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Transboundary management of Transitional Waters – Code of Conduct and Good Practice examples

Editors:
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This report contains the Code of Conduct and Good Practice examples developed within the international project ARTWEI.

ARTWEI aims at developing methods for effective management of transitional waters in transboundary areas. Focus areas of the project are four different waterbodies in the south Baltic Sea which all are located in transboundary areas, namely Curonian lagoon, Vistula lagoon, Odra lagoon and Öresund. ARTWEI is an EU co-financed project and runs from March 2010 to February 2013. Lead Partner of the project is Klaipeda University and the partnership consists of five organisations from Lithuania, Germany, Sweden, Poland and one associated organisation from Russia.

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Preface

Mikhail Durkin

Baltic Marine Environment Protection Commission (Helsinki Commission – HELCOM)

The Baltic Sea is one of the smallest seas in the world; however it is one of the world's largest semi-enclosed bodies of brackish water[1]. It represents an example of an almost completely land-locked sea with unique ecosystem consisting of a variety of marine, brackish and freshwater species, and very slow water exchange. One could even say that the whole sea by itself is a "transitional" area between freshwater and marine/ocean ecosystems. All of this forms the basis to increased vulnerability of the Baltic ecosystem to any impacts, caused from its quite densely populated catchment area with over 85 million people living in it. Management of these impacts require commitment at political level and efficient coordination of activities among all the countries located not only along its coasts but within the whole Baltic Sea catchment area.

Such cooperation started in 1974, when the Baltic Marine Environment Protection Commission (Helsinki Commission or HELCOM) was created. It works to protect the marine environment of the Baltic Sea from all sources of pollution through intergovernmental cooperation between Denmark, Estonia, the European Community, Finland, Germany, Latvia, Lithuania, Poland, Russia and Sweden. HELCOM is the governing body of the "Convention on the Protection of the Marine Environment of the Baltic Sea Area" - usually better known as the Helsinki Convention.

HELCOM's vision for the future is a healthy Baltic Sea environment with diverse biological components functioning in balance, resulting in a good ecological status and supporting a wide range of sustainable economic and social activities having biodiversity at its core and which builds upon concepts such as "favourable conservation status" and "good ecological and good environmental status". To reach this vision and to support ecosystem-based management for protection of the Baltic Sea marine environment, HELCOM adopted in 2007 the Baltic Sea Action Plan (BSAP), addressing major current environmental challenges. The HELCOM BSAP stresses the need for integrated management of human activities and the need to take into account their impacts on the marine environment in all policies and programmes implemented in the Baltic Sea region; and further the need for integration of environmental objectives with economic and socio-economic goals in order to advance and strengthen the three interdependent pillars of sustainable development. These issues become particularly important in transitional waters where the integration and coherence of land-based and open sea practices management is even more crucial.

Actual transitional waters in the Baltic Sea are represented by large river estuaries, lagoons, numerous coastal archipelago areas and fjords. Most of them, especially coastal lagoons and wetlands, receive nutrients and hazardous substances from the rivers entering them and from direct land runoff. Agriculture and insufficiently treated municipal and industrial wastewaters are significant sources of such pollution that threatens biodiversity and hinders nature conservation in these rich habitats. The complexity of environmental management measures in these areas is in many cases connected with their transboundary nature. This is further complicated by impacts originating not only from riparian countries, but from the whole drainage area.

In 1993, HELCOM addressed transitional waters, represented by coastal lagoons and wetlands in the Baltic Sea Joint Comprehensive Environmental Action Programme (JCP, to be completed in 2012). It aimed "to formulate and carry out programmes to manage these environmentally sensitive and

[1] HELCOM, 2010 Ecosystem Health of the Baltic Sea 2003–2007: HELCOM Initial Holistic Assessment. Balt. Sea Environ. Proc. No. 122.

economically valuable areas which serve as important buffers of pollution before it reaches the Sea, and provide critical habitat for diverse flora and fauna including commercially important fisheries." (HELCOM 1993). These management systems should include land use controls and limited infrastructure, and in some cases will be integrated with compatible eco-tourism and recreation developments possibly through public/private joint ventures or private investments. Originally, the programme was scheduled to be finalised by 2002, however it turned out to be a longer and more difficult task. Most of the initial coastal areas designated as hot spots within the JCP still remain on the list of most critical and impacted areas in the Baltic Sea.

The first phase of work in the following target areas aimed to develop common management plans:

- The Matsalu Bay in Estonia;
- The Gulf of Riga, shared by Estonia and Latvia (later sub-divided into the Käina-Bay and Engure-Kemeri areas);
- The Curonian (Kursiu) Lagoon, shared by Lithuania and the Kaliningrad Oblast in Russia;
- The Vistula Lagoon, shared by the Kaliningrad Oblast and Poland;
- The Oder/Odra Lagoon, shared by Poland and Germany.

The overall objectives of these plans were:

- to provide information on the most urgent and pressing environmental and conservation problems in each Task Area;
- to provide a mechanism for closer coordination and integration between environmental concerns and major economic activities in the Areas concerned;
- to provide national, regional and local authorities with guidelines for sustainable and ecologically sound development in the coastal areas covered by the plans.

Five Integrated Plans were finalized in 1998, however these plans quite differed in quality, and were recommended for further upgrade in terms of operationalization and wider involvement of the public in the decision-making process, in order to provide a good basis for implementation.

Although, four of five areas still remain as unresolved environmentally critical hot spots, the major changes in the region regarding transitional waters occurred since the accession of the Baltic republics and Poland into the European Union in 2004. This has led to adaptation of common water quality standards across the region, *inter alia,* for coastal waters, providing them with joint principles for assessment of their current state and same level of protection.

However, the variety of stakeholders involved in transitional waters management in the Baltic Sea Region, as well as problems with multi-level governance in these areas still require further development of common agreements or codes of conduct for efficient management and protection of these waters. This task was tested during 2 years of implementation of the ARTWEI Project and is presented in this report to your attention and feedback.

HELCOM supported implementation of the project as it contributes to implementation of the Baltic Sea Action Plan and specifically addresses the situation in three of the remaining coastal hot spots and will provide input to the next HELCOM Ministerial Meeting in 2013 as an input to the review of implementation and efficiency of the Baltic Sea Joint Comprehensive Environmental Action Programme. The outcomes of the project will be further utilized by national, regional and municipal authorities, e.g. in the process of reviewing programmes of measures under the EU Water Framework Directive.

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Executive Summary

Henrik Nilsson, Ramūnas Povilanskas & Nardine Stybel

Abstract

Transitional waters have the ecological peculiarity of being both very fragile and resilient at the same time. The degradation of the transitional waters and the decline of their economic value arise from the excessive use of the resources, external input of pollutants mostly brought by large tributaries and from the mismanagement of the adjacent areas. The EU Water Framework Directive has accelerated the transboundary co-operation and development of spatially integrative management approaches in the south Baltic transitional waters. A high-level political committment in countries sharing a transitional water body, a professional agency, a stakeholders‘ forum and regular funding is the key to successful transboundary management of transitional waters.

In the legislation of the European Union "transitional waters" are defined as "bodies of surface water in the vicinity of river mouths which are partially saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows". These areas are diverse, highly productive, ecologically important systems on a global scale and highly valuable for the services they provide to human societies. Transitional waters have the ecological peculiarity of being both very fragile and resilient at the same time, and possess those emergent properties that actually favored the development of human societies and cultures. The effective management of lagoon inlets for ensuring the best hydraulic functioning of the basins is a clear example of adaptive management, resulting in the optimization of the fish catch yield, as well as in the conservation of the high ecological status.

The process for identifying coastal and transitional water body types initiated by the Water Framework Directive of the European Union (WFD, 2000/60/EC) requires the development of new approaches and the need to agree on a common set of typology factors and their categories for comparable and consistent typology categorization across the coastal areas of the regional seas. It is also acknowledged that the estuarine and coastal types are not distinct categories that can be easily identified by a set of factors, but rather a continuum. It is questioned whether estuaries and other transitional waters should be excluded from the geographical coverage of the EU Marine Strategy Framework Directive (MSFD, 2008/56/EC). As a result of the definition vagueness, each Baltic Sea country has adopted different approaches and some do not appear to be designating to any transitional waters. Yet, the differences in formal designation should not be considered as an obstacle for the transboundary cooperation efforts in the management of transitional waters.

