

The International EMECS Center has been reorganized. (April 1, 2000)



"Meeting of Individuals and Organizations Proposing the Establishment of the International EMECS Center as a Foundation" held at Hyogo House on March 3, 2000

First proposed in the Declaration of Principles adopted at the second EMECS conference (EMECS '93), the International EMECS Center was established in November 1994 as an internationally-oriented body to serve as a center for research and informational exchanges aimed at the environmental management and appropriate use of enclosed coastal seas. Since that time, the Center has sponsored EMECS conferences, conducted training in the techniques of environmental management in enclosed coastal seas, and actively worked to collect and make available information on a variety of research projects.

Recently, in recognition of these steady achievements, and in view of the prospects for further growth in the future, the International EMECS Center has been reorganized, changing from a private organization to a Japanese Government authorized foundation under the auspices of the Environment Agency of Japan. The Articles of the Center, officers, business policy, administrative structure and other matters were formally decided at the "Meeting of Individuals and Organizations Proposing the Establishment of the International EMECS Center as a Foundation" held on March 3, 2000. Currently an application for the establishment of the International EMECS Center as a foundation is being made to the relevant authorities.

The International EMECS Center will work to increase the scope of its activities -- building an organized network linking government officials, researchers, companies, private citizens and other entities and promoting academic exchanges on an international basis, implementing research and training, providing support for activities and so on -- in order to contribute to the preservation of existing enclosed coastal sea environments and the creation of new ones, and to create a society capable of sustainable development in which human beings can live in harmony with nature. We ask for your continued understanding and support in these efforts.

Members for the establishment

- Hiroshi Ishikawa**
President, Kansai Electric Power Co., Inc.
- Takafumi Isomura**
Mayor, Osaka Municipal Government
- Toshizo Ido**
Chair, Hyogo Prefectural Environmental Creation Center
Public Corporation; Chair, Association for Hyogo
Prefectural Environmental Creation
- Toshio Endo**
Governor, Tokushima Prefectural Government
- Hiroshi Oba**
President, Kawasaki Heavy Industries, Ltd.
- Nagaoki Okamoto**
Chief of Takasago Plant,
TAKEDA CHEMICAL INDUSTRIES.LTD.
- Toshitami Kaihara**
Governor, Hyogo Prefectural Government (Japan)
- Jiro Kondo**
President, Central Environment Council
- Fusae Saito**
Governor, Osaka Prefectural Government
- Masaaki Sakurai**
Former Deputy Director General, Minister Secretariat,
Environment Agency
Managing Director, Japan Environment Association;
Adviser, Association for the Environmental Conservation
of the Seto Inland Sea
- Kazutoshi Sasayama**
Mayor, Kobe Municipal Government
- Takeo Terahata**
Managing Director, Association for the Environmental
Conservation of the Seto Inland Sea
- Isamu Nishiguchi**
Governor, Wakayama Prefectural Government
- Koichiro Noda**
Vice Governor (Treasury), Tokushima Prefectural
Government
- Shunsaku Hashimoto**
Counselor, Sakura Bank, Ltd.
- Kagechika Matano**
Former ambassador to the kingdom of Sweden
- Koshi Mizukoshi**
President, Kobe Steel, Ltd.
- Kenzo Monden**
Senior Advisor, Kawasaki Steel Corp.
- Shinichiro Ryoki**
President, Osaka Gas Co., Ltd.

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Mission Statement of the EMECS

Establishment of the International EMECS Center

Inland bays, inland seas, archipelagos and other ocean areas that are substantially closed off by land regions have outstanding natural attributes that have caused them to become centers for fishing, industry, maritime transport and recreation since ancient times. These regions have nurtured a variety of cultures and have ensured rich and fulfilling lives for their inhabitants. Ensuring that the bounties of these enclosed coastal seas, which are a treasure for all of humanity, are passed on to future generations in the next century is a tremendous responsibility.

Accordingly, the International EMECS Center was established in November 1994 through the cooperation of concerned persons and organizations. Its purpose is to create new prospects for the preservation of the environments of the Seto Inland Sea and other enclosed coastal seas throughout the world.

Since its establishment, the Center has sponsored the Third International Conference on the Environmental Management of Enclosed Coastal Seas (EMECS) in Stockholm, Sweden (August 1997) and the Fourth EMECS conference in Antalya, Turkey in November 1999. The Center issues a newsletter and has been building a database to gather and make available general information pertaining to the environmental management of enclosed coastal seas. It also conducts training in environmental management techniques and holds a course on environmental preservation for government officials from developing countries in an effort to train personnel who will be engaged in environmental conservation of coastal seas.

However, although the environment is improving in some enclosed coastal seas throughout the world, in most areas habitat environments are worsening; both species and populations are declining, and ocean catches are diminishing. If these trends continue, enclosed coastal sea environments will continue to deteriorate, and this may even have a major adverse impact on the global environment as a whole. As a result, increasingly there are calls for the Center to implement more aggressive measures, making enhancement of its information-providing and research functions necessary.

