

B I R E M E

Baltic Sea Research Programme

■ The concept Ecosystem Approach will introduce a mechanism for integrating research into environmental management and create a forum for true discussion between scientists and decision makers. The ecosystem approach is currently introduced to the Baltic Sea monitoring programme, and an active involvement by scientists is therefore timely. Sebastian Valanko's and Eeva-Liisa Poutanen's article clarifies the issue on _____ *page 4*

■ Marine science would particularly benefit from coordination of research funding and use of research infrastructure. The new EU funded project BONUS for the Baltic Sea science – network of funding agencies brings together 11 organisations involved in the funding and organisation of Baltic marine research. The expected outcome of BONUS is a joint Baltic Sea research and training programme. BONUS is part of the European Research Area (ERA) process. Read more on _____ *page 8*

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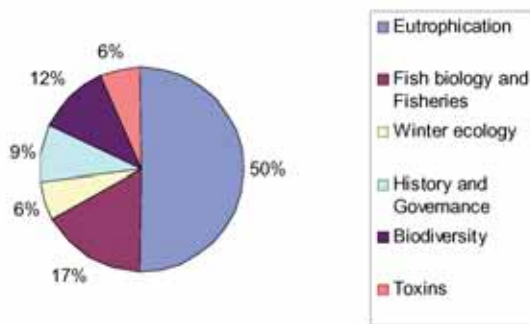
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BIREME IN A NUTSHELL

Funding

Academy of Finland	4.70 Meuro
Ministry of the Environment	0.50 Meuro
Ministry of Agriculture and Forestry	0.30 Meuro
Ministry of Transport and Communications	0.07 Meuro
<u>Maj and Tor Nessling Foundation</u>	<u>0.25 Meuro</u>
Total	5.82 Meuro

Breakdown of funding by themes



Institutes and universities involved

- Evo Fisheries Research Station
- Federal Unitary Firm "GOSMET", North-West Administration of Federal Service of Russia for Hydrometeorology and Environmental Monitoring, Russia
- Finnish Environment Institute
- Finnish Game and Fisheries Research Institute
- Finnish Institute of Marine Research
- Institute of Limnology RAS, Russia
- Kemira Chemicals Oy Kemwater
- National Institute of Nutrition and Seafood Research, Norway
- National Public Health Institute, Department of Environmental Health, Kuopio
- North-Savo Regional Environmental Centre
- Pirkanmaa Regional Environmental Centre
- Stockholm University, Sweden
- Tallinn Technical University, Estonia
- Tvärminne Zoological Station
- University of Helsinki
- University of Jyväskylä
- University of Kuopio
- University of Oulu
- University of Turku
- Åbo Akademi University

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BIREME Newsletter

This is the first volume of the BIREME Newsletter. The newsletter is published twice a year. The chief editor is Programme Manager Kaisa Kononen, tel. +358 9 774 881.



THE FIRST YEAR OF BIREME IS BEHIND

■ The Finnish Baltic Sea Research Programme, BIREME (2003-2005), was launched in January 2003. The name of the programme was chosen carefully in order to emphasise the importance of collaboration: bireme is an English word meaning a boat for two rowers – if such a boat is rowed by one rower alone, it will just turn around and not proceed. One has to row together to be able to get ahead.

The programme involves 21 projects, selected by an international peer review panel, with almost 100 scientists. In June this year, the programme was enlarged by the Nessling Foundation's international research group funding. The ambition of the programme is to be multidisciplinary, including both ecological and socio-economical research.

The first year of BIREME is soon behind. All the projects have started well. A number of young, enthusiastic scientists have been recruited into the research groups. The first field season is behind and the first results are being analysed. The projects and consortia have held meetings and workshops within their own group and together with other groups. Three programme workshops have been organised by the coordination: Kick-Off Cruise, PhD Workshop and Ecosystem Approach Workshop.

BIREME started at a time when the Academy of Finland defined and published its international strategy. At the same time, on the European level, the EU Sixth Framework Programme launched new kinds of funding instruments with the aim to improving the coordination and collaboration of national research activities. These two facts have decisively contributed to the work of the Programme Manager and to how BIREME has developed during 2003.

On the bilateral level of cooperation, the Collaboration Agreement between the Academy of Finland and the Russian Foundation for Basic Research BIREME has been enforced through a joint call in August 2003, and new projects will enter the programme at the beginning of 2004. BIREME had its kick-off symposium together with the Swedish MARE programme and some of the projects have direct cooperation with the MARE scientists. On the regional and European level, BIREME was the initiator of the BONUS ERA-NET project, which aims at building up a network of funding agencies in the countries around the Baltic Sea. More about BONUS on page 8.