Goods and services delivered by transitional water ecosystems can be grouped into six broad groups: conservation of aquatic biodiversity; protection of coastal environments from both physical disturbance due to flooding, and chemical disturbance due to watershed pollution; production of goods, in terms of fish, mussel, clam and shrimp production; providing amenities for nature- and water-tourism and other outdoor leisure activities; maintaining specific coastal cultural and historical heritage values; providing information and data for environmental research, education and public awareness efforts. The main ecosystem goods (commodities) delivered by the transitional waters are mostly related to the harvesting of shell- and fin-fish resources. Meanwhile, the ecosystem services delivered by the linear fringes of the transitional waters are primarily related to recreation and tourism. Increasing use of resources by all sectors of the society and the mismanagement as a result of many conflicting stakeholder interests are responsible for the degradation of the transitional waters and

potential decline of their economic value. Successful reversal of the degradation of transitional waters needs sound scientific information that can be used to quantify the costs of policy enacting and benefits of a proper management of their natural resources and economic functions.

The most critically important challenges for the management of the South Baltic transboundary transitional waters are the ones that threaten the transitional waters' ecosystem integrity. Environmental problems in the transitional waters arise from the external input of pollutants mostly brought by large tributaries, but also from the mismanagement of the areas adjacent to the transitional waters. Although a significant number of sewage treatment facilities were constructed during the last decade, environmental conditions of the south Baltic lagoons have not improved to the expected extent, probably due to the recovery of agriculture and re-emission of nutrients deposited in sediments. The south Baltic lagoons and estuaries are important as "stepping stones" and migration corridors for many endangered fish and bird species. The threat of invasive flora and fauna species is considered to be a moderate one yet. The global climate change increases the probability of a catastrophic inundation. However, cooperation between the countries on natural or technological hazard prevention, or transboundary environmental impact assessment of possible large-scale development projects, is still missing in the countries sharing the south Baltic lagoons. The first step in transboundary co-operation usually is the need to negotiate the quotas for commercial fish landing on a regular basis. The WFD has accelerated the transboundary cooperation and development of spatially integrative management approaches in the south Baltic transitional waters. Even if the WFD regulations are not legally binding for Russia, the WFD presumes developing close cooperation with the neighbouring non-EU states. Ultimately, the South Baltic transitional waters that are under the influence of large rivers, with a large population, a high number of authorities and organisations in the catchment area, as well as complex political and legal structures, require high ranking political commitments, clear objectives and structures, an adequate body and regular financing as a basis for the transboundary management.

On a broader European and worldwide geographical scale, several principles to resolve the key challenges of transboundary management of transitional waters have proven to be successful in practice. They recognize that a high-level political committment in countries sharing a transboundary transitional water body and a joint umbrella agreement on key issues of common concern and potential principal solutions provide the response to conflicting jurisdictions and political uncertainty. The agreement should contain a list of priority issues where joint actions must be taken. For the agreement to be truly effective, it must be supported by three key elements: a dedicated professional agency established jointly by the cooperating countries, an integrated management plan and a common information sharing platform. The plan should address the issues of common concern of bordering countries in the management of a transboundary transitional water body combining them with the management of the catchment area and the adjacent marine nearshore. Transboundary management of transitional waters should also be facilitated by a bilateral forum of interdisciplinary expert groups, direct users and other interest groups involved in the planning and decision-making process, the transboundary environmental impact assessment procedures, education projects empowering local communities, as well as involving local people in economic activities facilitated by the plan.

A combination of physical, hydrographical and ecological criteria, which will be relatively different in every case, should be applied to single out the transitional water body as a distinct planning and management area. Thematic scopes of the transitional waters' management can range widely – from fulfilling the WFD requirements for water quality to a comprehensive addressing of environmental, social, economic and other issues on local, regional, national, transboundary and international scale. The planning process for transitional water management is a continuous cyclical process following a sequence of basic steps from analysis to synthesis, action, review, assessment and revision of goals, strategies, priorities and measures. It includes seven phases: initiation, existing situation analysis, identification of conflict and opportunities, identification of goals and alternative courses of action, development of a strategy, implementation, monitoring and evaluation.

The planning process for transitional waters, particularly the transboundary ones, needs to be integrated, inclusive, transparent and dynamic. It should reflect the provisions of the international management frameworks that are pertinent to the reinforcement of transitional waters' environmental integrity. The planning document for the integrated transitional water management has to specify concrete management goals, sectoral and cross-sectoral objectives. It must also identify the key policy measures, priority actions, necessary resources, commitments concerning funding, actors involved in the implementation, a schedule for the implementation, tangible targets, indicators and benchmarks for the transboundary management cohesion assessment. All these elements have to be linked in a coherent way and related geographically. Multi-criteria techniques are applied to discriminate between the various alternative strategic options in order to select the best one.

A bilingual coastal information system for a transitional water body should be seen as the key tool facilitating transboundary information exchange. Its relevance is particularly high considering the needs to support management integration between the downstream river basin, a transitional water body and the adjacent marine nearshore. The effectiveness of such a system depends on whether or not governmental institutions in the countries sharing a transboundary transitional water body are willing to share data in their possession with institutions in another country, even if both institutions collect similar data in the same transboundary water body. The cross-border information exchange system can be sustainable only if the rules and principles for information exchange are agreed upon and the committed personnel and funding sources are available on both sides of the border for a longer time.

Strategic environmental assessment (SEA) is presumed for all large-scale projects (both, private and public) that are subject for governmental approval. Public participation must enable the concerned public to express their opinion on the draft plan or programme and the environmental report. It should employ easy-to-use consultation techniques that are suitable to facilitate active public participation. The transboundary SEA and/or environmental impact assessment (EIA) process can be triggered by the public concerned when it considers that it would be affected by a significant adverse transboundary impact of a proposed activity, and when no notification has taken place in accordance with the provisions of the Espoo Convention. If the project initiating state has not ratified the Espoo Convention, the Kiev Protocol, or is not an EU member, then the progress of SEA depends upon the legal capacity, determination and skills of the interest groups.

The key requirements for effective public participation are best met by a non-governmental forum of local stakeholders from the states sharing a transboundary transitional water body. The nomination of such a forum as a joint body, which is responsible for organizing the involvement of the public concerned, should be the subject of the multilateral agreement among all concerned states. The multilateral agreement should also make clear what the roles and responsibilities are in informing the public and in transferring the public comments to the competent authority of the country of origin.

Usually, full documentation should be available in the original language whereas a non-technical summary should be translated to the language(s) of the potentially affected state(s) and distributed widely. Formal public hearings combined with informal interactive workshops are the most effective public participation tools. The Kiev Protocol (Article 8.2) refers to electronic media as primary means to ensure the timely public availability of the draft plan or programme and the environmental report.

Domestic government budgets are still the single largest source of funding for the transboundary cooperation in transitional waters' management. Yet, the importance of the international financial assistance for biodiversity conservation, which has become increasingly driven by social and economic objectives, rises since governments cut these expenditures because economic needs in the countries increase. The development benefits might be the main rationale for conserving biodiversity and maintenance of natural or semi-natural habitats and ecosystems of transitional waters. An optimal management financing model and partnership should rely on a professional management agency, whose activity is regularly financed from the governmental sources, supported by a non-governmental stakeholders' forum funded from various endowment funds and providing the economic base for the

sustainable local economic activity. Ecotourism development should not be regarded as a panacea for the development problems and a universal tool capable of sustaining transboundary co-operation in the transitional water areas. A continuous funding base for sufficient time is required to ensure progress in the transboundary co-operation on nature conservation in some economically disadvantaged areas.

Scientific research and monitoring in transboundary transitional waters require attention to both ecological and socio-economic values. When the transitional water body is a transboundary one, i.e. administered by more than one country, an additional perspective related to politics and power also needs to be considered. The idea of establishing a common platform for monitoring, research as well as data sharing, needs to be promoted, and the win-win possibilities for all involved parties should be emphasised in the evaluation and revision process. A key factor for successful implementation of a monitoring programme in transboundary transitional waters is the environmental awareness and interest among local, regional and national authorities, and stakeholders prior to the start of the programme. Part of the successful long-term environmental co-operation stems from a strong concern among the public and local authorities for the environmental integrity of the transboundary transitional waters.

