

ROMANIAN INVOLVEMENT IN THE BLACK SEA MANAGEMENT - SCIENTIFIC AND POLITICAL TOOLS (1990-2005): THE CASE STUDY OF THE NATIONAL INSTITUTE FOR MARINE RESEARCH AND DEVELOPMENT “GRIGORE ANTIPA”

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Abstract. The Romanian involvement in Black Sea research, monitoring and co-operation activities is reviewed. Literature selection mainly included references of local / national and regional relevance, possibly those less widely acknowledged internationally. The article provides an examination of the following main concerns and achievements of the National Institute for Marine Research and Development “Grigore Antipa” Constanta: recent ecosystem changes and trends in transitional and coastal waters; integrated coastal zone management approaches; integrated monitoring of the marine and coastal environment; implications of and contributions to most Black Sea-related conventions, declarations, and agreements; co-operation with relevant international and Black Sea-related organisations; successful participation in joint programmes / projects and commitments to various major environmental issues (e.g., reports, management plans, National Action Plans, technical / juridical documents, implementation of EU directives). A slight but continuous improvement in the state of the marine environment in the Romanian sector has been observed since the 1990s compared to its previous status. Further cooperation is obviously necessary in all the afore-mentioned areas with the Danube countries and with the Black Sea coastal states; international expertise is strongly needed and recommended.

Key words: Black Sea; Romanian coast; ecosystem; research; monitoring; co-operation

1. INTRODUCTION

As a consequence of the severe environmental problems, the Black Sea has been defined as one of the most critical marine areas in the world, where it may even be too late for joint action aiming at the recovery of the ecosystem. The characteristics of the Black Sea, its long overturning period, the large amount of the annual discharge from its tributaries, and the habits of the population living in its drainage basin, formed the basis of the arguments on the impossibility for remediation and the irreversibility of the environmental situation (Istemil, 2003). The Black Sea states finally met in 1985 in an attempt to negotiate a legal convention to protect the sea, modelled along the lines of the Barcelona Convention, forerunner of the Mediterranean Action Plan. All six Black Sea states signed the Convention on the Protection of the Black Sea Against Pollution, known as the Bucharest Convention, in April 1992. The aim of this convention was the protection of the marine environment against pollution.

Two months after the Bucharest Convention, the United Nations Conference on Environment and Development (UNCED) held in Rio de Janeiro, Brasil, on 3-14 June 1992 developed a breakthrough for the future orientation of environmental policy at global, regional and national levels. The major output of the Conference, Agenda 21, describes actions covering a series of new approaches as the integrated ecosystem approach. In this way the protection area was extended to the coast resulting in the Integrated Coastal Zone Management (ICZM) principle. The first legal document that fit in the Rio principles and ICZM was the Odessa Declaration signed in April 1993 by the six coastal countries. According to this Declaration the countries committed themselves to work consistently towards the rehabilitation of the Black Sea ecosystem (Odessa Declaration, 1993). The six states immediately requested help from UNEP in designing an action plan and made a formal request to the Global Environment Facility (GEF), which established ecosystem-based priorities for cross-border issues, to support the process both techni-

cally and financially, under the "Black Sea Environmental Programme" (BSEP) (Strategic Action Plan for the Rehabilitation and Protection of the Black Sea, 1996; Black Sea Transboundary Diagnostic Analysis, 1997).

Major reviewed international reference documents emphasizing the need for long-term sustainability of marine environments and wise use of their resources, including the Black Sea, are:

- the UN Convention on the Law of the Sea (UNCLOS),
- the UNCLOS Report "The marine environment. Are we destroying the Oceans?" which states that "the state of the world's ocean continues to deteriorate" with special emphasis on destruction of marine environments, pollution and over-exploitation of non-living and living resources, and
- the Johannesburg Summit Report (2002).

Other related references are contained in:

- the Washington Declaration on the Protection of the Marine Environment from Land-based Activities,
- the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA),
- the International Convention on Biodiversity, and
- the concept of Large Marine Ecosystems (LMEs) including the Black Sea as No. 62 on LME's map of World and Linked Watersheds (Damon, 2002).

