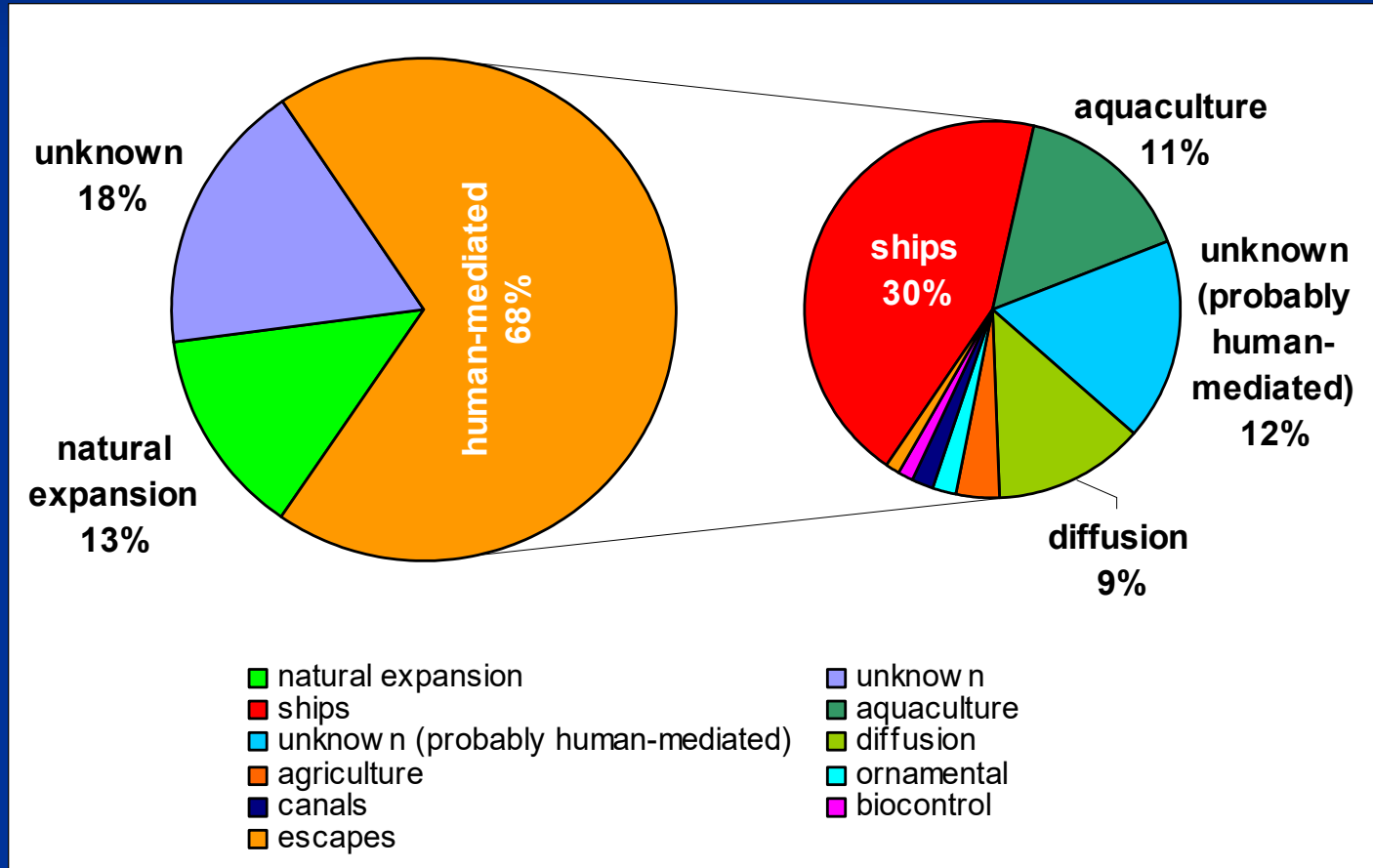
🌐 Suite of recommendations made to help target priorities for the Black Sea

Biodiversity/Habitat Changes (1)