From the Programme Manager's point of view the year has been busy though all this activity may not have been visible to scientists. Our programme was born and is flourishing under lucky stars. Even if we as scientists have for long been fully aware of the importance of collaboration, the administrative, legislative and financial structures and motivations have not always been supportive to this approach. Now the situation has changed. I can assure you that after three years when BIREME is over, the landscape of the Baltic Sea research will be different from what it was before. I hope that we all BIREME fellows share the pride in and challenge of contributing to this process.

Helsinki, 24 November 2003



Kaisa Kononen
Programme Manager

ESTABLISHMENT OF ECOLOGICAL QUALITY OBJECTIVES (EcoQOs) FOR A REGIONAL ECOSYSTEM APPROACH IN THE BALTIC SEA

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2. University of Plymouth, U.K.

The ecosystem approach

Increasing socio-economic activity effecting the marine environment has progressively led to its degradation by reducing its natural buffering capacity. With the recognition that humans form an integral part of the marine environment, maintaining ecosystem health and resilience is considered essential to ensure long-term sustainability and thus the socio-economic activities that depend on it. Such an approach can be provided by adopting the ecosystem approach, which includes the role played by EcoQOs. This approach has recently been adopted by the Helsinki Commission (HELCOM) and the OSPAR Commission¹. It also now forms an integral part of the European Marine Strategy, which is currently under elaboration by the European Commission. The working definition of the ecosystem approach is:

“the comprehensive integrated management of human activities based on best available scientific knowledge

about the ecosystem and its dynamics, in order to identify and take action on the influences which are critical to the health of the marine ecosystem, thereby achieving sustainable use of the ecosystem goods and services and maintenance of ecosystem integrity”

It is true that earlier management approaches have also been guided by ecological applications, but the ecosystem approach differs in several important ways:

- Emphasis on sustainability and future generations, with an appropriate balance between conservation and use.
- Management objectives as societal choice.
- Conservation of ecosystem function, health and resilience; which include non-commodity values.
- Appropriate temporal and spatial scale
- Management within system limits, but taking a landscape perspective, moving beyond boundaries set by ownership and recognizing the reciprocal influence of neighbouring ecosystems on the system being managed.
- It places management in the context of natural

¹ JMM. 2003. Statement on the ecosystem approach to the management of human activity: presented by HELCOM and OSPAR secretariats. Joint Ministerial Meeting of the Helsinki and OSPAR Commissions (JMM), Bremen 25-26 June, Agenda item 6 JMM 2003/4 -Rev.1-E.



disturbance and long-term visions (change is inevitable).

- Management decentralised and multi-sectoral, requiring broad use of knowledge and participation throughout the project with scientists participating in the initial design and subsequent monitoring, analysis, and adaptation of management options.²

This shift from traditional resource management is therefore aimed at long-term sustainability, has a multi-species framework, integrating human activities and conservation of nature, including political, economic and social values, and proposes solutions which are socially acceptable.³

The Baltic Sea – regional application

How then can this new concept be applied within the Baltic Sea context? To answer this, a clear picture needs to be first formed on how it can be most effectively implemented regionally. This framework will need to build on an existing management plan, develop desired future conditions through the interactive planning sessions with a variety of user groups, and needs to incorporate current existing data with new research to develop ecologically based concepts and techniques to achieve the desired conditions. Furthermore, it should ultimately allow for the setting of future policy goals and the evaluation of management outcomes. This will include the setting of ecological quality objectives (EcoQOs).

Some working definitions:

- Ecological Quality (EcoQ) is defined as: An overall expression of the structure and function of the marine ecosystem taking into account the biological community and natural physiographical, geographic and climatic factors as well as physical and chemical conditions including those resulting from human activities.
- Ecological Quality Elements are the individual aspects of overall Ecological Quality.
- An Ecological Quality Objective (EcoQO) is the desired level of an ecological quality (EcoQ). Such a level may be set in relation to reference level.

For its regional delivery an initial roadmap has been developed characterised by simplicity, setting out the principle route to be taken; broad and non-limiting (see figure 1, page 6). The first step within this roadmap has been recognised as the continuous interactive process of involvement between scientists and managers providing a “window of opportunity”, where scientists gain a better appreciation of policy formulation and implementation, while managers/stakeholders gain a better understanding of the functioning and variability of natural systems and the consequences of socio-economic activity, throughout the continuous policy cycle. This will include building consensus on a common set of pressure/problem issues and building a foundation of understanding surrounding the concept where emphasis is placed on long-term sustainability. Within this framework, it must also be recognised that identifying and engaging all stakeholders in the development process is key to developing truly effective objectives within a management plan. Therefore we will need to ultimately express EcoQOs in terms of a “public ecology”, where the public is aware of the aims, implementation, potential benefits, and the governance of marine conservation with regard to their anthropogenic activity⁴. The development of EcoQOs, will require trade-offs; there will be no so called “magic-bullet”. EcoQO development and management actions will be the result of intense debate. If we only choose scientific certainty and political objectives as our criteria for EcoQOs it will risk alienating the public and many key stakeholders. Simplification may risk scientific uncertainty, but we need to ask our selves are we willing continue denying stakeholders the know-how to conserve our marine environment? After all humans who are part of the ecosystems will define the future of those ecosystems.