Increasing and more integrated attention has been paid at national, regional and international level to environmental issues of the Black Sea since 1990 (e.g. Zaitsev, 1997; Hobson and Mee, 1998; Gable, 2000; Meinier, 2002a, b); this has been particularly so in ecosystem research (Bologa, 2001a; Reynolds, 2002), development of integrated quality monitoring (Bologa and Patrascu, 1997; Piescu *et al.*, 1997; Bologa *et al.*, 1999; Bologa, 2003/2004; Bologa and Costache, 2004; Romeo *et al.*, 2005) and strengthening of regional cooperation (Bologa, 2000).

2. SCIENTIFIC RESEARCH

The oneness of the Black Sea has been emphasized by various authors, starting with N. M. Knipovich (1862-1939) – "unicum hydrobiologicum" (Knipovich, 1933), G. Antipa (1867-1944) – "... the Black Sea, because of entirely different conditions from those prevailing in other seas represents a real natural laboratory..." (Antipa, 1941), or more recently Jane Lubchenco – "The problems of the Black Sea are not so different as elsewhere, but they are more obvious, in part of isolated, contained nature of the Black Sea" (Lubchenco, 1997).

Scientific research around the Black Sea proved that the state of its ecosystem has changed dramatically and related to the hydrographic basins (Fig. 1) of its major tributary rivers (Danube, Dnieper, Don, Dniester, Bug). These rivers drain an area five times larger than the Black Sea surface itself - including economic activities of over 165 million people – contributing to the Black Sea's present ecological state with about 350 km³ of river water every year (Bologa, 2003). The Danube

River basin accounts for half of the Black Sea catchment area ! Therefore, taking responsibility for the health / disease, or ecological equilibrium / disequilibrium of the Black Sea has to be shared by all 17 riverine countries, and not simply by the six coastal states (Fig. 2). So, the most important contemporary environmental constraints of the Black Sea, still considered to be "the most seriously degraded sea on our planet" (GEF, 1992), consist of severe ecosystem changes in the following respects:

- coastal erosion,
- eutrophication / pollution,
- decline of biodiversity,
- loss of living resources,
- degradation of landscapes.

All of them maintain the necessity of developing national ICZM strategies, preferably in accordance with EU provisions and requirements.

These concerns were also exacerbated by the opening of the Rhine – Main – Danube shipping channel in 1992 (Bologa and Seceleanu, 2002) and first segment of the Danube – Black Sea Chilia – Bystroe shipping channel in 2004.

Nevertheless, a most recent review of the National Institute of Marine Research and Development "Grigore Antipa" (NIMRD), Constanta / Romania, revealed a slight but continuous improvement in the state of the N-W Black Sea ecosystem (Romanian coastal waters) during the last two decades (Nicolaev *et al.*, 2004), compared to its earlier status (Bologa *et al.*, 1995 ; Zaitsev and Mamaev, 1997; Petranu *et al.*, 1999).

3. ENVIRONMENTAL QUALITY MONITORING

The environmental quality of the Black Sea has to be assessed through an *integrated monitoring*, by a macrosystemic understanding (Danube – Danube Delta – Black Sea), continuously developed at national and regional level, up to its recognised EU dimension (Water Framework Directive, Bathing Waters Directive, Habitats Directive, Shellfish Directive, etc.). This approach is consistently supported by UNCLOS + Agenda 21, UN Framework Convention on Climate Change, Convention on Biological Diversity, FAO Code of Conduct for Responsible Fisheries, Straddling Stocks Agreement, GPA for the Protection of Marine Environment from Land-based Activities, Integrated Maritime Enforcement and National Integrated Maritime Enforcement.

Permanently monitored parameters around the Black Sea refer to climate change, global warming and sea level rise, coastal erosion, pollution originating from the atmosphere and land-based sources, and biodiversity / living resources; usually, nutrients, heavy metals, radionuclides, petroleum hydrocarbons, persistent organic substances, litter and sewage are monitored basin-wide (e.g. Bologa, 2003/2004).