It is for these reasons that the International EMECS Center has reorganized as a body that is authorized by the Japanese government. The new Center will form a solid base for the creation of an organized network linking governments, researchers, companies, private citizens and other entities for enhanced academic exchanges on an international level, as well as conducting research and training and providing support activities, in order to preserve existing enclosed coastal sea environments and create new ones, and to help establish a society capable of sustainable development in which human beings can coexist with the tremendous diversity of nature.

Individuals and Organizations Proposing
the Establishment of the International EMECS Center

Extracts from Articles of International EMECS Center

(Objectives)

Article 3

The Center's objectives shall be to construct an organized network linking governments, researchers, companies, private citizens and other entities to promote academic exchanges on an international level and conduct research, training and support activities, in order to preserve existing enclosed coastal sea environments and create new ones and help create a society capable of sustainable development in which human beings can

coexist with the tremendous diversity of nature.

(Activities)

Article 4

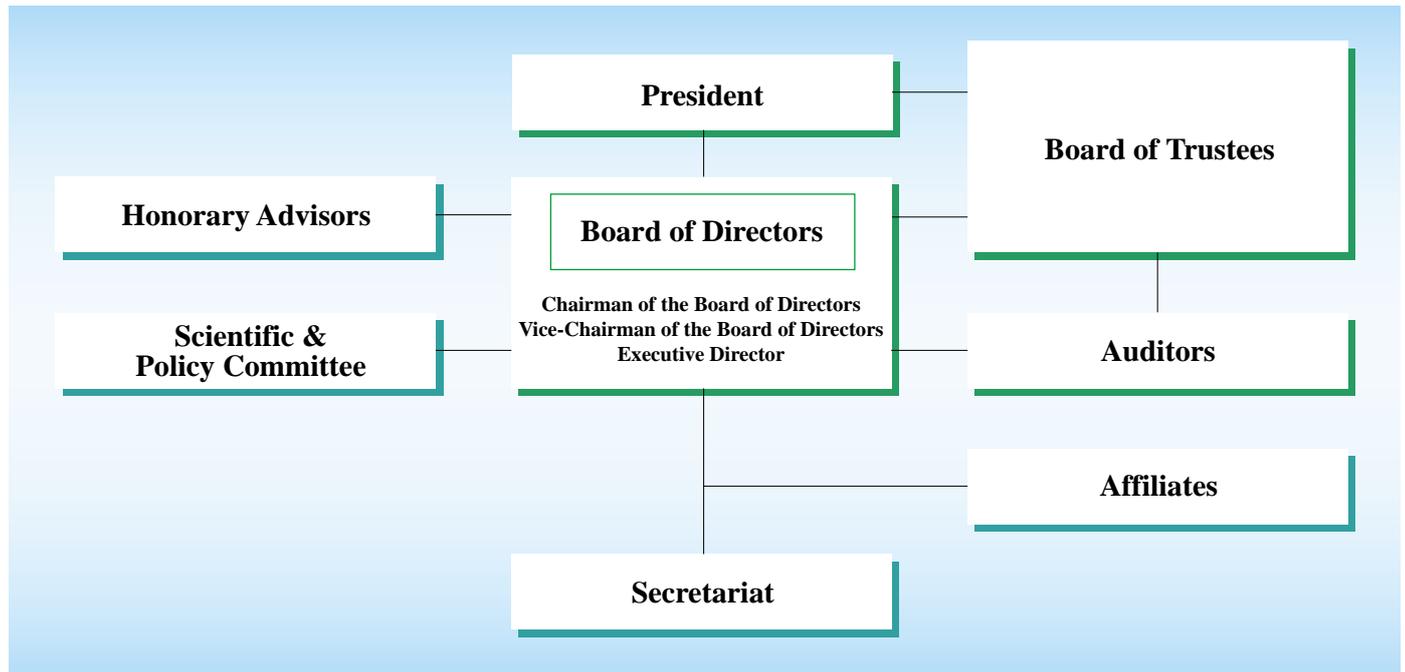
In order to achieve the objectives stipulated in the preceding article, the Center shall conduct the following activities:

- (1) gather and make available information pertaining to enclosed coastal seas
- (2) conduct research into the conservation of existing enclosed coastal sea environments and the creation of new ones
- (3) implement training relating to the preservation

of existing enclosed coastal sea environments and the creation of new environments

- (4) support activities related to the preservation of existing enclosed coastal sea environments and the creation of new environments
- (5) sponsor international conferences and otherwise promote international exchanges relating to the conservation of existing enclosed coastal sea environments and the creation of new environments
- (6) carry out other activities necessary to achieve the Center's objectives

International EMECS Center



Role of Individual Entities

Board of Directors

The Board of Directors is made up of knowledgeable individuals with academic expertise or practical experience from various areas in order to ensure the fair and impartial operation of the Center.

Board of Trustees

The Board of Trustees is positioned as an entity separate from the Board of Directors in order to monitor the Directors and other executive organs from an impartial perspective and ensure that work is executed fairly and the Center operates in an appropriate manner.