How to develop effective EcoQOs?

As it is impossible to measure everything of potential relevance within an ecosystem, indicators can be used to reduce the number of components that have to be investigated and monitored. An evaluation of the effectiveness of each potential ecological quality indicator needs to be made, on the basis of which ecological quality objectives can be set. When these indicators are chosen an ecosystem approach should be applied where objectives are set, based on sound ecological principles, which emphasizes the role of processes and their interconnectedness. There needs to also be a shift towards the ecosystem itself, which will be at the centre of the causal chain continuum of cause and effect. Effective EcoQOs will reflect the core of information on the ecosystem, with a balance between the basic ecosystem properties on one hand and human influence on the other. It has been recognised that biological effects can provide a useful link between effects and human influence or use of the marine environment.

The ecosystem approach does not suggest that science at the ecosystem level is only relevant, but that science at all levels is relevant. For example indicators for ecological

² Meyer, J.L., Swank, W.T. 1996. Ecosystem management challenges ecologists. Ecological Applications. 6:738-740.

³ Pavlikakis, G.E., Tsihrintzis, V.A. 2000. Ecosystem management: a review of a new concept and methodology. Water Resource Management. 14:257-283.

integrity may be found at many organizational levels including species, stand, landscape, and ecosystem⁵. Therefore the ecosystem approach depends on research performed at all levels of organization, from investigation of the morphology, physiology, and behaviour of individual organisms, through studies of the structure and dynamics of populations and communities, to analysis of pattern and processes at the level of ecosystem and landscape. EcoQOs, once developed, should ultimately reflect a main set of criteria to be achieved in order to reach a “desired future trajectory” or “desired future behaviour” of the ecosystem components and processes; necessary for sustainability.

There should also be a clear distinction between management action and EcoQOs which are two different tools. Where for example, 50% reduction in nutrients is a management action not an EcoQO. An EcoQO can be used to gauge the effectiveness of management actions such as this. Furthermore management actions can be viewed as hypothesis to be tested by EcoQO. Was a 50% reduction in nutrients enough, or too much, and most importantly how has this changed the state of the marine environment? Therefore, in order for EcoQO to be most effective they must to address the gradual changes that affect resilience rather than merely controlling disturbance, reducing the risk of unwanted state shifts or unwanted future trajectories.

Conclusion

In conclusion, the regional establishment of EcoQOs requires a firm foundation, built from an appreciation of the underlying themes of an ecosystem approach, where

both the top-down and the bottom-up processes are incorporated to identify the most essential components or issues to address the preservation of ecosystem integrity and improved ecosystem health for long-term sustainability. An ecosystem with low sustainability in terms of ecosystem health and resilience will provide few benefits, just as a bank account with little money will yield almost no interest. It will also require scientists and managers that are able to “system think” working across disciplines and be imaginative and integrative, flexible and adaptive. It will also require managers who are passionate about interdependent as well as independent thinking.

Using an analogy, once a set of EcoQOs is developed for a region they should be viewed as a “tool box”. The characteristics of these tools in the tool box will range from simplistic to technical or aimed at broad to specific jobs (i.e. EcoQOs and management objectives). A set or combination of tools from the tool box may be used for specific jobs. The designers of these tools will not necessarily be the end user. Therefore when decisions are made on which tools should be taken out of this tool box, it is the end user who will ultimately decide what they want to “fix” (the management outcomes the regional society wants) and their technical know-how will determine how effectively they can “use” the chosen tool(s). Ultimately the tool box will provide the means for “maintaining” the marine environment in order to achieve long-term sustainability.

BIREME workshop The Ecosystem Approach in Research and Management was held in the Ministry of Environment, Helsinki, during 25-26 September, 2003. The Workshop was attended by ca. 60 scientists, managers and decision makers.

Sebastian Valanko made his MSc degree in the University of Plymouth in marine biology and coastal and ocean policy. In collaboration with HELCOM-MONAS he worked at the Ministry of the Environment, Finland in a pilot project into the development of a road map for the establishment of ecological quality objectives (EcoQOs) for the Baltic Sea. At present works as a Project Assistant at HELCOM with a specific task of developing the Ecological Quality Objectives for the Baltic Sea in the process of regional implementation of the ecosystem approach and European Marine Strategy.