According to the BS-SAP (1996) "the state of the Black Sea environment continues to be a matter of concern due to the ongoing degradation of its ecosystem and the unsustain-

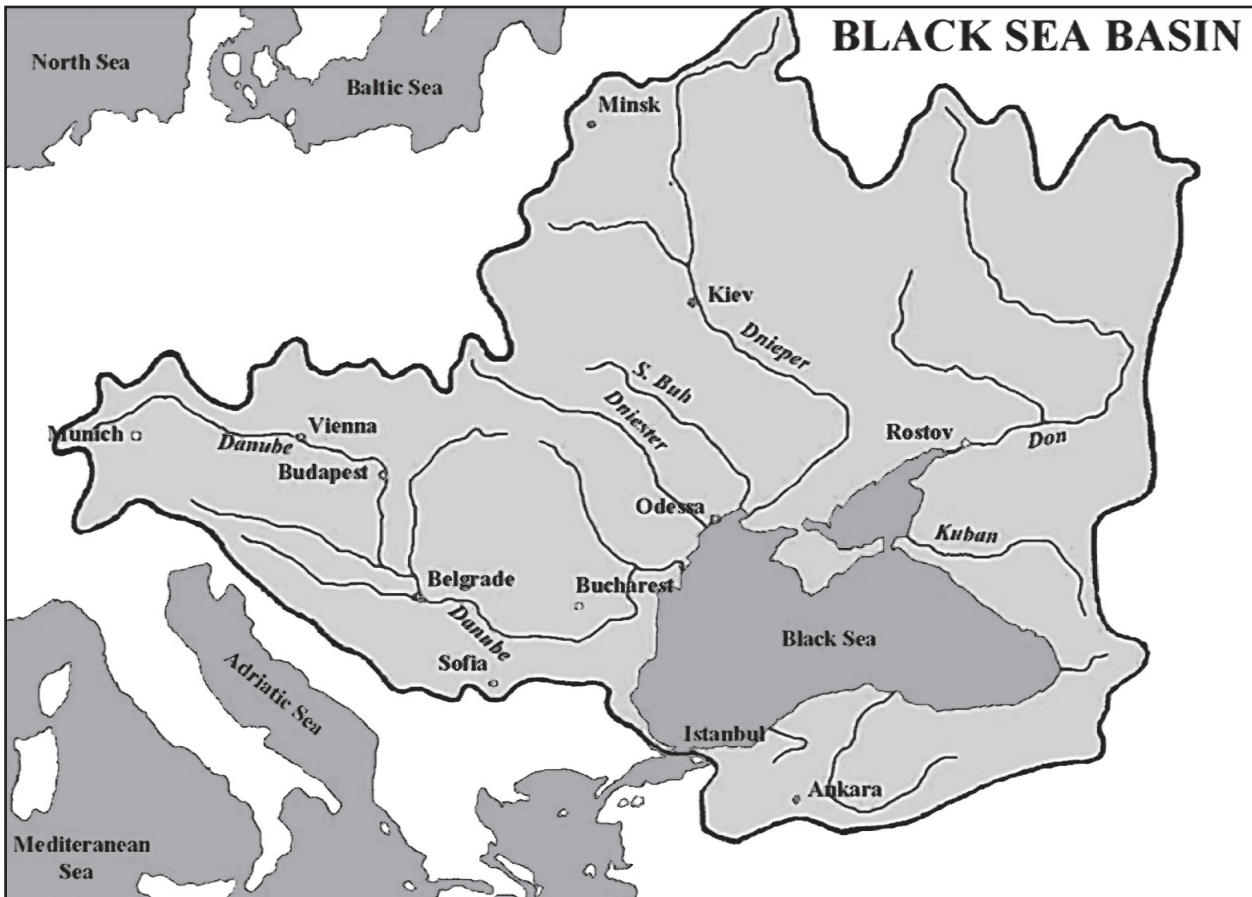


Fig. 1 The Black Sea basin



Fig. 2 The Black Sea and its coastal states

able use of its natural resources" (Strategic Action Plan for the Rehabilitation and Protection of the Black Sea, 1996); this consideration referred to levels / loads of chemical, oil, micro-(bacterial) and biological pollution.

Both the GEF / Black Sea and Danube conventions increase the countries capacity of monitoring specific ecosystems and assess effects of pollution, identify and assess main land-based (point and non-point) pollution sources, develop Transboundary Diagnostic Analysis (TDA), develop and approve Strategic Action Plans (for the Black Sea and Danube), and identify and develop investment portfolios.

Examples of related successful achievements consist of the inventory and assessment of land-based pollution sources (1996), the Black Sea Transboundary Diagnostic Analysis (1997) and the Black Sea Pollution Assessment (1998).