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Transboundary management of transitional waters – Code of Conduct and Good Practice examples

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Abstract

This Code of Conduct on Transboundary Management of Transitional waters is one of the major outcomes of the ARTWEI project, which is implemented within the EU South Baltic Cross-border Co-operation Programme 2007-2013. The objective of the Code of Conduct is to provide guidelines for transboundary management of transitional waters. The guidelines are based on good practice examples of already implemented actions collected mainly from the south Baltic Sea but also from elsewhere in Europe and North America.

A significant part of all large marine ecosystems in the world are shared by two or more countries. Environmental management of these waterbodies related to pollution control, the conservation of biodiversity, management of fisheries or maritime transport thus requires a transboundary approach, giving special attention to cross-border management. Transitional waters such as estuaries, lagoons, river mouths and deltas located in transboundary areas add another challenge to the management of such water bodies. There are over 50 large transboundary transitional water bodies worldwide. The best-known example is the Wadden Sea, one of the largest coastal lagoons in the world shared by the Netherlands, Germany and Denmark.

Transitional waters are diverse and highly productive and therefore also very important for the environmental (ecological) integrity. They provide habitat and food for many different species and serve as reproduction areas and migratory corridors for several species. For the human society they also play an important role in supporting several different socio-economic functions such as providing space for settlement, producing living/non-living resources and absorb unwanted products such as sewage and waste. Assessing transitional waters in a transboundary area requires a holistic approach taking into account not only the transitional water body per se but also river basins, catchment areas and coastal and marine waters. Such approach can reduce potential conflicts and also streamline policies in order to avoid potential overlaps.

The term “transitional waters” came into place in 2000 through the publication of the EU Water Framework Directive (2000/60/EC). The term was coined to maintain a simple distinction of surface waters into fresh waters, intermediate waters and coastal waters. In the directive, transitional waters are defined as “bodies of surface water in the vicinity of river mouths which are partially saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows”. The WFD has several different objectives including preventing and reducing pollution, promoting sustainable water usage and improving aquatic ecosystems. The ultimate objective however is to achieve good ecological and chemical status for all EU waters by 2015. The WFD also requires all EU member states to identify all river basins lying within their national territory and designate a competent authority for the management of these. By 2012 an identification and analysis of each river basin district must have been carried out and management plans developed and implemented in order to inter alia reduce pollution from discharges, preserve protected areas and prevent deterioration.

Since 2010 seven universities, research institutes and environmental NGOs, from five countries, in the south Baltic Sea have been working together in the EU co-financed project ARTWEI (Action for the Reinforcement of Transitional Waters Environmental Integrity) implemented within the South Baltic Cross-border Co-operation Programme 2007-2013. The principal aim of the project has been to improve the environmental management of transitional waters in the south Baltic Sea by addressing the issue from two perspectives; cross border management and reinforcement of environmental (ecological) integrity. A transboundary regional approach has been the backbone of the project developing measures and recommendations that are based on local examples but that could be applied in similar contexts elsewhere in the European Union and the World.

Focus areas of the project have been four different transitional waters in the south Baltic Sea that also are transboundary waters i.e. administered by more than one country. The focus areas are: the Curonian lagoon (LT/RU), the Vistula lagoon (RU/PL), the Odra (Szczecin) lagoon (PL/DE) and the Sound (Öresund/Øresund) (SE/DK). In each focus area a stakeholder body was established in an early phase of the project involving, apart from the project partners, also local stakeholders such as public authorities, NGO's and research institutes. The setting up of the stakeholder bodies ensured a continuous communication with local organizations and also the possibility to provide input to policy makers on environmental management of transitional waters.

All four transitional water areas addressed within the ARTWEI project are facing large challenges when it comes to environmental protection. Their attractive locations near the coast attracts more and more people to dwell in the area and during the summer months large numbers of people come to use the areas for recreational purposes. These developments put heavy anthropogenic pressure on the coasts and water bodies, and also increase the competition for space in a limited area, thus creating a number of potential sources for conflicts. Moreover, eutrophication is an overall problem in large parts of the Baltic Sea, which also affects the transitional waters with regular blooming of cyanobacteria every summer. Öresund in particular, being one of the most heavily trafficked waters in the world, is facing increasing maritime transports passing through the sound. More in numbers and larger in volume, vessels transporting oil and other hazardous substances have changed the risk pattern in Öresund and an accident resulting in a major oil spill is likely to happen sooner or later. The Vistula, the Curonian and the Odra (Szczecin) lagoons, on the other hand, being the end stations for large rivers, face concern due to the pollution from industries and agriculture in the drainage areas.

Perhaps the greatest challenge to environmental management of the transitional waters is the recognition of the river basin - transitional area - open sea as one integrated area. Difficulties in adopting such holistic approach when assessing, analysing and managing transitional waters have hampered the development of efficient environmental management progress.

One of the major outcomes of the ARTWEI project is this Code of Conduct on Transboundary Management of Transitional waters. The objective of the Code of Conduct is to provide guidelines for transboundary management of transitional waters. The guidelines are based on good practice examples of already implemented actions of transboundary transitional waters' management. 33 case studies have been compiled based on the experience of the project partners and other stakeholders in the four project target areas. Several studies present good practice examples of the transboundary transitional water management in the Wadden Sea and Ireland, as well as in North America.

The 'OURCOAST' database of good coastal management practice case studies, which was compiled for the Directorate General Environment of the European Commission, was also used for the purpose of this Code of Conduct. Several partners and experts participated in both the, OURCOAST and ARTWEI projects and, hence, in the creation of both good practice case study databases, so the synergy was welcome. It was agreed by the ARTWEI project team, that the structure of the good practice case studies compiled for this Code of Conduct will follow closely the structure of the case studies compiled for the OURCOAST project. Hence the labels of the case study rubrics: 'Experiences that can be exchanged', 'Overview of the case', 'ICZM tools', 'Success and Fail factors'.

The intended target groups of this Code of Conduct and Good practice examples are public administrations on local, regional and national levels working with planning and environmental management. In addition it is also aimed for NGOs and private stakeholders who are working to improve management of transitional waters in a transboundary area.

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Introducing transitional waters

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Abstract

Transitional waters are defined by the European Commission as "bodies of surface water in the vicinity of river mouths which are partially saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows." These areas are diverse, highly productive, ecologically important systems on a global scale and highly valuable for the services they provide to human societies.

1 Introduction

"Where land, freshwater and sea meet, these environmental changes became so evident as to be representative of a transitional landscape, which integrates, on the one hand, natural processes ranging from the scale of microbial loop dynamics to that of climate changes, on the other, the history of human societies." (Basset & Carrada 2007)

The term transitional waters was introduced in 2000 with the publication of the Water Framework Directive of the European Communities (WFD, 2000/60/EC) to describe the continuum between freshwaters and coastal waters. In the Official Journal of the European Communities 43 (L327), transitional waters are defined as "bodies of surface water in the vicinity of river mouths which are partially saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows". These areas are diverse, highly productive, ecologically important systems on a global scale and highly valuable for the services they have provided to human societies from as early as the Neolithic age. They supplied food, shelter, transportation and also served as natural wastewater treatment systems. The presence of human settlements along the shores of estuaries and lagoons has been documented since ancient times, representing the nucleus of early civilization and later social and economic establishments. In the Mediterranean basin, we have a number of documented evidences of a multiple use of coastal lagoons, from fisheries to transportation (Castagnoli 1976, Breber et al. 2008). In the first century A.D., Romans used the Tyrrhenian coastal lagoon system as a transit route between Rome and Naples for commercial and military purposes.

2 Experiences

From the ecological point of view, transitional waters are ecotones between terrestrial, freshwater and marine ecosystems, being characterized by high spatial heterogeneity and temporal variability (Basset et al. 2006). The term transitional waters embraces a wide array of ecosystems types, including river mouth ecosystems, lagoons, coastal lakes, rias, fjords and fjards, brackish wetlands and hyper saline ecosystems. Due to the hydrological balance between fresh water and marine forces, transitional waters, particularly the rias and the lagoon types, are sedimentary and nutrient sinks, modulated through multiple scales of variation according to the dial and lunar tidal cycles, seasonal and longer terms, precipitation cycles, and climate (Comin et al. 2004, McLusky & Elliott 2007).