Eeva-Liisa Poutanen is a Senior Adviser at the Finnish Ministry of Environment. She is coordinating the marine protection issues for HELCOM and OSPAR. She the Project Manager for HELCOM-MONAS pilot project for the establishment of ecological quality objectives (EcoQOs) within HELCOM for the Baltic Sea, led by Finland.

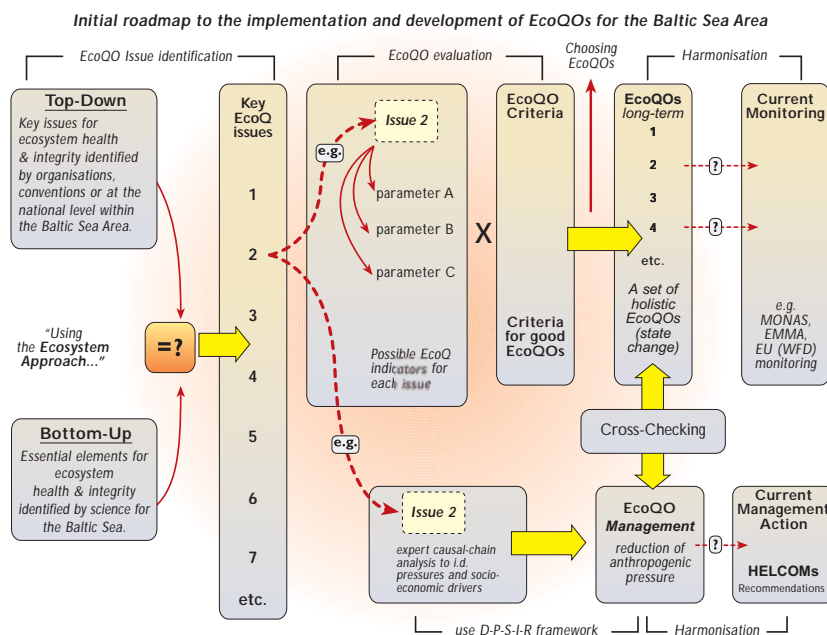


Figure 1. A road map showing the main route to be taken in the initial implementation and development of EcoQOs within the Baltic Sea area.

⁴ Robertson, D.P., Hull, B.R. 2001. Beyond biology: towards a more public ecology for conservation. *Conservation Biology*. 15:970-979.

⁵ Carignan, V., Villard, M. 2001. Selecting indicator species to monitor ecological integrity: a review. *Environmental Monitoring and Assessment* 78:45-61.

BALTIC SEA ISSUES AND RESEARCH ETHICS ON THE AGENDA AT BIREME PHD WORKSHOP



PhD Pauli Seppänen, Licentia Oy, told about scientific co-operation and protecting scientific results.

■ The Baltic Sea Research Programme BIREME hosted in late August a two-day workshop for PhD students in different fields of study. The workshop was conveniently scheduled to follow the Baltic Sea Science Congress, and participants were also able to enjoy a lively social programme of the City of Helsinki. Among the subjects covered were the ever-topical issues of good scientific practice and the protection of the Baltic Sea.

Good scientific practice

The first day of the interdisciplinary workshop was devoted to questions of good scientific practice, research cooperation and immaterial rights. The subject of research ethics inspired lively debate, clearly warranting its inclusion on the agenda. Member of the National Advisory Board of Research Ethics, Dr Arja Kallio pointed out in her talk that good scientific practice requires not only care and honesty and ethical consideration of colleagues, but also good administrative practice within the research group. In the last instance, however, responsibility for maintaining good scientific practice always rests with the individual researcher.

Immaterial rights

Researchers do not necessarily appreciate how important it is for them to agree on the immaterial rights to their research findings in advance, and in writing. Research institutes in different countries have somewhat divergent practices. Visiting researchers may be surprised to learn that, unless specifically agreed otherwise, ownership of

the materials they have brought along from their home country is transferred to the university in the recipient country.

The participants also discussed the issue of authorship: who should be listed among the authors of a scientific paper? “Mechanical work, such as pipeting, does not necessarily warrant inclusion, but any intellectual involvement should always be acknowledged. On the other hand, it might be a good idea occasionally to acknowledge the skills and contribution of laboratory staff by listing their names among the authors,” said Pauli Seppänen of Licentia Oy, a company who specialise in licensing and commercialising scientific results. In any case for all parties concerned it is probably easiest to agree on the names of the authors in advance.

Protection of the Baltic Sea

Questions of Baltic Sea protection were addressed at the workshop by studying the Helsinki Convention, EU water directives, nutrient loads on the Baltic Sea, fishing, international control of the adverse effects of maritime transport, and finally the role of research in the protection of the marine environment.