In the above-mentioned Bucharest Convention, pollution of the marine environment has been defined as "...the introduction by man, directly and indirectly of substances or energy into the marine environment, including estuaries, which results in or is likely to result in such deleterious effects as harm to living resources and marine life, hazards to human health, hindrance to marine activities, including fishing and other legitimate uses of the sea, the impoverishment of quality of sea water and reduction of amenities".

The GEF / Black Sea Environmental Programme related Strategic Action Plan for the Rehabilitation and Protection of the Black Sea (1996) states under the Assessment and Monitoring of Pollutants, 54: "A Black Sea Monitoring System based upon measuring biological effect and the measurements of key contaminants, will be established in accordance to the Bucharest Convention. It will consist of the integration of obligatory *national monitoring programmes*, to be included in the National Strategic Action Plans, and an independent quality assurance system. It is advised that the Istanbul Commission develop such a *quality assurance system* through its Advisory Group on Pollution Monitoring and Assessment, by 1998".

In Romania "NIMRD is the technical operator of the national network for physical, chemical and biological monitoring of national marine and coastal waters and of surveillance of coastal erosion, entitled to submit to the Ministry of Waters and Environment Protection proposals for marine environmental regulations" (HG 686 / 1999). Within the National Integrated Monitoring System (NIMS) dating back to 1975, four categories (physical, chemical, biological & micro-biological and biomarkers) of over 30 parameters are monitored in emerged / submerged sediments, sea water and biota (Fig. 3). The objectives of NIMS consist of :

- the assessment of the health state of the Black Sea ecosystem;
- the assessment of evolution trends of marine environment quality;
- the preparation of policies and measures of protection and rehabilitation;

- the estimation of effect and efficiency of protection measures;
- maintaining standards, agreements and permits issued by environmental authorities;
- the fulfilment of government obligations imposed by international programmes and conventions of which Romania is a signatory or a participant;
- the adaptation to EU legislation.

4. REGIONAL COOPERATION

In the 1970s, significant signs of ecosystem deterioration started to appear in the Black Sea but it was only after 1992 that programmes, for the management of the Black Sea environment and for the rehabilitation of its ecosystem, were established.

The legal instruments used at national, regional and international level for solving the environmental problems of the Black Sea are different. The new environmental policy developments are the ICZM approach and the establishment of the Permanent Secretariat of the Black Sea Commission in 2000. The Secretariat has the important role of coordinating all activities at local, national and regional level.

Various Black Sea conventions / declarations / agreements sustain the progressive strengthening of regional cooperation between Black Sea coastal states, other countries and international organisations:

- Black Sea Fishery Convention (1958);
- Convention on the Protection for the Black Sea Against Pollution (Bucharest Convention) (1992);
- Odessa Declaration (1993);
- Strategic Action Plan for the Rehabilitation and Protection of the Black Sea / Istanbul, (1996);
- Agreement on the Conservation of Cetaceans of the Black Sea; Mediterranean Sea and Contiguous Atlantic Area – ACCOBAMS (Monaco, 1996);
- Ministerial Declaration / Monaco (1998);
- Declaration of Sofia Ministerial Conference (2002);
- Convention on the Fisheries and Management of Black Sea Living Resources (in preparation);

all of them now closely in accordance with the International Commission for the Protection of the Danube River (ICPDR).

Numerous national, regional and international organizations contributed to the present development of capacity building / institutional infrastructure in the Black Sea area, mainly CIESM, IOC, UNEP, UNDP, FAO, NATO, CECAF, IAEA, IMO, ESRB, IUHPS, as well as more recently:

- Commission on the Convention for the Protection of the Black Sea Against Pollution (Black Sea Commission);
- Permanent Secretariat of the Commission (Istanbul, 2000);
- GEF / Black Sea Environmental Programme (BSEP);
- Programme Implementation Unit (of BSEP)
 - six Advisory Groups,