Provisional classification of different coastal types covered by the term transitional waters is provided in the table below:

Table 1.1: Main physiographic forms included within the term transitional waters (after McLusky & Eliott 2007) *present around the Baltic Sea

Type	Characteristics
Classical estuary*	Tidally dominated at the seaward part; salinity notably reduced by freshwater river inputs; riverine dominance inward
Fjord*	Land freshwater seepage or markedly seasonal riverine inputs; limited tidal influence; stratified; long narrow, glacially eroded sea inlet, step sided, sill at mouth
Lentic non-tidal lagoon*	Limited exchange with the coastal area through a restricted mouth; separated from sea by sand a restricted mouth; separated from sea by sand or shingle banks, bars, coral, etc., shallow area, tidal range < 50 cm
Lentic microtidal lagoon	As above but with tidal range > 50 cm
Ria	Drowned river valley, some freshwater inputs; limited exchange
River mouth	River outlet as well-defined physiographic coastal feature
Delta*	Low energy, characteristically shaped, sediment dominated, river mouth area; estuary outflow
Coastal plume*	Outflow of estuary or lagoon, notably diluted salinity and hence different biota than surrounding coast

Transitional waters are under heavy anthropogenic impact being the sites of major cities and ports. Because of this, these waters have been degraded by port activities, dredging and the pollution from urban, industrial and agricultural areas, aquaculture and fishing. These problems have a profound impact on human wellbeing in coastal areas, since the goods and services provided by the transitional waters, as diverse and special aquatic ecosystems, are affected as well. Therefore, the transitional waters of the European Union have recently received special attention from legislators.

Transitional waters, being ecotones between freshwater, marine and terrestrial ecosystems, have always prompted the need to be categorized into operational types from both the scientific and applied points of view (Basset et al. 2006). Although an operational definition of transitional waters is provided by the EU Water Framework Directive, there is, indeed, an ambiguity originating from different approaches by the member states in defining transitional waters (Elliott & McLusky 2002, McLusky & Elliott 2007).

According to McLusky and Elliott (2007) the term transitional waters is used in practice as meaning "Aquatic areas which are neither fully coastal nor enclosed or flowing freshwater areas" and may be defined by physiographic features or discontinuities or by salinity or any other hydrographic feature. In the next decade, these discussions of habitat definition will become more important within Europe, given the implementation of the EU Water Framework Directive (WFD, 2000/60/EC) and also the limits of jurisdiction of the Marine Strategy Framework Directive, MSFD (i.e. whether it will stop at the seaward limits of the transitional waters or whether it will go to the Tidal High Water mark inside estuaries and lagoons). This will require the member states to define the different types of transitional waters throughout Europe and to delineate the borders of these waters.

The WFD is a wide-ranging and ambitious piece of European environmental legislation, which provides for a strengthened system for the protection and improvement of water quality and dependent ecosystems (SEA 2010). The WFD process for identifying coastal and transitional water body types required the development of new approaches and the need to agree on a common set of typology factors (i.e. salinity, tidal range, exposure, etc.), and their categories for comparable and consistent typology categorization across the coastal areas of the regional seas. It was also acknowledged that the

estuarine and coastal types are not distinct categories that can easily be identified by a set of factors, but instead by a continuum (Box 1.1).

The borderline between two separate types has therefore often been difficult to define (Borja et al. 2010). The question is whether estuaries and other transitional waters should be excluded from the MSFD if they have a large marine influence, e.g. tidal systems or where salinity incursion occurs, as these are by definition part of marine systems. In their conclusion, Borja et al. (2010) emphasize that there is a need for a completely coordinated approach and a harmonized, seamless transition from catchment through transitional waters and coast to an open marine system.

Despite the fact that the technical typology defined in the EU Water Framework Directive proved to be essential for defining a set of environmental descriptors and reinforcing environmental protection, the transitional waters are still a very complicated and often not clearly defined term in this typology. This definition is even more problematic when applied to the three largest European transboundary lagoons situated in the Baltic region. The situation is especially complicated because two of these transitional water bodies are shared with Russia, which is not a part of the EU and, therefore, the term transitional waters has no legislative consequences in the Russian parts of these lagoons.

The distribution of various types of transitional waters varies largely between different seas in Europe (Fig. 1.). Schernewski & Wielgat (2004) highlighted that each Baltic country has adopted a slightly different approach and some do not appear to be designating any transitional waters. In the Baltic Sea area, Finland and Estonia do not appear to have transitional waters, while in Sweden an attempt was made to overcome the problems in designating transitional waters by even suggesting a further category, that of enclosed, brackish coastal types. The North Sea and Baltic coasts of Denmark have no transitional waters. In Germany its North Sea estuaries are designated as transitional waters (the Weser, Elbe, etc.) but not its Baltic Sea estuaries and lagoons. For example in the Odra lagoon, the Polish and German parts belong to different typologies (the Polish part being designated as transitional waters whereas the German part as coastal waters), which is confusing for both research and management matters. Lithuania considers the Curonian lagoon to be a transitional water body. Yet, the discharge plume from the Klaipeda Strait into the Baltic Sea is also designated as transitional waters. Latvia treats the Daugava River estuary and the riverine discharge plume into the Gulf of Riga as a transitional water area. Poland has designated the entire areas of the Odra (Szczecin) Lagoon, Vistula Lagoon and a part of the Gulf of Gdansk (the inner Puck Bay) as its transitional waters as well as parts of the Gulf of Gdansk and Pomeranian Bay where riverine plumes occur (Krzyminski et al. 2004). Poland has also designated the coastal areas affected by the riverine/lagoon plumes discharging into the open Baltic Sea as transitional waters.

Most of the properties of transitional waters derive from both hydrological balance and land-water interfaces (Box 1.1). They are characterized by strong directional gradients of salinity, organic matter, nutrients and oxygen concentrations, which act as fine-mesh filters in selecting potential colonizer species. From a trophic point of view, transitional waters are very productive. The overall hydrologic and ecological balance that maintains the ecological status of transitional waters covers scales ranging in time from minutes and hours for bacterial and primary producer turnover to years for long-term hydrologic balance and large species population dynamics; in spatial terms, from microns, as regards nutrient exchange at the cell surface interface, up to hundreds and thousands of kilometres for processes driving material loads from the watershed, and migratory species dynamics.

Transitional waters play a key role as spawning grounds for fish and invertebrates and support a rich biodiversity and provide migration corridors for fish and waterfowl (Breber et al. 2008). They are often valuable natural heritages, are suited for human settlements and provide relevant biological resources, which have been commercially exploited since prehistoric times (Viaroli et al. 2005). A step backward in our history shows that the spatial distribution of successful societies in the past was not random, but was rather the result of favourable ecosystem conditions, which, in turn, were determined by emergent properties at local and regional scales (Viaroli et al. 2005).

Box 1.1: Case Study: Integrated strategies for the management of transboundary transitional waters on the Eastern border of the European Union – Poland/Russia (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
Vistula Lagoon is one of the largest transboundary lagoons in the southern Baltic Sea shared by Russia and Poland. The direct connection with the Baltic Sea causes significant interactions between the sea and the lagoon. As the lagoon is subjected to both point and non-point sources of nutrient loads, only integrated management may provide successful management solutions. The project focused on the analysis of existing monitoring systems, long-term changes in water quality and biota, and used modelling tools for assessment of ecological status and forecasts. Cooperation between the research institutions enabled a cross-border comparison of available data and application of a single simulation model for the entire trans-boundary transitional water body. The participation of end-users from both countries assured the proper dissemination of the project results.
Overview of the case
The MANTRA-East programme focused on facilitating the cross-border cooperation on the management of transboundary water bodies between Russia and new EU members. The Vistula Lagoon was chosen as one of such bodies. The project focused on the analysis of existing monitoring systems, long-term changes in water quality and biota, and used modelling tools for the assessment of ecological status and forecasts.
ICZM tools
Management of transboundary waters is complicated since there is no single government to manage the water body and bordering states have different languages, cultures, as well as different water management legislation and institutional structures. Due to the European Union enlargement preparations, the management of transboundary waters received considerable attention in the early 2000s. There was an urgent need to develop approaches and integrated strategies for the management of transboundary waters on the European fringe. Another challenge was that the years 1990 and 1991 were the years of an almost total collapse in agricultural production due to the disintegration of the former economic systems. The consequences of this collapse were immediate and included, among other things, dramatic decrease in nutrient inputs. At the same time, large areas of arable land were taken out of production. Such abrupt and large change in land use has hardly ever been recorded in modern European agricultural history. Therefore, there is a need to study river, lake and lagoon responses to such abrupt changes in land use. Prerequisites for a successful environmental management of the transboundary transitional water body include the collection of basic environmental statistics and quantitative estimates of the riverine loads; estimation of pollution sources, retention and buffering capacity in the drainage basin; and a knowledge of the transitional water body water quality. For international or transboundary water bodies, the strong cooperation in the field of environmental monitoring as well as exchange of data between the countries sharing the transitional water body and its drainage basin are needed. Water quality issues related to surface waters are being related to both hydrological concerns and terrestrial biogeochemical processes, including the change in land use and other basin-wide anthropogenic issues. Another aspect of this problem is the conflict between social and economic development on the one hand and environmental and pollution concerns on the other. Despite this, water policy analysts increasingly recognize that managing water resources can no longer be regarded as an independent field of expertise and a separate domain of public policy. Thus, it is clear that water management should be based on an integrated participatory approach, involving planners, scientists, policymakers and end-users. Even though integrated water resource management is currently practiced in many regions worldwide, we have still not been able to 'solve' pollution problems, and examples of 'success stories' are difficult to find.
Success and failure factors
Success factors: 1. Strengthening of transboundary cooperation between monitoring and managing institutions. 2. The development of the new modelling tool. 3. Providing the first estimates of the Ecological Quality Ratios under different scenarios. 4. Formulation of the final management recommendations. Failure factors: 1. Operational data exchange expired after project completion. 2. The EU WFD is not binding for the Russian Federation and therefore it is unlikely to expect the full implementation of the WFD in the Kaliningrad Oblast.