Although the state of the Baltic Sea off the coast of Helsinki, for instance, has shown signs of improving, emission levels within the Gulf of Finland are still too high. Shipping also poses an ever graver threat to the Baltic Sea. The 1992 Convention on the Protection of the Marine Environment of the Baltic Sea and the Helsinki Commission that is charged with monitoring its implementation, represent important milestones in the ongoing conservation effort in that the convention was designed to protect the Baltic Sea against pollution from all sources: the land and the air as well as from sea vessels. The EU’s new water framework directive will apply not only to inland waters but also to coastal sea areas, so it is expected that this instrument will further contribute to the protection of the Baltic Sea. The future will tell what today’s young BIREME researchers will have to say about the state of the Baltic Sea.

Leila Sihvonen works as a scientist in the BIREME project Cyanobacterial and microbial communities in the Baltic Sea: responses to environmental impacts led by the Academy Professor Kaarina Sivonen. University of Helsinki.



Leila Sihvonen
Department of Applied Chemistry
and Microbiology,
University of Helsinki

BUILDING UP THE EUROPEAN RESEARCH AREA (ERA)

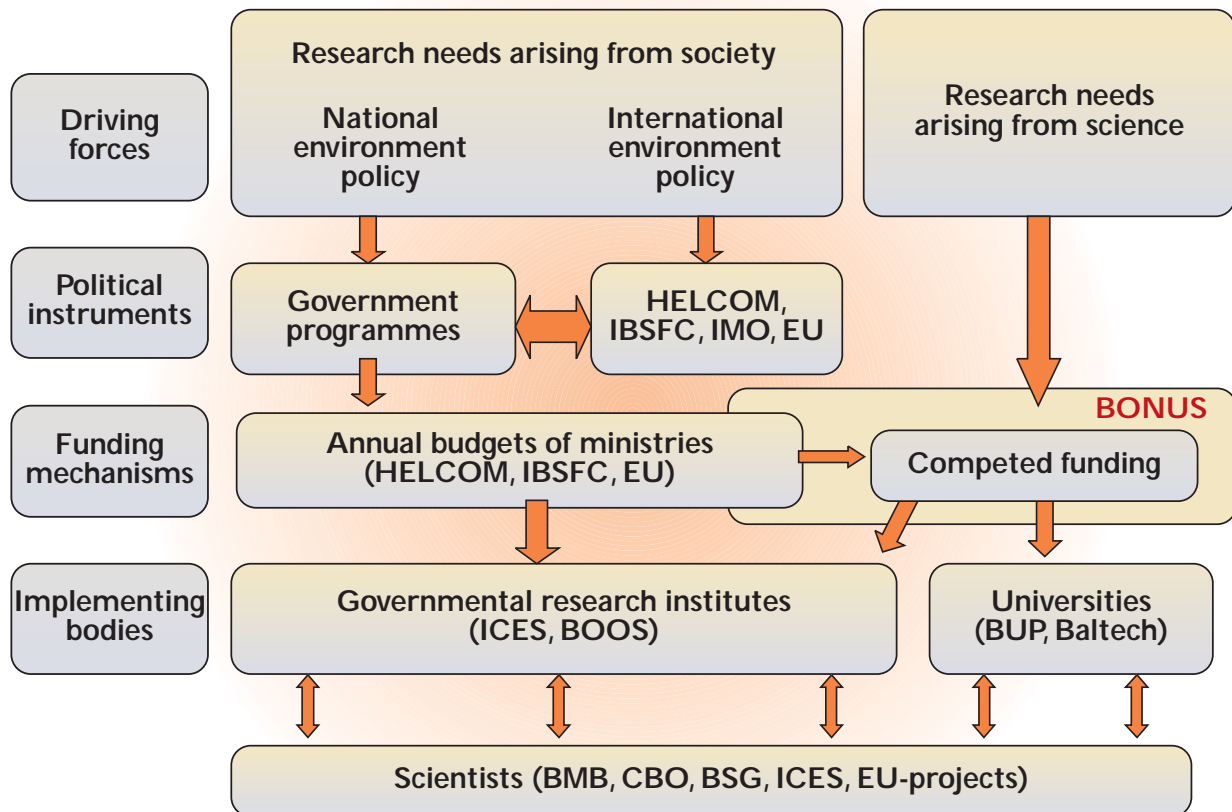


Figure 1. A schematic presentation of actors in research funding, implementation and networks in the Baltic Sea area. The networks of each actor group are presented in parentheses. The abbreviations: Baltech - Consortium in Science and Technology, BMB - Baltic Marine Biologists, BO - Baltic Oceanographers, BOOS - Baltic Operational Oceanographic System, BSG - Baltic Sea Geologists, BUP - The Baltic University Programme, HELCOM - Helsinki Commission, IBSFC - International Baltic Sea Fisheries Commission, ICES - International Council for the Exploration of the Sea, IMO - International Maritime Organisation .