- Alien introductions have continued unabated (48 new spp. identified between 1996 and 2005)
- Now 217 registered alien species: half are permanently established and a quarter highly or moderately invasive
- Coastal development and non-sustainable fisheries practices are seen as the major physical causes of habitat damage
- Shipping and aquaculture are the primary vectors of alien species introductions

Vectors of Introduction

By far the most important routes of introduction are shipping and aquaculture



Biodiversity/Habitat Changes (2)

- All 5 coastal margin habitats are in a critical status in at least one country
- benthic pelagic habitats are critical in at least one country
- 13 of 37 types of benthic habitat are considered to be critical in at least one country
- Those habitats most at risk include the neritic water column, coastal lagoons, estuaries/deltas and wetlands/saltmarshes

Biodiversity/Habitat Changes (3)

- The huge reductions in areas of *Phyllophora* and *Zostera* have greatly reduced biodiversity
- Alien species introductions have also reduced biodiversity substantially
- Recent and obvious improvements have occurred in the NW Shelf
- Eutrophication has been greatly underestimated as a contributory factor to reduced biodiversity

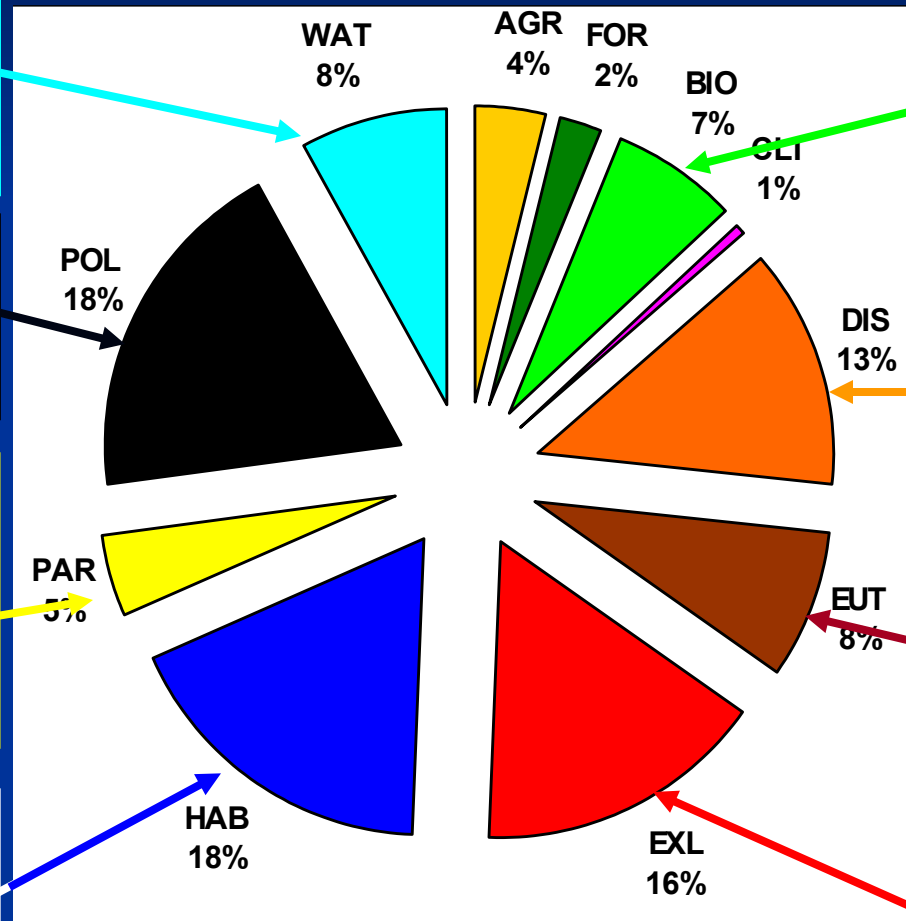
Threats to Red List Species

Water reg'n
land reclam'n

Chemical
pollution

Parasites,
diseases,
competition

Habitat
destruction



Biological
character'ics

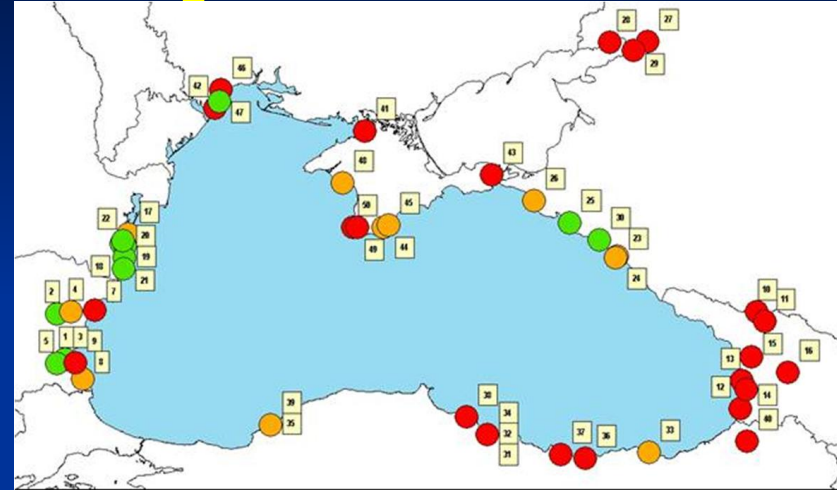
Disturbance
tourism

Eutrophic'n

Over-
exploitation

Hot-Spots Analysis

- 12 have been completed
- 2 are no longer required
- 10 Work in progress
- Over half have no plans for completion or only partial investments have either been or are planned to be made
- By the end of 2005 at least \$143 million had been spent, with a further \$340 million planned to be spent by the end of 2015



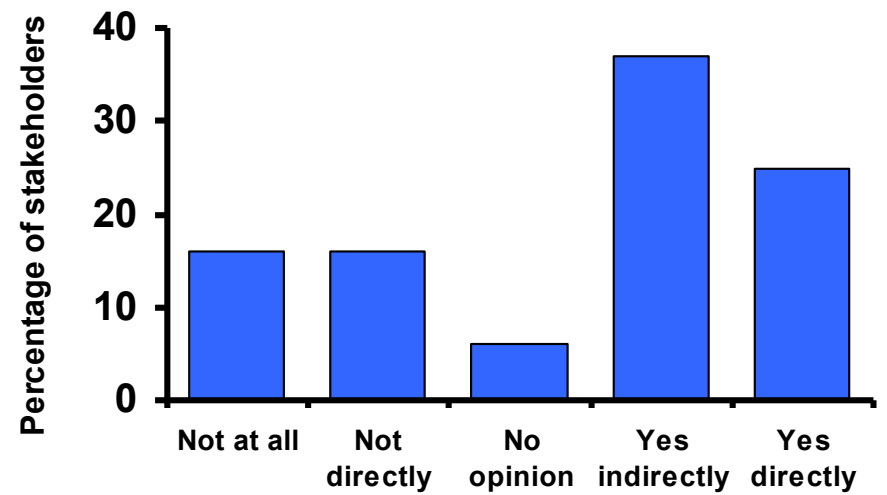
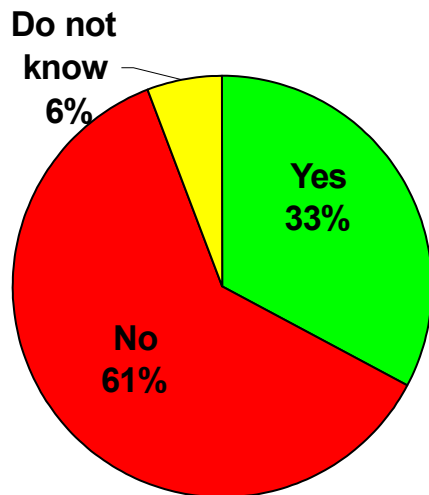
Stakeholders Analysis (1)

435 survey returns

42 stakeholder groups

Is the Black Sea healthy?

Are you responsible for the health of the Black Sea?



Stakeholders Analysis (2)

- Ranking of major transboundary problems:
 - 1st Chemical pollution
 - 2nd Changes in marine living resources (fisheries)
 - 3rd Changes in biodiversity
 - 4th Nutrient enrichment/eutrophication
- Information dissemination is critical
- Surprisingly high amount of willingness for Stakeholders to be actively involved in environmental protection