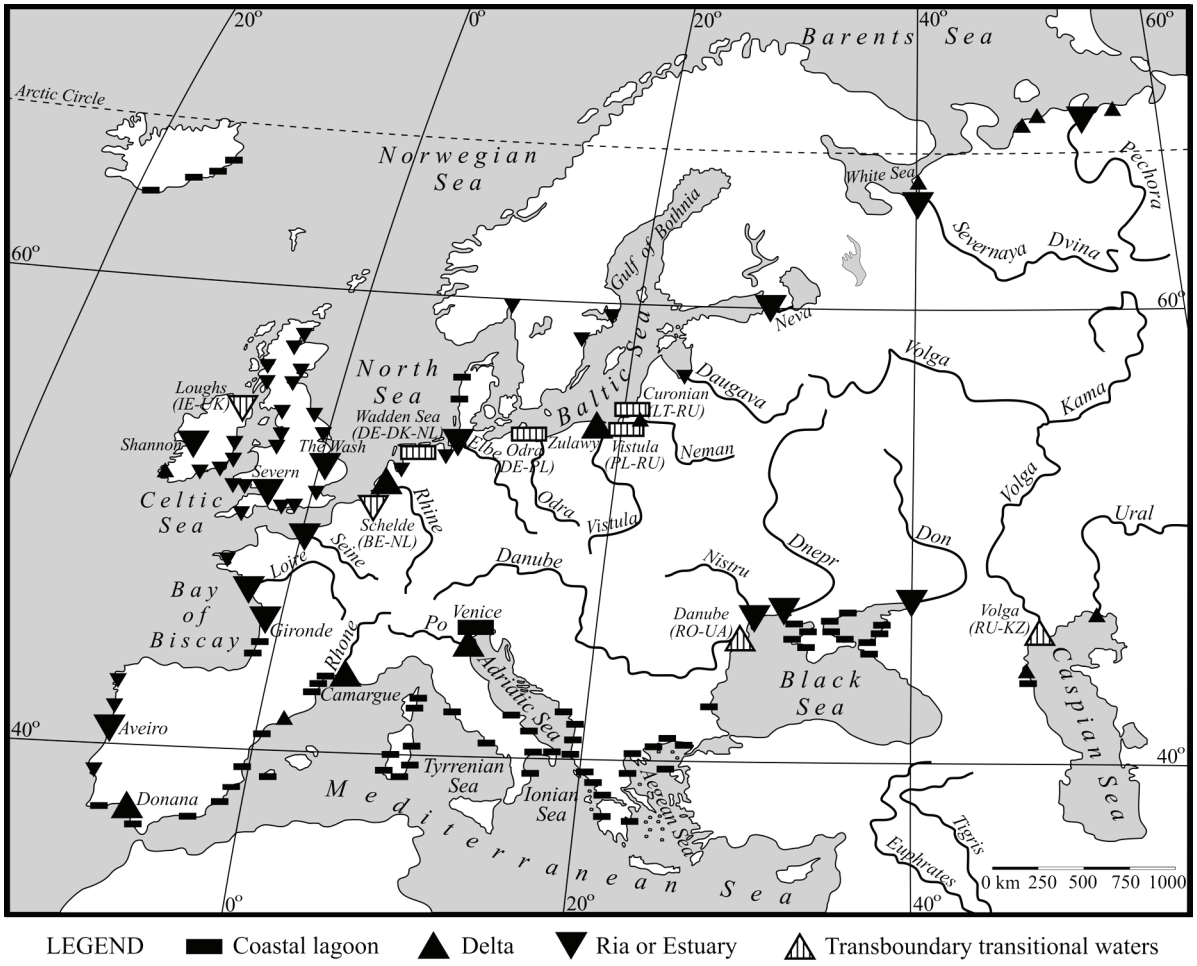

Figure 4.1: Distribution of the major transitional waters in Europe

3 Conclusions

In the legislation of the European Union transitional waters are defined as "bodies of surface water in the vicinity of river mouths which are partially saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows". These areas are diverse, highly productive, ecologically important systems on a global scale and highly valuable for the services, they provide to human societies. Transitional waters have the ecological peculiarity of being both very fragile and resilient at the same time, and possess those emergent properties that actually favoured the development of human societies and cultures. The effective management of lagoon inlets for ensuring the best hydraulic functioning of the basins is a clear example of adaptive management, resulting in the optimization of the yield of fish, as well as in the conservation of the high ecological status.

The WFD process for identifying coastal and transitional water body types required the development of new approaches and the need to agree on a common set of typology factors and their categories for comparable and consistent typology categorization across the coastal areas of the regional seas. It was also acknowledged that the estuarine and coastal types are not distinct categories that can be easily identified by a set of factors, but are instead more of a continuum. It is questioned whether estuaries and other transitional waters should be excluded from the MSFD. As a result of the vagueness of the definition, each Baltic country has adopted a slightly different approach and some do not appear to be designating any transitional waters. Yet, the differences in formal designation should not be

considered as an obstacle for the transboundary cooperation efforts in the management of the transitional waters.

Watchwords

- From an ecological point of view, transitional waters are ecotones between terrestrial, freshwater and marine ecosystems, being characterized by high spatial heterogeneity and temporal variability.
- From the management point of view, we need a coordinated approach and a harmonized, seamless transition from catchment through transitional waters and coast to an open marine system.
- Transitional waters play a key role as spawning grounds for fish and invertebrates and support a rich biodiversity and provide migration corridors for fish and waterfowl.
- Transitional waters have the ecological peculiarity of being both very fragile and resilient at the same time.

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Ecosystem goods and services of transitional waters

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Abstract

Goods and services delivered by the transitional waters ecosystems can be grouped into six broad groups: conservation of aquatic biodiversity; protection of coastal environments from both physical disturbance due to flooding, and chemical disturbance due to watershed pollution; production of goods, in terms of fish, mussels and clams, and shrimp production; amenities for nature and water tourism and other outdoor leisure activities; specific coastal cultural and historical heritage values; information and data for environmental research, education and public awareness.