“In a rapidly changing world, in which research is proving to be an increasingly vital element, Europe possesses considerable advantages. But to exploit these to the full, it needs to overcome the fragmentation of its Member States’ science and technology policies. The European Research Area (ERA) is intended to co-ordinate these national research policies in the direction of shared objectives, expertise and resources.”

BONUS ERA-NET aims at a joint research programme

The Baltic Sea is Europe’s largest internal body of water, and therefore of special interest in the European Union. A major step towards ERA will be achieved in the Baltic Sea region during the coming four years through the implementation of the project called *BONUS for the Baltic Sea Science – Network of Funding Agencies*. BONUS is a coordinating project which will be funded by the EU 6th Framework Programme ERA-NET scheme.

The rationale for establishing BONUS is the apparent lack

of networks of the funding agencies. Figure 1 shows an overview of research funding flows, research implementing bodies, already existing networks in the Baltic Sea and location of BONUS within them. It appears that in the Baltic Sea there are numerous networks which bind together institutes, universities, scientists and managers. Funding agencies usually cover a broad spectrum of disciplines, and do not therefore have thematic networks. Furthermore, these organisations are not integrated with the other actors. The current situation has created a lot of inefficacy of research funding, overlapping and gaps of research, researcher training and investments as well as difficulties in implementing global and regional research programmes in the Baltic Sea area.

The aim of BONUS is to form a network and partnership of research-funding agencies with the aim to deepening the understanding of conditions for science-based management of environmental issues in the Baltic Sea. The aim is to gradually and systematically create conditions for a joint Baltic Sea research and researcher training programme. The expected outcome of BONUS will be a programme where all partner funding agencies allocate

resources, the funding is open to researchers without national borders, and the decisions based on competition and scientific quality of proposals.

During the lifetime of BONUS, 2004–2007, the ‘status quo’ in ongoing research, research funding, marine research programme management and infrastructures will be examined and the necessary communication and networking tools established. The needs for and conditions of a joint research programme from scientific and administrative point of view will be examined. The integration of the Member States into the common funding scheme will be considered in one of the proposed tasks. Finally, an Action Plan for creating joint research programmes, including all jointly agreed procedures of programme management and aspects of common use of marine research infrastructure will be produced. An additional activity will be the development of a common postgraduate training scheme. All this will be achieved in a number of workshops where science funding administrators, infrastructure managers, teaching professors and scientists will be invited.

BONUS will bring together the key research funding organisations in all EU Member States around the Baltic Sea, including the new members, and operate in close contact with the scientific and management actors, such as HELCOM, IBSFC, ICES, BMB etc. The consortium is composed of altogether 11 partners: ten partners from eight countries and one international organisation. In addition, BONUS links seven funding organisations as associated members, which increases the number of involved organisations to 18 and countries to nine.

Following funding agencies are partners of BONUS:

- Academy of Finland, Coordinator
- Forschungszentrum Juelich
– Projekttraeger Juelich, Germany
- Danish Natural Science Council
- Estonian Science Foundation
- International Council for the Exploration of the Sea
- Ministry of Education and Science of the Republic of Lithuania
- Latvian Council of Science
- Ministry of Scientific Research and Information Technology, Poland
- The Foundation for Strategic Environmental Research, Sweden
- The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning
- Swedish Environmental Protection Agency

In addition, observers of BONUS include:

- Deutsche Bundesstiftung Umwelt
- Deutsche Forschungsgemeinschaft
- Estonian Ministry of Environment
- Latvian Environmental Agency
- Maj and Tor Nessling Foundation, Finland
- Nordic Council of Ministers:
Marine and air pollution group
- Russian Foundation for Basic Research

European Strategy on Marine Research Infrastructure

In 2002, the EU Member States established a European Strategy Forum on Research Infrastructure. Marine research was identified as one of the first fields of research to be considered. An Ad Hoc Working Group was established to identify the ‘hot topics’ in the field so as to improve the level of co-operation, while providing the basis for more coherent, strategy-led policy-making and initiatives in this area.

The report of the Working Group was published by the Academy of Finland in autumn 2003. The report reviews the diversity, operation, management and co-ordination of Europe’s marine research infrastructures as well as future requirements and investments. The Working Group recommends the establishment of a Marine Infrastructures Strategy Group composed of members mandated by Member States and Associated States active in marine research, according to the report. Creating such a Strategy Group, the report continues, would make a vast contribution to the much broader vision embodied in the European Research Area (ERA).