For this reason, Trustees are appointed by the Board of Directors and are not allowed to serve concurrently as Directors. Also, since they

must have various administrative and authoritative functions with respect to the Board of Directors, the post of Trustee is limited to Japanese nationals. The Board of Trustees is made up of representatives from contributors and related organizations, etc. with the aim of improving research capabilities and ensuring the diversity of the network.

Scientific & Policy Committee

The Scientific & Policy Committee is set up to provide the Board of Directors with scientific and policy-related advice from a wide-ranging perspective as regards the drafting and implementation of project programs for the International EMECS Center and other matters.

The Committee is specifically made up of persons with academic expertise or practical experience and researchers from related organizations working at the front lines of their fields

both at home and abroad, in order to clarify the future direction of the International EMECS Center and improve its survey and research capabilities, and to ensure the diversity of the network and otherwise help promote the activities of the International EMECS Center.

Honorary Advisors

The Center has Honorary Advisors to study important matters related to the operation of the Center as directed by the Chairman of the Board of Directors.

Affiliates

The Center has an Affiliate system whereby organizations engaged in wide-ranging work to preserve the environments of enclosed coastal seas, and other individuals, corporations and groups that endorse the objectives of the Center may become Affiliates of the Center.

Business Plan for the Year 2000 for the International EMECS Center

From the date on which establishment is authorized until March 31, 2001

1. Business Policy

The Center's aim is to increase cooperation with, and make an active contribution to, efforts to preserve enclosed coastal sea environments both in Japan and throughout the rest of the world. In order to achieve this, the Center works to effectively use information and personnel networks and obtain the cooperation of researchers and organizations working to preserve the environments of enclosed coastal seas both at home and abroad, in order to promote activities aimed at achieving "a society capable of sustainable development in which human beings can coexist with the tremendous diversity of nature."

2. Business Plan

(1) Projects to Promote the Preservation of Enclosed Coastal Sea Environments

a. Researching measures to preserve existing ocean environments and create new ones

Seaweed beds, tidal flats, natural shorelines and other priceless natural environments are steadily disappearing from enclosed coastal seas. These natural environments that have been lost due to development must be restored. The Center will conduct comparisons with environmental creation techniques used in other countries and research new techniques to preserve existing enclosed coastal sea environments and create new ones.

b. Researching water cleanup in the area off Amagasaki and other environmental restoration plans

In order to establish an environmental maintenance plan to help achieve "environment-creating urban planning" that integrates both land and sea areas and enhances the attractiveness of the Amagasaki coastal region, the Center will set up a research project committee made up of learned and experience persons from Japan and other countries to pursue research in the areas listed below:

- (a) studying policies to restore existing water environments and create new ones
- (b) verifying that these policies are technologically, environmentally and economically feasible
- (c) studying what type of citizen involvement is desirable in the restoration of existing water environments and creation of new ones.

c. Studying the feasibility of setting up recycling centers in coastal regions

Various policy measures that have been implemented have decreased the environmental load from human activities in enclosed coastal seas to some extent. However, much more must be done in order to preserve these environments, including dealing with the accumulated environmental load from past development efforts and other sources and finding solutions to new environmental problems. Recently the approach to environmental preservation has changed from an initial focus on pollution control (improving water quality, taking measures to control harmful substances, etc.) to a broader emphasis on environmental management (ensuring biodiversity, restoring and securing healthy water circulation, promoting substance recycling, ensuring that people are able to come in contact with the rich natural environment, etc.) as can be seen in the Basic Environmental Plans, and the like. Great changes are also occurring in people's perception of the environment, and considerable progress is being made in a variety of environment-related technologies.

For these reasons, in order to determine the feasibility of setting up recycling centers in coastal regions to curb reclamation in these regions and ensure their appropriate use, the Center will perform the following actions:

- (a) analyze basic data
(generation and processing of recyclables, technical means, etc.)
- (b) study recycling plans
- (b) study the feasibility of the project
(barriers and incentives, feasibility studies using case studies, etc.)

d. Studying systems for monitoring the environments in inland seas and bays

Integrated and systematic monitoring of marine environments is needed to promote the conservation of these environments. However, in current monitoring efforts, each entity conducts various studies on its own. As a result, although a great volume of data has been collected, this data has not been systematically organized and integrated. The current system of monitoring makes it difficult to gain access to the integrated data on marine environments that must serve as the foundation for evaluating and preserving marine environments.

For this reason, the Center will focus on the construction of an integrated system for the monitoring of marine environments and, having selected inland seas and bays as the field of study, ascertain the status of environmental monitoring in these regions and study ways to integrate data on inland sea and bay environments.

e. Preparing for the 5th EMECS Conference

It has been eleven years since the first EMECS conference was held in 1990, in Kobe. EMECS 2001, the fifth EMECS conference and the first one of

the new millennium, will be held in Kobe and on the nearby island of Awaji in the year 2001. The conference will bring together researchers and organizations from both the natural and the social sciences who are working to preserve the environments of enclosed coastal seas both at home and abroad.