1 Introduction

Ecosystem goods and services are all kinds of benefits that people obtain from ecosystems (de Groot et al. 2002, Hassan et al. 2005). According to the Millennium Ecosystem Assessment (de Groot et al. 2002, Hassan et al. 2005), ecosystem services can be grouped into four broad categories:

1. ***Provisioning*****,** such as the production of food and water, and other biological and non-biological products. Transitional waters provide food products like fish, shellfish, crustaceans and seaweeds, building materials such as sand and gravel and medicinal products from marine plants, microbes and animals. The definition can be expanded to include renewable energy (wind and wave power and estuarine tidal power systems).
2. ***Regulating*** services are the benefits obtained from the regulation of ecosystem processes, like climate and disease control. Transitional waters outperform any other ecosystems with respect to regulating services (Costanza et al. 1997). Transitional waters and, in particular, their specific habitats e.g., salt marshes, mangroves and intertidal flats regulate several material flows by recycling different elements, decreasing the amount of excess nutrients flowing to the ocean, protecting the hinterland against flooding caused by storms or hurricanes and absorbing and processing waste materials.
3. ***Cultural*** services are non-material benefits people obtain from ecosystems through, for instance, recreation and aesthetic experiences. Many large cities and seaports hosting the majority of the world population are located close to lagoons and estuaries and profit directly from the recreation services delivered by the transitional waters.
4. ***Supporting*** services are those that are necessary for the production of all other ecosystem services, like soil formation, and nutrient cycling. Primary production is another supporting service as it fuels and maintains the higher trophic levels of the ecosystem and its biodiversity. For instance, coastal lagoons, estuaries and other transitional waters provide the essential nursery grounds for the young of many marine, commercially harvestable fish species.

2 Experiences

Transitional waters such as estuaries and coastal lagoons are situated at the interface between land and ocean. Functioning transitional water ecosystems, if they are healthy, produce a number of key goods and services for human populations – biological production, biodiversity conservation, river flow purification, storm and flood protection, cycling and transformation of elements and nutrients, wastewater treatment.

Goods and services delivered by transitional waters are not as yet properly defined. McLusky & Elliott (2007) note that ecological concepts such as resilience and ecosystem goods and services are still poorly quantified for marine and estuarine environments, yet they must be quantified and linked to the management framework to provide a holistic approach to managing these environments. Despite the high value of the goods and services provided by the transitional waters the spatial coverage of aquatic systems is much less well documented, as compared to the terrestrial systems (Beaumont et al. 2007). This lack of information therefore hinders the decision-making process (Daily et al. 2009) and, by extension, the implementation of supranational legislation by the EU member states.

The goods and services delivered by the transitional water ecosystems can be grouped into six groups:

- Conservation of aquatic biodiversity, particularly the biodiversity of migratory fish and birds;
- Protection of coastal environments from both physical disturbance due to flooding, and chemical disturbance due to watershed pollution;
- Production of goods, in terms of fish, mussels and clams, and shrimp production;
- Providing amenities for nature and water tourism and other outdoor leisure activities;
- Maintaining specific coastal cultural and historical heritage values like the traditional combining of fishing and farming, sustainable small-scale aquaculture, etc.;
- Providing diverse and relatively easily available information and data for environmental research, education and public awareness efforts illustrating interconnections of physical, ecological and human processes shaping the environment.

Whilst analysing various transitional water ecosystem goods and services we must consider the essential morphological and ecological differences between the linear and areal types of littoral ecosystems, including the ecosystems of transitional waters (Povilanskas 2009). The main differences between the two types are in their shape, structure and the hydrodynamic, salinity and ecological gradients between the terrestrial and aquatic environments. These differences are the reason for essential differences in goods and services provided by the transitional waters and by their linear fringes. The main ecosystem goods (commodities) delivered by the transitional waters are mostly related to the harvesting of shell- and fin-fish resources. At the same time the ecosystem services delivered by the linear fringes of the lagoons are primarily related to recreation and tourism. These different types of ecosystems and their goods and services should both be assessed separately yet with equal attention. The assessment could render significant differences in elicited economic total use values of the investigated ecosystems.

As a good practical example from the economic valuation of the Curonian Lagoon region shows, the elicitation of non-use values of the habitats of the transitional waters is one of the key socioeconomic decision-support tools. The elicited non-use values enable weighting the public support for different riparian landscape and habitat conservation policies and priorities in comparison to their costs (Box 2.1). Both investigated ecosystems, the floodplains and wetlands of the Nemunas Delta (an areal littoral ecosystem) and the shifting dunes of the Curonian Spit (a linear littoral ecosystem), are the most important ones for the preservation of environmental integrity, identity and touristic attraction of the transboundary Curonian Lagoon Region. The results of the case study show that the residents of Lithuania attribute nearly double the economic (passive-use) value to an easier apprehensible linear ecosystem of the shifting dunes of the Curonian Spit than to a vaguer areal ecosystem of the floodplains and wetlands of the Nemunas Delta.

Box 2.1: Case Study: Economic valuation of linear and areal riparian habitats of the Curonian Lagoon (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
Although the economic valuation is time and resource demanding, it is even so effective in delivering adequate economic values of landscapes and habitats. Economic valuation is a useful tool in providing the information necessary to weigh public support for various riparian landscape and habitat management and conservation policies against implementation costs. Economic valuation is therefore indispensable in the feasibility studies of the riparian landscape and habitat management, and conservation programmes for the transboundary transitional bodies under stress. The results of the study allowed weighing the public support and benefits of various riparian landscape and habitat conservation policies against their costs in the Lithuanian part of the Curonian Lagoon Region. By applying the coherent systematic cross-border economic valuation survey in both parts of the transboundary area, valuable comparative data on the conservation priorities in both neighbouring countries could be elicited and differences in priorities understood.
Overview of the case
In 1997, 2003 and 2009, the staff of the Department of Recreation and Tourism of Klaipėda University, Lithuania has conducted recurrent economic valuation of the riparian landscapes and habitats of the Curonian Lagoon. The main focus was on the economic valuation of the shifting dunes of the Curonian Spit as a linear habitat and the wetlands of the Nemunas Delta as a key areal habitat. Both are the most important habitats for the preservation of environmental integrity and tourist attraction of the transboundary Curonian Lagoon Region. In the contingent valuation survey, randomly selected respondents were asked about their willingness to pay a certain amount as a lump sum for the conservation of the habitats being investigated.
ICZM tools
The economic valuation study involved recruitment of the professional staff from the EUCC Baltic Office, EUCC – Italy, and Department of Recreation and Tourism of Klaipėda University. The contingency valuation survey was conducted by volunteers mobilized by the EUCC Baltic Office. Such a management approach ensured the nationwide scope of the study: the contingency valuation survey covered a representative sample of the Lithuanian population (over 1000 respondents living in various places of the country). The recurrent economic valuation study conducted enabled the development and practical testing of the methodology for eliciting the non-use values of the riparian habitats as one of the key socioeconomic decision-support tools for the ICZM of the Curonian Lagoon. The methodology enables weighing the public support for different riparian landscape and habitat conservation policies against their costs. Contingency decisions of the respondents on the willingness to pay for the conservation of the riparian habitats are economically realistic, i.e., the demand for the riparian habitats as specific environmental commodities is either bid- restrained or income-restrained. The economic value of the riparian habitats, which is elicited in the realistic income-restrained decision framework, should be interpreted as total passive use value rather than total economic value of a habitat.
Success and failure factors
The success factors for the economic valuation (particularly, contingent valuation) studies are listed in the seminal recommendations of the Blue Ribbon Panel (Arrow et al. 1993). The Panel concluded that contingent valuation studies convey useful information for economic values of any riparian habitats, including the accidental damage assessment, which consists of the lost passive use values, provided they follow a number of stringent guidelines. These guidelines first of all include: (1) the use of rigorous probability sampling with a high response rate, (2) in-person interviews, (3) a discrete choice referendum elicitation format, (4) an accurate description of the management and conservation programme or policy, (5) conservative questionnaire design, (6) checks on respondents understanding and acceptance, (7) debriefing questions following the referendum questions, and (8) careful pre-testing. Some economic valuation survey biases can cause failure of the undertaken economic valuation efforts. Contingent valuation studies being the most realistic and comprehensive economic valuation studies are at the same time the most prone to survey biases (Venkatachalam 2004): 1. Starting bid bias; 2. Information bias; 3. Hypothetical bias; 4. Free-riding bias; 5. Strategic bias; 6. Anchoring effect.

Worldwide, goods and services of transitional water ecosystems were valued over 15 years ago and yielded a gross estimated product of € 16,913.00 per hectare (Costanza et al. 1997). Yet, increasing use of their resources by all sectors of society and the mismanagement as a result of many conflicting stakeholder interests are responsible for the degradation of these ecosystems and potential decline in their economic value. The benefits that these ecosystems generate are threatened by society's own activity (Nobre 2009). Transitional waters like coastal lagoons or estuaries are under constant pressure including habitat loss and pollution coming from their surroundings and catchments (Aubry & Elliott 2006, Zalvidar et al. 2008). Examples include the declining capacity of the transitional waters to provide fishery products or ensure the cycling of elements.