Programme Manager Kaisa Kononen will start to work as the coordinator of the BONUS project. She is chair of the Ad Hoc Working Group of Marine Research Infrastructure.

Kaisa Kononen
Programme Manager
Academy of Finland



THEMES OF THE BIREME PROGRAMME

Eutrophication

Eutrophication is one of the most severe environmental problems in the Baltic Sea. Funding to research on eutrophication in BIREME amounts to 2.8 Meuros, which accounts for some 50 per cent of the total funding of the programme. Following questions are studied in the BIREME projects:

- What is the most cost-effective strategy for the protection of the Gulf of Finland?
- How does the drainage area nutrient dynamics influence the state of sea?
- What kind of ecosystem information is needed for the decision-making to protect the particularly sensitive Archipelago Sea?
- What was the state of the sea in the preindustrial period?
- How do the cyanobacterial blooms function and influence the rest of the ecosystem?
- How are nutrients refrained in the coastal macrophytic plants and further transferred to herbivores?

The following twelve BIREME projects study eutrophication:

Searching efficient protection strategies for the eutrophied Gulf of Finland: the integrated use of experimental and modelling tools, D.Sc. (Agr. & For.) Heikki Pitkänen, Finnish Environment Institute.

Catchment nutrient flows and coastal retention. D.Phil. Petri Ekholm, Finnish Environment Institute.

Factors influencing phosphorus and silicon binding in the sediment. D.Phil. Mirja Leivuori, Finnish Institute of Marine Research.

Nitrogen fluxes at the sediment-water interface. Prof. Jorma Kuparinen, University of Helsinki.

Nutrients from river basins - experimental and modelling approach. D.Phil., Docent Martti Rask, Finnish Game and Fisheries Research Institute.

Pool sizes, turn-over rates, transformation, and retention of nutrients in selected water bodies.

D.Phil., Docent Lauri Arvola, University of Helsinki.

Assessing coastal water characteristics using river basin and estuary modelling. D.Phil. Ilona Bärlund, Finnish Environment Institute.

Nitrogen and greenhouse gas cycling in rivers and estuaries of the Bothnian Bay (the Baltic Sea). Prof. Pertti Martikainen, University of Kuopio.

Interpreting Baltic coastal marine ecological data for environmental decision making (IMAGINE). Prof. Erik Bonsdorff, Åbo Akademi University.

Developing a tool for assessing ecological reference conditions in the coastal zone of the Baltic Sea (DETECT). Prof. Atte Korhola, University of Helsinki.

Cyanobacterial and microbial communities in the Baltic Sea: responses to environmental impacts. Prof. Kaarina Sivonen, University of Helsinki.

Eutrophication and biotic regulation of littoral macroalgal communities.

Prof. Veijo Jormalainen, University of Turku.

Fish Biology and Fisheries

Sustainable use of the living resources of the Baltic Sea has to be based on thorough knowledge of the functioning of the catch organisms, their environment and the influence of human activities on the system. Funding for the three projects studying fish and fishery issues totals 0.9 Meuros (17%). The BIREME projects search answers to following questions:

- How to reliably assess the state of the wild salmon populations in the Bothnian Bay?
- What is the way to make local communities to commit salmon restorations actions?
- What causes the early mortality of wild salmon yolk sac?
- How do the cyanobacterial toxins enrich in the food web and influence fish populations?



The following three projects study problems associated with fish stock:

Baltic Salmon Action Plan in the Bothnian Bay rivers: interdisciplinary modelling of the evolving salmon stock and socio-economic aspects. D.Phil., Docent Jaakko Erkinaro, Finnish Game and Fisheries Research Institute.

Molecular mechanisms of early mortality syndrome (M74) in Baltic salmon (Salmo salar). Prof. Mikko Nikinmaa, University of Turku.

Trophic interactions in the Baltic Sea: how are zooplankton communities and commercially important fish stocks regulated. Prof. Markku Viitasalo, Finnish Institute of Marine Research.

Winter ecology

The northern location and strong seasonal variability of the Baltic Sea sets specific conditions for the functioning of the ecosystem. A total of 0.35 Meuros of BIREME funding (6%) is allocated to research on winter ecology. The two projects look for answers to the question:

- How do nutrients and energy cycle in the Baltic sea during winter?

The Baltic Sea ice bacteria: The community structure and role in wintertime biogeochemical transformations. Prof. Jorma Kuparinen, University of Helsinki.

The role of Baltic Sea ice biota in carbon cycling during winter. Prof. Harri Kuosa, University of Helsinki.