The Center will move ahead with the preparations needed to ensure that the conference is a success and achieve its goals of attaining "sustainable development that balances the preservation of nature and ecosystems with the needs of human society."

f. Sponsoring international EMECS symposiums overseas

An international EMECS symposium will be held in the year 2000 in southeast Asia (Thailand). The symposium will bring together researchers, government officials, corporate representatives, NGO organizations and other delegates from China, Korea, Japan and the ASEAN member nations, to present the results of research conducted in each of these countries, to enhance ties, and to debate and exchange views regarding environmental management and sustainable appropriate use of enclosed coastal seas in Asia. Such debate and exchanges will help promote research and efforts to preserve enclosed coastal sea environments in these countries, and will also serve to invite active participation in EMECS 2001.

g. Supporting activities to preserve the environments of enclosed coastal seas

The Center will provide grants to be used to hold academic conferences and other events aimed at the environmental management and appropriate use of enclosed coastal seas, helping to establish ties with other relevant organizations. The achievements of such conferences and other events will be reflected in the Center's activities.

(2) Collection, Organization and Utilization of Information

a. Collecting data relating to the current status of enclosed coastal sea environments and creating a database thereof

The Center will gather basic data (in the fields of both the natural and social sciences) relating to the current status of enclosed coastal sea environments both at home and abroad and will create a database from such data in order to enable information to be shared among enclosed coastal sea researchers both at home and abroad and promote effective research.

b. Publishing the EMECS newsletter

The Center will publish the EMECS Newsletter containing papers from contributors, information on the status of preparations for the fifth EMECS conference, the achievements of previous conferences, profiles of organizations working for the preservation of enclosed coastal sea environments, information on upcoming international conferences and other information, in order to promote the exchange of information pertaining to enclosed coastal seas.

c. Establishing and operating an information collection and distribution system

The Center will gather and process information pertaining to the preservation and appropriate use of enclosed coastal sea environments throughout the world and endeavor to improve the operation and management of the system used to provide this information via the Internet. In fiscal 2000, the Center will also work to upgrade its database of researchers and its database containing information on enclosed coastal sea environments.

d. Promoting EMECS activities by local representatives

In order to build a network of people to promote international study and research activities, the Center will organize local representatives in regions in which previous EMECS conferences were held and request that they conduct the activities listed below. In fiscal 2000, as in fiscal 1998 and 1999, the Center will continue to request this of researchers active in Sweden, Turkey and other countries.

- (a) creating and maintaining a network of local specialists
- (b) gathering and making available data on the local environment, including the current status of the environment and the implementation of environmental training
- (c) publicizing EMECS activities

(3) Conducting education and training activities

a. Training in Techniques for the Environmental Management of Enclosed Coastal Seas

At the request of the Japan International Cooperation Agency (JICA), the Center will implement Training in Techniques for the Environmental Management of Enclosed Coastal Seas for mid-level government officials from developing countries, based on its experience in implementing policies for environmental management in the Seto Inland Sea.

b. Commemorative Symposium

The Center will hold a symposium in the environmental management and appropriate use of enclosed coastal seas to commemorate the establishment of the International Center for the Environmental Management of Enclosed Coastal Seas.

Our Changing View of the World's Coastal Seas

Dr. Wayne H. Bell



Last November, as the 20th Century neared its end, more than 300 delegates from 50 countries convened for five days in Antalya, Turkey to discuss the state of the world's coastal seas. This joint international conference was convened by EMECS, the International Center for Environmental Management of Enclosed Coastal Seas (Kobe, Japan), and MEDCOAST, an initiative for the

Mediterranean Coastal Environment coordinated by the Middle East Technical University (Ankara, Turkey). It was the fourth conference in each series. Its theme "A Land-Ocean Interactions: Managing Coastal Ecosystems" complemented that of the third EMECS conference "With Rivers to the Sea" convened with the Stockholm Water Symposium in 1997. Together these two themes provide an important perspective on our changing view of the world's coastal seas.

The Antalya conference unanimously adopted a Coastal Seas Declaration that summarizes emerging new perspectives and recommends actions needed to restore the world's coastal waters and conserve their irreplaceable marine life. The accompanying Table summarizes the global context for this Declaration.

While coastal marine science is firmly rooted in classic studies of lakes and oceans, it remains a relatively new discipline. Most of today's coastal seas management programs began within the last 25 years or so. 'Traditional' problems were apparent then and could be traced to four main causes: nutrient pollution, contaminants, over-fishing, and a lack cooperation between coastal cities, states, and nations needed to address these common issues. These problems remain but recent cooperative efforts to solve them have resulted in some successes. Other 'emerging' problems have been recognized within only the past decade or so. They are manifestations of our changing perspective: coastal seas are not isolated bodies of water but are dynamic ecosystems strongly influenced by processes that take place on the adjacent watershed, the neighboring ocean, and beyond. Measuring and monitoring those changes require application of new remote sensing and automated technologies; understanding and predicting them requires scientists trained outside the constraints of familiar disciplines in biology, chemistry, or physics; reversing or directing them requires environmental management and regulatory action on a broader scale with new levels of public participation and multi-jurisdictional cooperation.