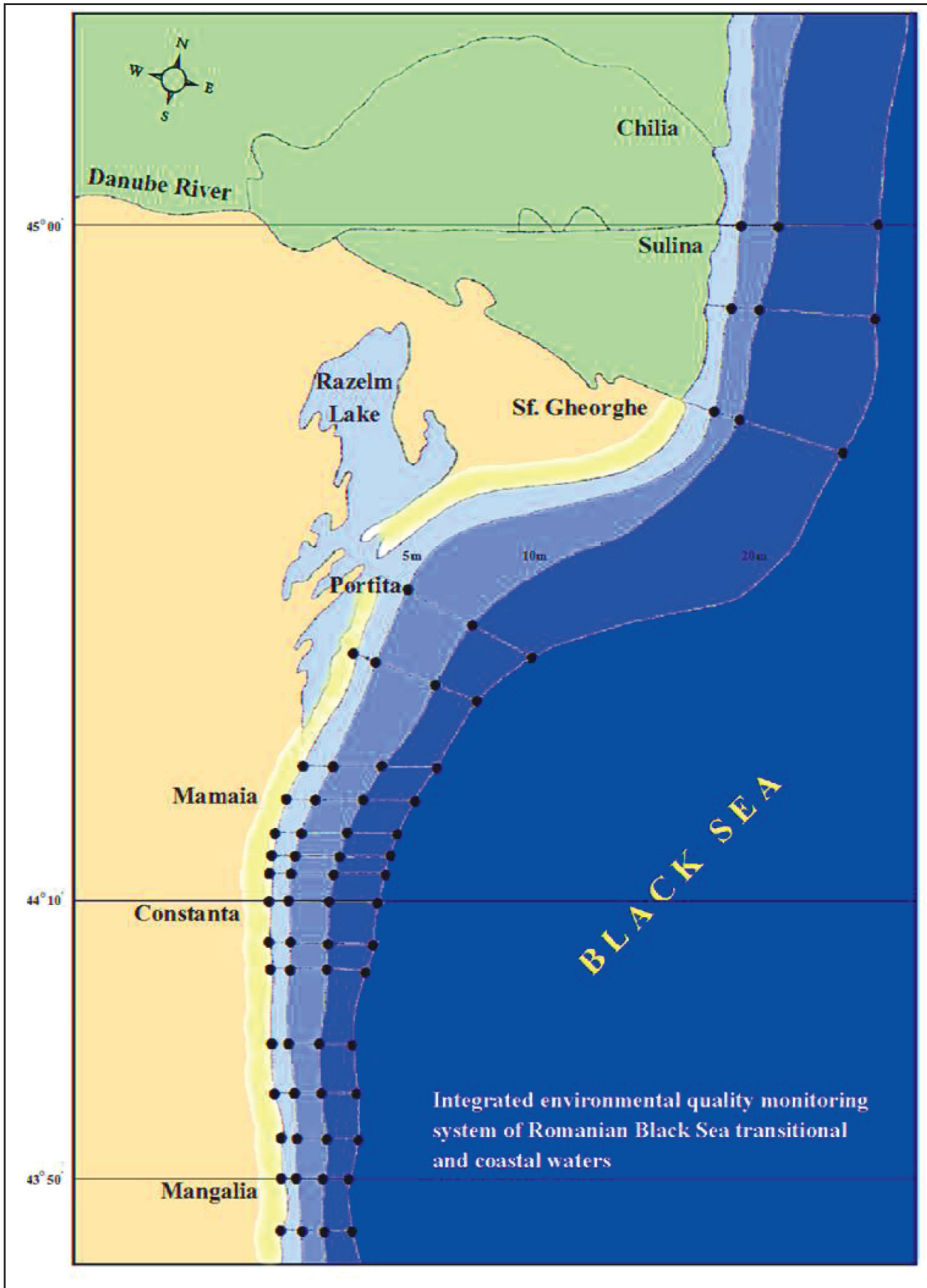


Fig. 3 The NIMRD integrated monitoring system

- Ad Hoc Working Group on Water Framework Directive (WFD);
- Activity Centres + National Focal Points
 1. Development of Common Methodologies for Integrated Coastal Zone Management,
 2. Pollution Monitoring Assessment,
 3. Control of Pollution from Land Based Sources,
 4. Conservation of Biological Diversity,
 5. Environmental Aspects of Fisheries and Other Living Resources Management,
 6. Environmental Safety Aspects of Shipping;
- International Centre on Water Research in the BSEC region (Kiev / Ukraine);
- International Centre for Black Sea Studies (Athens/ Greece);
- IOI – Black Sea Operational Centres (Constanta/Bucharest/ Romania and Sevastopol / Ukraine);
- IOC – Regional Black Sea Centre (Varna / Bulgaria);
- MEDCOAST (Ankara / Turkey);
- Balkan Environmental Association (Thessaloniki/ Greece).