History and governance



Both the environmental problems and their management are strongly linked to the socio-economic development in the drainage area. The state and development of the sea cannot be considered in isolation of human activities. A total of 0.5 Meuros (9%) of BIREME funding goes to projects dealing with history

and governance in the Baltic Sea states. The two projects look for answers to the following questions:

- How has the environmental governance developed in the Baltic Sea region and how it influenced the local communities and local environment?
- When and how did the environmental problems become issues in the Baltic Sea region?

Governing a common sea (GOVCOM) Changing modes of governance in the Baltic Sea region, D.Soc.Sc. Marko Joas, Åbo Akademi University.

The sea and the societies: approaches to the environmental history of the Baltic Sea, D.Soc.Sc, Docent Simo Laakkonen, University of Helsinki.

Biodiversity

Due to its brackish water character, the biological diversity of the Baltic Sea is relatively low. New species are, however, continuously establishing themselves in the Sea. The ecological consequences of such invasions are not known. BIREME funding for projects studying biodiversity totals 0.64 Meuros (12%). The questions to be answered are:

- How do alien species enter and influence the Baltic Sea ecosystem?
- How does the feral American mink influence the bird, mammal and plant diversity in the archipelago?

Is the biological integrity of the Baltic Sea threatened by invasive non-native species? (BITIS) Prof. Erkki Leppäkoski, Åbo Akademi University.

Human impacts on biodiversity in the Baltic Sea - invasion of an alien predator and return of a native top-predator. Prof. Erkki Korpimäki, University of Turku

Toxins

Fish and fish products account for the majority of the dietary intake of dioxins by the Finnish people. This problem is studied by one BIREME project with the funding of 0.36 Meuros (6%). The project is searching for answers to the question:

- How do the toxic organochlorines accumulate in the Baltic Sea fish stocks?

Bioaccumulation of dioxin-like organochlorines in Baltic fish - experimental and modelling approach (DIOXMODE), Prof. Juha Karjalainen, University of Jyväskylä.

In January 2004, a few Finnish–Russian collaborative projects will be added to BIREME. The joint call was announced by the Academy of Finland and the Russian Foundation for Basic Research in August 2003, and the decision about projects to be funded will be made in December 2003.

Multidisciplinary in MARINE RESEARCH

Preliminary programme

Wednesday, 11 February

9:00 – 10:00 Registration

Session 1: Socio-economic dimensions of the protection of the Baltic Sea

10:00-11:00 Keynote lecture: Sustainability science and global environmental challenges
Prof. Roger Kasperson,
Stockholm Environment Institute, Sweden
11:00-12:30 Presentations by BIREME research groups
12:30-13:30 *Lunch*

Session 2: The Baltic Sea living resources

13:30-15:00 Presentations by BIREME research groups
15:00-15:30 *Coffee break*
15:30-16:30 Presentations by BIREME research groups
16:30-16:45 *Stretching break*

BIREME-business-session

16:45-18:00 Reporting and preparation for the BIREME evaluation in 2006

Thursday, 12 February

Session 3: Land-sea interactions and eutrophication in the Baltic Sea

9:00-10:00 Keynote lecture: Drainage area – sea interactions in large US estuaries
Prof. Donald Boesch, University of Maryland Center for Environmental Science, USA
10:00-12:00 Presentations by BIREME research groups
12:00-13:00 *Lunch*
13:00-15:00 Presentations by BIREME research groups

15:00-15:30 *Coffee break*
15:30-17:00 Presentations by BIREME research groups
17:00-18:30 Poster session
18:30- *Conference dinner*
Friday, 13 February

Session 4: Emerging issues in research of marine ecology and biodiversity

9:00-10:00 Keynote lecture: Patterns and processes in marine biodiversity
Prof. John Gray, University of Oslo, Norway
10:00-12:00 Presentations by BIREME research groups
12:00 End of the symposium

Registrations and abstracts of oral/poster presentations should be sent no later than 9 January, 2004 to tuula.nyqvist@aka.fi. All abstracts should be sent in electronic format by e-mail as attachment. If possible, use MS Windows Word, English (Br) lettering. Arial 10 pts and single line spacing. The whole abstract, together with possible graphs and pictures must fit on A4 page. No editorial work is made by the Secretariat.

Symposium fee is 100 euros per person, and should be paid no later than 9 January, 2004, to the Academy account Nordea 166030-112337 with a reference to 'BIREME symposium 11-13.2.2004', and including the names of the participants.

Accommodation is available at the Hanasaari Cultural Centre. The cost for a single room is 94 euros per night and for a double room 126 euros per night, including sauna and breakfast. For room reservations, please contact myyntipalvelu@hanaholmen.fi, or tel. +358 9 43502411, fax. +358 9 467291. A quota of rooms is reserved for BIREME until 9 January, 2004. Thereafter the organisers cannot guarantee free rooms at the Cultural Centre.

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