First, An Allegory

The Antalya Declaration begins with an allegory in which the reader crosses a familiar landscape and comes to the edge of a vast new coastal sea. The landscape left behind is the 'traditional' one: mankind has carved it into political jurisdictions, studied it from the perspective of specialized disciplines, and dealt with its environmental problems according to one's role in life. The new coastal sea lacks the traditional, familiar boundaries. It stretches to the horizon and farther

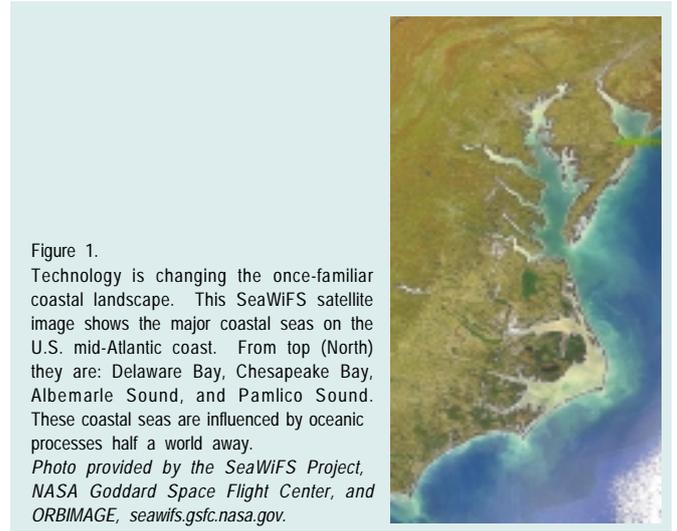


Figure 1. Technology is changing the once-familiar coastal landscape. This SeaWiFS satellite image shows the major coastal seas on the U.S. mid-Atlantic coast. From top (North) they are: Delaware Bay, Chesapeake Bay, Albemarle Sound, and Pamlico Sound. These coastal seas are influenced by oceanic processes half a world away. Photo provided by the SeaWiFS Project, NASA Goddard Space Flight Center, and ORBIMAGE, seawifs.gsfc.nasa.gov.

still; satellites and remote sensing technology study it day and night; and electronic communications give scientist, policy maker, and citizen rapid access to the resulting information. Participants in the joint MEDCOAST /EMECS conference felt that they had come to this point and embraced the challenge of navigating the new unfamiliar waters.

The Declaration also conveys a sense of passing the baton. Many of the conference participants had served as originators or early leaders of some of the world's most ambitious coastal seas programs on Chesapeake Bay, the Baltic Sea, the North Sea, the Seto Inland Sea,

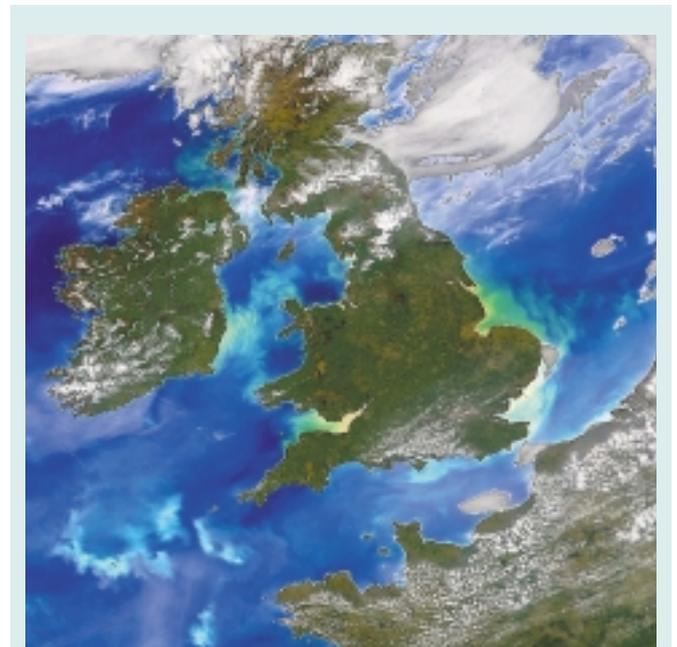


Figure 2. A very different view of the North Sea obtained by the satellite-based Sea-viewing Wide Field-of-view Sensor, SeaWiFS. This ocean color sensor can monitor concentrations of chlorophyll caused by algal blooms such as those caused by high nutrient concentrations along the English coast (lighter colors). There is also an algal bloom of coccolithophores in the Atlantic Ocean to the southwest (lower left). Photo provided by the SeaWiFS Project, NASA Goddard Space Flight Center, and ORBIMAGE; <http://seawifs.gsfc.nasa.gov>.

or the Mediterranean Sea. In the bittersweet paragraph that follows the allegory they take stock, recognizing that traditional approaches and old values no longer suffice for solving the problems of the world's coastal seas. They affirm their commitment to think differently, but it is clear they believe that success lies with better preparing the next generation of managers, scientists, and citizen stewards for the work ahead.