Concrete achievements / outputs / references consist of the Black Sea Environmental Programme (BSEP), BS-SAP, BS-TDA / based on National Black Sea Action Plans, monographs (Antipa, 1941; Mee and Topping, 1998; Besiktepe *et al.*, 1999), data bases (Ivanov *et al.*, 1998), GEF Strategic Partnership Approach / 2001, Partnership Investment Facility, EC / Declaration on Water and Water-Related Ecosystems in the Wider Danube and Black Sea (DABLAS) Task Force (Black Sea Commission + ICPDR).

Relevant ongoing Black Sea related research (pollution), monitoring and networking projects proved successful basin-wide with respect to the exchange of experience, results and information:

- European sea level system (ESEAS);
- Nutrient management in the Danube basin and its impact on the Black Sea (DANUBS);
- Mediterranean and Black Sea Mussel Watch (MED-WATCH);
- Conservation of dolphins in Romanian waters of the Black Sea (LIFE NATURA);
- A regional capacity building and networking programme to upgrade monitoring and forecasting activity in the Black Sea basin (ARENA);
- A Pan-European network for ocean and marine data and information management (SEA-SEARCH);
- International action for sustainability of the Mediterranean and Black Sea environment (IASON);
- European lifestyles and marine ecosystems (ELME).

Examples of new projects under preparation are:

- Coastal state and dynamics (COSTAS);
- A supporting programme for capacity building in the Black Sea region towards operational status of oceanographic services (ASCABOS);
- Black Sea Scientific Network (SCENE);

- Science and policy integration for coastal ecosystem sustainability (SPICES).

Romanian involvements and initiatives, with respect to participation in joint programmes / projects, establishments, responsibilities, consist in recent NIMRD commitments to Black Sea environmental issues such as:

- elaboration of Annual reports on the state of marine and coastal environment (chapter 4 of National "Report on the state of environmental factors in Romania" with reference to EU decisional indicators / state, pressure, impact, response since 2004);
- contribution to Management Plan of the Danube River, Danube Delta, hydrographic basin of Dobrudzha and coastal waters (under the coordination of National Administration "Romanian Waters");
- elaboration of ICZM related technical-juridical documents (mainly for Ministry of Waters and Environmental Protection);
- National Action Plan for dolphin conservation in coastal waters;
- biological component of National Action Plan minimizing the transfer of harmful marine and pathogene organisms in ballast waters in the Black Sea region;
- implementation of EU Directives (WFD, Bathing Waters, Habitats, Shellfish);
- implication in assessment of consequences / effects of Chilia – Bystroe Danube – Black Sea shipping channel;
- custodian of Marine Reserve 2 Mai – Vama Veche (Southern Romanian littoral);
- Vice-presidency of the Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and Contiguous Atlantic Area (ACCOBAMS);
- residence of:
 - Romanian National Committee of Oceanography (National Commission of Romania to UNESCO);
 - Permanent Technical Secretariat of National Coastal Zone Committee;
 - GEF / Black Sea Environmental Programme,
 - Black Sea Regional Activity Centre of Environmental Aspects of Fisheries and Other Marine Living Resources Management,
 - five national focal points;
 - Balkan Environmental Association
 - International Secretariat of South-East Europe;
 - International Training Centre of Environmental Professions;
 - IOI – Black Sea Operational Centre (until 2004),
- representation of Romania at UNESCO/IOC, CIESM, FAO, CECAF, ICES, ACCOBAMS, and other international bodies.

As to the importance of the concept of ICZM (Istemil, 2003), the Government of Romania promulgated the Law of Integrated Coastal Zone Management (No. 280 / 2003), including a National Coastal Zone Committee, whose Permanent Technical Secretariat is located at NIMRD as well.