Over the past 50 years, humans have changed ecosystems of transitional waters more rapidly and extensively than in any comparable period of time in the past. Although the changes that have been made to ecosystems have contributed to substantial net gains in human wellbeing and economic development, these gains had some costs such as degradation of many ecosystem services and the increased risks of dramatic changes (Duarte et al. 2009). The degradation of ecosystem goods and services could increase significantly in the future and in turn this will influence human wellbeing. Negative changes in ecosystems directly feed back to the socioeconomic system that relies on the ecosystem's goods and services. An example is the loss of estuarine wetlands as fish nursery areas whereby these juvenile fish then go on to become the commercial stocks (Hassan et al. 2005). For the sustainable management of environmental resources, identifying and quantifying ecosystem goods and services is increasingly required (Troy & Wilson 2006). An understanding of functions and valuation of the ecosystem is crucial for appropriate decision making.

The increasing demand for the resources by changing land use, application of fertilizers and pesticides in watersheds and unsustainable forms of fishery and tourism is leading to the degradation of the transitional water ecosystems. Impaired functioning of transitional waters might cost dearly, as urban agglomerations adjacent to the mismanaged transitional waters are devastated by extreme storm surge (New Orleans in 2005) or river flooding events (Bangkok in 2011). Furthermore, the rehabilitation of damaged transitional waters might incur significant costs, emphasizing the need to preserve transitional waters to maintain their goods and services for future generations (Duarte et al. 2009).

Any degradation of the transitional waters will act as a bottleneck in the movement of organisms from the sea to rivers and vice versa (in the case of fishes) and from the wetlands to the Arctic breeding grounds (in the case of birds). Thus the reduction of carrying capacity in the transitional waters will have far-reaching repercussions. Successful reversal of the degradation of transitional waters needs sound scientific information that can be used to quantify the costs of policy enacting and benefits of a proper management of the natural resources and economic functions of transitional waters.

As the good practice example provided from the Sound between Sweden and Denmark shows, limiting or completely abolishing harvesting of endangered marine fish species in a transitional water body can contribute to the maintenance of the commercially viable stock of the species on a broader regional scale (Box 2.2). As a result, the production of cod is higher in the much smaller Sound area than in the entire Kattegat area. Furthermore, recreational fishing in the Sound is also thriving as an added value from the abolishment of the commercial trawling of the cod. Hence, the abolishing contributed to augmenting of the total economic value of ecosystem goods and services of the Sound.

Although ecosystem services are recognized in a number of European Commission communications and strategies as essential to human wellbeing, few studies have attempted to determine their importance. Most studies are restricted to local examples and are difficult to apply on a continental scale. As a consequence, ecosystem services are often overlooked in environmental decision-making as there are no tools available to weigh the costs of losing their services against the benefits of expansion of human activities at the cost of ecosystems. In making such policy choices, the economic values of the ecosystem services must be known. Prior to that, the services have to be quantified, preferably as rates of production or carrying capacity.

Box 2.2: Case Study: Transboundary conservation of fish stocks in the Sound (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
Due to the comprehensive transboundary agreement and strict fishery regulations, far less technologically advanced fishery in the Sound is giving greater returns than the high-tech fishery in the Kattegat. The production of cod is higher in the much smaller Sound area than in the entire Kattegat area and recreational fishing in the Sound is also thriving. Hence, the abolishing of the commercial trawling of the cod contributed to augmenting of the total economic value of ecosystem goods and services.
Overview of the case
The Sound together with the Belt Sea comprises the Danish straits, and constitutes the threshold for the Baltic Sea. The surface area is about 2,000 km^2. The Sound is a relatively shallow area; the threshold between the Sound and the Baltic Sea is located in the southern part of the Sound and has two furrows at a depth of eight meters. The surface water usually flows northwards, and the salinity increases from about 8-9 PSU to about 15 PSU in the northern part of the Sound. Circulation in the Kattegat/Sound is influenced by exchanges with neighbouring seas (the Skagerrak, the Belt Sea, and the Baltic Sea) and depends on meteorological forcing; tides are much weaker here than in the southern North Sea. The horizontal exchanges can transport fish eggs and larvae among areas. The Sound is a rather specific, yet critically important transitional water body linking the Baltic Sea with the North Sea. As a result of agreements between Denmark and Sweden on the management of the fisheries in the Sound, the populations of several commercially important fish are larger and more stable than anywhere else in the Baltic, the Kattegat and the Skagerrak. In particular the ban on towed fishing gears in the Sound has been particularly effective in rebuilding the stocks of cod and other demersal species. The positive impacts are particularly obvious when compared to the neighbouring Kattegat. The cod stock in the Kattegat has shrunk to a remnant population over the last two to three decades. The decline of the cod stock in the Kattegat is linked to the disappearance of separate spawning aggregations/sub-populations in the Kattegat area. Such structural changes within the stocks are very alarming, as the disappearance of stock units could effectively hinder a recovery of depleted areas even after substantial reductions in fishing activity. A near-total ban on towed fishing gear (i.e., otter and mid-water trawls, Danish seine and purse seine) has been in place in the Sound sea area between Denmark and Sweden since 1932, due to its status as a heavily trafficked sea area. In contrast, no such gear limitations have ever been enforced in the adjacent Kattegat sea area. Different studies and available data from the area were explored in this briefing paper, which clearly shows that Atlantic cod in particular was much more abundant and had higher age diversity in the Sound than in the Kattegat, the Baltic Sea or the Skagerrak. On the whole, a great many of formerly important fish species have either disappeared or have been reduced to remnant populations in the Kattegat, while the fish community in the Sound is in much better condition. It is reasonable to believe that the main reason for the much higher levels of productivity of cod and other demersal species in the Sound is linked to the absence of trawling within the area.
ICZM tools
Commonly agreed Total Allowable Catch (TAC) is the main ICZM tool guaranteeing the sustainable trans-boundary management of the fish stocks in the Sound. The fishery in the Kattegat and the Sound is managed both by Total Allowable Catches (TAC) and effort regulation. The trawling ban has not been implemented in a small part of the northern Sound area adjacent to the Kattegat. In 2009, however, this trawl fishery became more restricted as trawling was banned from February to March (i.e., during the cod spawning period). This new regulation will be evaluated after three years. Apart from commercial fisheries, extensive leisure fishing based on spinning gear flourishes in the Sound, as it is situated in the most densely populated part of Scandinavia. The report gives good support to the theory that the ban on trawling in the Sound is part of the reason why fish productivity here is bigger than in the Kattegat where there is no such ban. A thorough exploration of earlier studies on subject has been investigated as well as results from field surveys. An additional positive side effect is the increased availability of fish for the recreational fishing in the Sound.
Success and failure factors
The ban on trawling in the Sound from 1932 is according to the investigation the clear reason why fish stocks are higher here than in the Kattegat. Despite the fact that the Kattegat is approximately three times the size of the Sound and that the Sound has a heavily populated coastal area, the official total landings of cod in the Sound during 2009 were ten times as high as in the Kattegat. The fisheries management of the Kattegat is considered a fiasco where reported landings have fallen continuously since 2000.