A List of Actions

The Antalya Declaration then commits conference delegates to specific actions and invites colleagues around the world to join them. *First, improve communication between researchers and non-scientists.* This recurrent call is becoming increasingly strident. Leading ecologists are predicting that we will never solve global environmental problems if scientists fail to recognize communication with non-scientists as a professional responsibility.

Second, undertake an interdisciplinary approach. A few years ago, 'interdisciplinary' meant having biological, chemical, and physical oceanographers work together. Today's environmental policy demands

that we transcend the natural sciences to include economics, law, ethics, and aesthetics. Indeed, the 'sense of place' that coastal seas convey to people who ply their waters or enjoy their resources is one of the strongest factors operating to initiate and sustain coastal seas restoration programs. And so: *Third, promote citizen involvement.* The key words, 'active and informed public participation,' go beyond merely educating people. Opinion polls show that individuals still believe that pollution is the fault of industry rather than stemming from their own personal behavior. It is time to take personal responsibility, and to become personally involved. Public participation also includes businesses, which are often able to act more quickly and effectively than governments in advancing environmental programs.

Fourth, undertake a new kind of environmental education. Many coastal seas programs have spawned projects and centers that teach young people about the environment. This recommendation goes further by calling for the direct involvement of schools, a ready-made and vastly under-used resource for conveying environmental information. School involvement in coastal seas education must not divert young people from learning science and technology. Rather, authentic data and information from monitoring and research can be used to teach science, mathematics,

THE ANTALYA COASTAL SEAS DECLARATION

This declaration is issued by more than 300 delegates from 50 countries who participated in the joint international conference, MEDCOAST '99/EMECS '99, Antalya, Turkey. The conference represents the convergence of two perspectives for improving environmental management of coastal seas: MEDCOAST, a regional initiative for the Mediterranean Sea and Black Seas, and EMECS, a global forum for policy makers, scientists, engineers, educators, and members of non-governmental organizations that is coordinated by the International EMECS Center, located in Kobe on the shore of the Seto Inland Sea of Japan. The unifying conference theme was, 'Land-Ocean Interactions: Managing Coastal Systems'.

We begin our conclusions with an allegory:

As the MEDCOAST and EMECS initiatives approach the end of their first decade, we recognize that we have crossed a familiar coastal landscape. We stand now overlooking a coast where a vast new sea sparkles in the sun. Today we see only a little of this new coastal sea, but future generations will surely walk its shore, sail its waters and harvest its resources.

The familiar landscape is still well marked by traditional boundaries. There are the political lines of local jurisdictions, states and nations. Researchers continue to define ecological differences between river, bay, land and sea. Each of us has become comfortable in our individual roles as biologist or hydrologist, engineer or manager, policy maker or citizen.

The new sea before us appears to be boundless. Automated monitoring techniques are generating large amounts of information, much of it in real time, that shows how the sea changes from day to day, month to month, year to year in response to changing land use and global climate trends. Satellite images are revealing how local coastal problems relate to regional sea processes and to those of the world ocean. Electronic communication is making this wealth of new information available to everyone at the same time: researcher, political official and concerned citizen alike. It is truly a seascape without familiar boundaries; its navigator is technology; day and night no longer dictate how clear we view its waters.

The participants in MEDCOAST '99/ EMECS '99 invite our regional and global colleagues to join us in the task of building the best vessels possible to help our children and their children navigate this new seascape and sustain the full potential of its resources. We will work together across traditional boundaries and assume personal responsibility for achieving our goal, irrespective of our nation, our discipline, or our role in life. We will meld old values into a new ethic that takes into account the true contribution a clean and healthy coastal environment makes to our social and economic well being. Finally, we will use new information technology to provide to

those who teach our young people the products of our research, the fruits of our wisdom and the benefits of our experiences.

We recommend that the following actions be undertaken by those who conduct national, regional and international environmental programs, as well as by individual policy makers, engineers, scientists, and concerned citizens:

1. Make every effort both to encourage and to improve communication between researchers and policy makers to ensure that environmental management of coastal seas is based on sound scientific information obtained by using the best technology available.
2. Pursue an interdisciplinary approach that includes not only the natural sciences and engineering but also economics, law, ethics, and aesthetics as the bases of more effective environmental policy, using coastal seas as excellent models for applying new remote sensing technologies and dealing with the complex interaction between land, water, and human endeavors.
3. Give paramount importance to active and informed public participation making every effort to inform citizens, directly and by working more closely with non-governmental organizations, about what all people can do to improve their coastal waters and sustain their irreplaceable resources.
4. Develop a new kind of environmental education for our young people, one that directly involves their schools and available Internet resources, enabling the use of coastal seas data and information to enrich curricula not only in science and mathematics but also in history, literature, and the arts.
5. Recognize the urgency of restoring and conserving coastal environments by turning policy into practice, realizing theory by taking action, sharing our knowledge and experiences instead of keeping them to ourselves, and eliminating delay by moving now.
6. Strengthen cooperation at local, national, and regional levels, recognizing that land-sea interactions transcend political boundaries and are part of the global ecosystem which we all share.