5. GENERAL OBSERVATIONS / PERSPECTIVES

1. The Black Sea ecosystem is still in an advanced state of ecological disequilibrium,
2. Better knowledge of recent changes in the Black Sea ecosystem and appropriate management of living resources,
3. The strong need for adequate policies regarding Black Sea environmental monitoring and protection,
4. The need for harmonization of National Black Sea monitoring programmes (according to recently gained / shared experience),
5. Positive achievements in regional cooperation by successful joint Black Sea related research, monitoring and management projects / programmes,
6. The need for continuing regional cooperation, including Danube riparian countries and international expertise,
7. The need for exchange of environmental data and development of regional databases and networks for scientific use, decision makers and end users.

REFERENCES

- ANTIPA G. (1941) - Marea Neagra, 1, Oceanografia, bionomia si biologia generala, Acad. Rom. Publ. Fond. «V. Adamachi», 10, 55, Bucuresti, 314 pp
- Black Sea, Transboundary Diagnostic Analysis, GEF / BSEP / PCU, 142 pp (1997)
- BESIKTEPE S., UNLUATA U., BOLOGA A.S. (eds.) (1999) - Environmental Degradation of the Black Sea: Challenges and Remedies, Kluwer Acad. Publ., The Netherlands, 393
- BOLOGA A.S. (2000) - Regional research and management developments in the Black Sea. Ocean Yearbook, 14, 515-519
- BOLOGA A.S. (2001) - Recent changes in the Black Sea ecosystem. Ocean Yearbook, 15, 463-474
- BOLOGA A.S. (2003) - The Danube drainage basin / the state of the Black Sea ecosystem: Need for continuing co-operation and partnership. 13th Stockholm Water Symposium, Abstracts, 11-14 August, 149-152
- BOLOGA A.S. (2004) - A Black Sea integrated environmental quality monitoring – a prerequisite for regional co-operation and EU accession. Geo-Eco-Marina, 9-10, 8-11 & ICS-UNIDO EGM "Integrated Management of Coastal Areas of the Mediterranean Basin and the Black Sea". Trieste, Italy, 13-15 Dec. 2004 (2003/2004)
- BOLOGA A.S., BODEANU N., PETRANU A., TIGANUS V., ZAITSEV YU. P. (1995) - Major modifications of the Black Sea benthic and planktonic biota in the last three decades. *in* Les mers tributaires de Méditerranée. F. Briand (éd.), Bull. Inst. océanogr., Monaco, num. spec. 15, CIEM Science Series no. 1, 85-110
- BOLOGA A.S., PATRASCU V. (1997) - Radioactivity in the Romanian Black Sea sector one decade after Chernobyl, *in* 'One Decade After Chernobyl: Summing Up the Radiological Consequences of the Accident', 2, Int. Conf. Vienna, Austria, 8-12 April 1996, IAEA-TEC-DOC-964, 469-475
- BOLOGA A.S., APAS M., COCIASU A., CUIINGIOGLU E., PATRASCU V., PECHEANU I. AND POPA L. (1999) - Present level of contaminants in the Romanian Black Sea sector. Marine Pollution, Proceed. Symp. Monaco, 5-9 Oct. 1998, IAEA-TECDOC-1094, 58-63
- BOLOGA A.S., SECELEANU M. (2002) - A promising example of Free Economic Zone development in East Europe: the Free Zone Administration of Constantza South & Basarabi / Romania, Cercetari marine-Recherches marines, INCDM, 34, 331-343
- BOLOGA A.S., COSTACHE V.P. (2004) - Improvement of Romanian marine coastal water quality by urban sewage treatment. J. Coastal Res., 21, 5, 977-981
- DAMON C. (2002) - Oceans and the World Summit on Sustainable Development. A Large Marine Ecosystem Strategy for the Assessment and Management of International Coastal Waters, April
- GABLE F. (2000) - The Black Sea: An environmental and ecological profile. Ocean Yearbook, 14, 420-467
- Global Environmental Facility (GEF), Environmental Management and Protection of the Black Sea (paper presented at the program Co-ordinating Meeting, Constanta, Romania, 22-23 May (1992)
- HOBSON S., MEE L.D. (1998) - Religion, Science and the Environment, Symposium II: The Black Sea in Crisis, 20-28 Sep. 1997, World Scientific, 262 pp
- ISTEMIL A. (2003) - Towards Development of ICZM in the Black Sea region *in* Proceedings of Sixth Int. Conf. Med. Coastal Env., MED-COAST 03, E. Ozhan (Ed.), Ravenna, Italy, 7-11 Oct., 13-24
- IVANOV L., KONOVALOV S., MELNIKOV V., MIKHAELIAN A., YUNEV O., BODEANU N., BOLOGA A.S., COCIASU A., DIACONU V., KAMBURSKA L., KIDEYS A., MANKOVSKY V., MONCHEVA S., NEZLIN N., NIERMANN U., PETRANU A., SHALOVENKOV N., SHUSHKINA E., SALIHOGLU I., SENICHKINA L., UYSAL Z., VEDERNIKOV V., YAKUBENKO V., YAKUSHEV E., YILMAZ A. (1998) - Physical, chemical and biological data sets of the TU Black Sea data base: description and evaluation *in* Ecosystem Modeling as a Management Tool for the Black Sea, L.I. Ivanov and T. Oguz (Eds.), 1, Kluwer Acad. Publ., The Netherlands, 11-37
- KNIPOVICH N.M. (1933) - Hidrobiologicheskie issledovaniya v Chernom more. Trud. Azovsk. Chernomorsk. nauchn. promysl. eksped., Moskva, 10, 1-272
- LUBCHENCO J. (1997) - Personal communication, quoted by S.A.Earle, Synthesis paper: Message from the Black Sea, Religion, Science and the Environment, Symposium II: The Black Sea in Crisis, 20-28 Sep. 1997