We encourage governments and organizations that fund environmental programs to join this commitment by providing urgently needed resources, paying special attention to the protection and restoration of coastal seas in developing regions. We recommend that such support be provided to help all nations, including those of the Black Sea area, to become full participants in regional and global initiatives for improved environmental management of the world's coastal seas.

Let us begin now!

Antalya, Turkey
12th November 1999



Figure 3.

In 1998, the Governors and lead agencies of the Chesapeake Bay region adopted a directive stating, '... We acknowledge that the Chesapeake Bay, its rivers and its watershed provide an authentic, locally-relevant source of environmental information and data that should be used to help advance student learning skills.' Coastal scientist Dr. Laura Murray trains teachers through summer research internships and field courses in watershed ecology (upper). Teachers incorporate their new knowledge into exercises for teaching science and mathematics. Three eighth grade students at Northern Middle School, Calvert County, Maryland, are honing their skills in recording, graphing, and doing elementary statistics on data they obtain through an experiment on water quality. Photos: W. Bell and A. Williams.

and many other subjects across the curriculum. Further, research is showing that students strongly relate to the environment as a context for learning and that they tend to do better in their studies as a result. Internet technology is making all this possible without waiting for the next textbook to be written.

Fifth, act now. There is a growing sense of frustration that coastal water quality is not improving in much of the world because comprehensive programs are awaiting governmental adoption. Regulation of non-point nutrient pollution from agriculture is taboo; few jurisdictions are willing to embrace 'smart growth' principles to guide development, revitalize coastal cities, and reduce landscape deforestation.

Sixth, cooperate between jurisdictions. Conference delegates were distressed by an inability to convene a multinational secretariat to coordinate a desperately needed environmental program for the Black Sea that has already been endorsed by scientists, policy makers, and local jurisdictions. Multi-jurisdictional cooperation is fundamental to the principles upon which both the EMECS and MEDCOAST initiatives were established. The Antalya Declaration concludes with a call for additional resource support and a commitment to begin at once to act on identified issues.

The Final Message

Today is it possible for us to join the participants in the joint MEDCOAST/EMECS Conference at the edge of a vast new sea. Using the Internet we can visit the Chesapeake Bay, for example, and understand how local ecology is linked in a predictable manner to El Nino/La Nina events in the mid-Pacific Ocean. The ultimate message conveyed by the Antalya Declaration is that the health of our coastal seas intimately depends upon other processes 'environmental, social, and ethical' continually taking place on a global scale. Technology may help us understand these relationships, but the future of our coastal seas remains an individual responsibility for each one of us. We must act now, and we must act together to secure the future of our coastal waters.

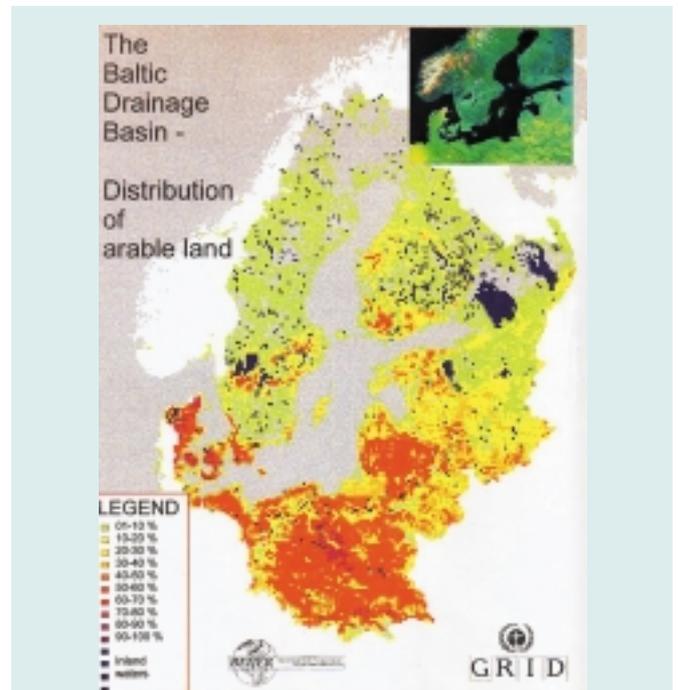


Figure 4. Geographic information systems (GIS) analysis of agricultural lands on the Baltic Sea watershed. Nutrient runoff from agricultural land has increased several-fold in the past 100 years and is a significant source of non-point pollution to coastal seas. Graphic courtesy B.-O. Jansson, University of Stockholm.



Figure 5.

The non-indigenous comb jelly *Mnemiopsis leidyi* invaded the Black Sea in the 1980's and multiplied in such numbers as to out-compete native species in the planktonic food chain. The resulting precipitous decline in the anchovy and sprat fisheries cost \$200 million in lost revenue. *M. leidyi* is traveled to the region in ship ballast from its home waters on the U.S. Atlantic coast. Photo: J. Purcell, University of Maryland Center for Environmental Science.

"Traditional Problems" (pre-1990)	"Emerging Problems" (post-1990)	Manifestations	Actions	Successes
Nutrient pollution: Point sources		Low-oxygen or anoxic waters; seagrass decline; algal blooms	<ul style="list-style-type: none"> - Build or upgrade waste water treatment plants - Ban phosphate detergents 	P concs. declining, N concs. increasing less in urban-impacted waters
	Nutrient Pollution: Non-point sources	Same as above	<ul style="list-style-type: none"> - Adopt agricultural best management practices; - Reforest watersheds - Riparian stream buffers - Control discharges to atmosphere 	Regulation of power plants, industry reducing deposition of S, N from atmosphere
Toxics		Population declines of top carnivores, especially birds of prey, seals; sores/lesions on bottom dwelling fish	<ul style="list-style-type: none"> - Ban DDT, PCBs; - Strive for toxics-free system 	Recovery of some birds of prey, seals.
	Toxics in food chain; Hormone action disruption	Increased species vulnerability to disease, stress; reproductive rate decline or failure	<ul style="list-style-type: none"> - Integrated pest management to reduce pesticide use; - Alternative pesticides 	
Sediment loads		Turbidity; seagrass decline; shipping channels fill	<ul style="list-style-type: none"> - Adopt agricultural and forestry best management practices - Control sediment runoff at construction sites - Harbor, channel dredging 	Sediment runoff can be significantly reduced during constructions
Over-fishing		Fish/shellfish stock declines; fisheries switch to previously unexploited species; food chains shift	<ul style="list-style-type: none"> - Close specific fisheries; - Stronger regulations - Restore vital habitat - Multispecies management 	Recovery of a few species to economic viability
Lack of regional cooperation		Programs to control pollution, restore fisheries, monitor environmental change have minimal effect	<ul style="list-style-type: none"> - Multi-jurisdictional agreements - Coordinate activities through international commission 	Examples of programs with some successes: Helcom for Baltic Sea; Chesapeake Bay Program; Commission for Environmental Protection of the Seto Inland Sea
	Harmful algal blooms, often by previously uncommon species	Increased fish kills, marine mammal diseases; human health problems	<ul style="list-style-type: none"> - Increase non-point nutrient pollution control 	
	Non-indigenous species invasions	Uncontrolled multiplication, leading to biofouling, food chain shifts, decline of commercial fisheries	<ul style="list-style-type: none"> - Restrict ship ballast discharges to offshore waters 	
	Sea level rise	Shoreline erosion; wetland losses on low-relief coasts	<ul style="list-style-type: none"> - Rip-rap, bulkheading - Reduce water removal from underground aquifers - Reduce global warming 	
	Undirected development	Critical habitat loss; urban sprawl; reduced quality of life in coastal cities	<ul style="list-style-type: none"> - Adopt economically and socially sustainable growth principles ("smart growth") 	
	Uninformed public opinion	People blame industry, fail to recognize personal role in decline of coastal water quality and living resources	<ul style="list-style-type: none"> - Informal and school-based environmental education - Recognize and promote coastal "sense of place" - Develop a new ethics and value system for the coastal environment - Scientists communicate with policy makers and public as part of professional responsibility 	

This table provides a perspective on the nature of coastal seas' environmental problems. It emphasizes chronic problems and therefore does not include local disasters such as oil spills and coastal storms that may have far-reaching effects as well. The "traditional" problems associated with nutrient pollution, toxins, sediment loads, and over-fishing can be traced well back into recorded history although their scientific bases were not widely recognized until the middle of the 20th Century. The lack of multi-jurisdictional cooperation is also a "traditional" problem because early attempts to conserve and protect coastal waters by individual cities, states, and nations met with very limited success. All of these "traditional" problems remain; in fact, they underlie the "emerging problems" that scientists and policy makers have recognized in the past decade or so. While the problems facing the world's coastal seas are daunting, there have been successes that should be recognized. In most cases, these successes can be attributed to changes in industrial practices and governmental regulation. On the other hand, people, even those living in areas with strong conservation and restoration efforts still fail to recognize their individual contributions to the degradation of coastal waters and their living resources.

Bulletin Board

Notice

We still have the CD-ROM and report on "Water Quality Conservation for Enclosed Water Bodies in Japan" in stock. Please feel free to ask the Secretariat if you need. Regarding Proceedings of the Joint Conference, you can purchase it from MEDCOAST Secretariat (medcoast@metu.edu.tr)

Call for Articles

Contributions from readers (reports on research in enclosed coastal seas, conference information, etc) would be greatly appreciated.

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