- MEE L.D. TOPPING G. (Eds) (1998) - Black Sea Pollution Assessment. GEF / BSEP, UN Publ., Black Sea Environmental Series 10, New York, 380 pp
- MEINIER B. (2002) - Prospects for institutional change in the Black Sea catchment to address water quality problems. Research project submitted in partial fulfilment of the requirements for the degree of Master of Resource Management, Report No. 304, Simon Fraser University, Canada, 93 pp
- MEINIER B. (2002) - The quest for integration: prospects for institutional changes in the Black Sea basin. Cercetari marine-Recherches marines, INCDM, 34, 321-329
- NICOLAEV S., PAPADOPOUL N.C., BOLOGA A.S., COCIASU A., DUMITRESCU E., ZAHARIA T., PATRASCU V. (2004) - Needs for sustainable development of the Romanian Black Sea coast, Cercetari marine-Recherches marines, INCDM, 35, 1-23
- PETRANU A., APAS M., BODEANU N., BOLOGA A.S., DUMITRACHE C., MOLDOVEANU M., RADU G., TIGANUS V. (1999) - Status and evolution of the Romanian Black Sea coastal ecosystem *in* Environmental Degradation of the Black Sea: Challenges and Remedies, S. Besiktepe, U. Unluata, A.S. Bologa (Eds.), NATO Science Series, 2. Environm. Security-56, Kluwer Acad. Publ., The Netherlands, 175-195
- PIESCU V., BOLOGA A.S., COCIASU A., CUINGIOGLU E., MIHNEA R., PATRASCU V., PECHEANU I. (1997) - Aportul fluvial de poluanti in masa sedimentelor colectate din zona litoralului romanesc al Marii Negre. Anal. st. ICPDD Tulcea, 407-421
- REYNOLDS P. (2002) - The development of an environmental, management driven research for the Black Sea. Saving the Black Sea, 7, 12-13
- ROMEO M., FRASILA C., GNASSIA-BARELLI M., DAMIENS G., MICU D., MUSTATA G., (2005) - Biomonitoring of trace metals in the Black Sea (Romania) using mussels *Mytilus galloprovincialis*. Water Research, 39, 596-604
- Strategic Action Plan for the Rehabilitation and Protection of the Black Sea, Istanbul, GEF – BSEP, Turkey, 31 Oct., 29 pp (1996)
- ZAITSEV YU. P. (1997) - The Black Sea: Status and challenges. Religion, Science & The Environment, Symposium II: The Black Sea in Crises, S. Hobson and L.D. Mee (Eds.), World Scientific, 20-28 Sep., 72-77
- ZAITSEV YU. P., MAMAEV V. (1997) - Marine Biological Diversity in the Black Sea. A Study of Change and Decline: GEF – BSEP, UN Publ., Black Sea Environmental Series 3, New York, 208 pp