Box 2.3: Case Study: NATURA 2000 management in and around the Odra (Szczecin) Lagoon (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
Private initiative backed by sufficient funding and local incentives can ensure long-term conservation and sustainable management of the riparian NATURA 2000 habitats of the transitional waters. The Odra (Szczecin) Lagoon is a very good example of a cross-border transitional water body where the reinforcement of the environmental integrity requires close transboundary cooperation of stakeholders at various levels. The initiative of establishing the Odra Delta nature park could serve as a pattern to follow in other riparian areas on both sides of the Polish-German border, particularly taking into account local cooperation in offering nature tourism services along the cross-border tourist trails (nature guiding, hiking, biking and horse riding tours, lodging, boating etc.).
Overview of the case
On the Polish side of the Szczecin Lagoon, a number of medium to large grants running simultaneously and successively have been necessary for establishing a privately managed Odra delta nature park. Yet, further external funding and additional efforts are needed for progress in cross-border cooperation. Finding the way for common implementation of NATURA 2000 for both parts of the Szczecin Lagoon is of crucial importance for properly realizing the nature conservation and sustainable development aspects. The concept of model areas on both sites, where it can be shown how this system is working is a guarantee for high effects in the broader context. As well as species and habitat management, tools for conservation and sustainability prepared in the common strategy documents, taking into consideration European legal context.
ICZM tools
Thanks to financial support from EECONET Action Fund and cooperation with EUCC Coastal & Marine Union, Society for The Coast (EUCC Poland) was able to purchase on long-term lease more than 1,000 ha of extremely valuable grounds located in the eastern part of the Szczecin Lagoon. Another project that provided support to the area was the Odra Delta nature park – demonstration active nature management as a path to sustainable development. It was supported by Dutch Government (PINMATRA/2002/026) and implemented in cooperation with Society for The Coast (EUCC Poland), as well as EUCC – The Coastal & Marine Union (International Secretariat) and Vereniging Natuurmonumenten. The first privately managed nature park in Poland on such a scale is dedicated to practical implementation of NATURA 2000. Management of the park mobilized stakeholders at different levels comprising a local community, a local forestry unit, as well as regional water management and nature conservation bodies. The entire network is maintained and facilitated by a national NGO supported by an international coastal and marine cooperation network and international funding. Establishing Odra Delta Nature Park became fairly important in the light of new opportunities and challenges for Stepnica Local Community, where the larger part of the area is located. Society for The Coast has prepared the management plan for the Odra Delta Nature Park aimed at developing it into a model coastal terrain for integration of nature conservation with sustainable tourism and extensive agricultural use. Special attention is being given to local initiatives focusing on soft tourism development by supporting a network of individual local investors and the Society for The Coast in the tourism sector (B&B, pensions, campsites, horse tours) with special attention to ecological tourism and education. The herd of wild horses (Konik Polski) (about 105) and primitive meat cows (Scottish Highlander) (about 35) comprise a specific attraction, but also a very important tool for nature conservation. These grazers play a significant role in keeping the grass short, which is important for a large group of wet meadow birds. For local farmers it is also a good example for possible development in the agrarian sector.
Success and failure factors
The report above gives a general overview for a new concept of practical implementation of NATURA 2000 at the local community level and as a model concept for sustainable development. It is also very important in the long term transformation from 'post-kolkoz landscape' to nature oriented developed region. So far nature conservation has been understood not least by local administrations as a group of restrictions which have not allowed any local development. The NATURA 2000 Network provides the opportunity to show that this is not so. The sustainable development of tourism and agriculture are the best example and for such an attractive location as the Municipality of Stepnica it can be the most 'natural' way to develop. The problems however are the lack of knowledge and experience as well as the serious and significant mistakes in public communication unfortunately made by Polish government in previous years. The infrastructure of the Municipality of Stepnica is not really prepared to these functions. The first strategy for local tourism development has been adopted in 2010.

There is clearly a growing demand by policymakers to include the information about the economic benefits that humans derive from ecosystem services and biodiversity in the decision making process. As a good practice practical example from the NATURA 2000 management in and around the Odra (Szczecin) Lagoon shows, combination of maintenance of the non-use values and goods (biodiversity) and the use values and services (nature tourism and recreation amenities) might indeed go hand in hand (Box 2.3). The Millennium Ecosystem Assessment and more recently the TEEB initiative (The Economics of Ecosystems and Biodiversity), illustrate this growing interest. This latter initiative was endorsed by G8+5 leaders in 2007 and is managed by the European Commission's DG Environment. The TEEB study will evaluate the costs of the loss of biodiversity and the associated decline in ecosystem services worldwide, and compare them with the costs of effective conservation and sustainable use. So far, forest and wetland ecosystems have been the major target of ecosystem valuation studies. Coastal and marine areas have received considerably less attention and a combined effort is needed to quantify and map on a continental scale the services that these ecosystems provide.

3 Conclusions

The goods and services delivered by the transitional water ecosystems can be grouped into six broad groups: conservation of aquatic biodiversity; protection of coastal environments from both physical disturbance due to flooding, and chemical disturbance due to watershed pollution; production of goods, in terms of fish, mussels and clams, and shrimp production; providing amenities for nature and water tourism and other outdoor leisure activities; maintaining specific coastal cultural and historical heritage values; providing information and data for environmental research, education and public awareness efforts. The main ecosystem goods (commodities) delivered by the transitional waters are mostly related to the harvesting of shell- and fin-fish resources. Meanwhile, the ecosystem services delivered by the linear fringes of the transitional waters are primarily related to recreation and tourism. An increasing use of the resources by all sectors of society and the mismanagement as a result of many conflicting stakeholder interests are responsible for the degradation of the transitional waters and potential decline in their economic value. Successful reversal of the degradation of transitional waters needs sound scientific information that can be used to quantify the costs of policy enacting and benefits of a proper management of their natural resources and economic functions.

Watchwords

- Mismanagement of transitional waters might cost dearly.
- Don't overlook ecosystem goods and services of the transitional waters in environmental decision-making.
- Ecosystem goods and services of transitional waters are poorly understood, yet they are essential for a comprehensive understanding of the sustainability conditions of the transitional waters and their adjacent areas.
- Whilst analysing ecosystem goods and services of transitional waters distinguish between the areal transitional water ecosystems and their linear fringes.

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Management challenges for the South Baltic transboundary transitional waters

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Abstract

The critically important challenges for the management of the south Baltic transboundary transitional waters are: i) threat of pollution and contamination from human activities; ii) threat of invasive flora and fauna species; iii) increasing vulnerability of the transitional waters to climate change; iv) threat of technological hazards and major hydrographical alterations; v) maintenance of biodiversity, migration corridors for fish and birds, and robust stocks of living resources; vi) cross-border differences in decision making decision-taking and spatial planning systems; vii) absence of coherent cross-border information exchange, environmental monitoring and risk prevention frameworks.

1 Introduction

The management and conservation of transitional water bodies proved to be complicated at the national level due to the fact that the drivers influencing environmental quality and most of the ecological goods and services might originate in the drainage basin, far away from the coast. This means that for the sustainable management of a river-dominated coastal lagoon or an estuary there must be a consensus of views with rural communities and urban municipalities situated hundreds of miles away from the transitional water body. Joint management of common resources of transboundary water bodies is an even more challenging task (see also Chapter 4). Notably, all four major South Baltic transitional water bodies – the Curonian lagoon, the Vistula lagoon, the Odra (Szczecin) lagoon and the Sound (Öresund) are transboundary. Management challenges of such transboundary transitional water bodies are extremely complex: there is a need to integrate the decision making from multiple perspectives, considering various, often conflicting interests of the local users of transitional waters in the neighbouring countries with those from the catchment basin and coastal areas.

2 Experiences

The objective of this Chapter is to summarize the experiences of addressing specific management challenges of the transitional waters in the South Baltic from the perspectives of different countries (Sweden, Denmark, Germany, Poland, Russia and Lithuania), based on the analysis of 33 case studies compiled by an international expert team within the ARTWEI project of the EU South Baltic Cross-border Cooperation Programme 2007–2013.

In our opinion, the most critically important challenges for the South Baltic transboundary transitional waters' management are the ones that threaten the integrity of the transitional waters' ecosystem:

1. Threat of pollution and contamination from human activities.
2. Threat of invasive flora and fauna species.

3. Increasing vulnerability of the transitional waters to climate change.
4. Threat of technological hazards and major hydrographical alterations.
5. Maintenance of biodiversity, migration corridors for fish and birds, and robust stocks of living resources.
6. Cross-border differences in decision making and spatial planning systems.
7. Absence of coherent cross-border information exchange, environmental monitoring and risk prevention frameworks.

Threat of pollution and contamination from human activities

Problems related to point sources and, particularly, to diffuse sources of nutrient loads and other different kinds of pollution require a transboundary consideration. Large rivers have a strong influence on their adjacent lagoon or estuary and the surrounding coastal area. Many environmental problems in transitional waters result from activities in the river basin (Box 4.1). Yet, in many cases, the mismanagement of the areas adjacent to the transitional waters might also cause severe contamination. This was particularly true for the Eastern European coastal lagoons from the 1960s to the 1990s. The aquatic environment of these transitional waters was severely affected by the direct discharge of the untreated wastewater from households. Input of nutrients from large livestock farms and agricultural land also caused severe pollution as a result of such erroneous practices as slurry dispersal on the snow or spreading mineral fertilizers from planes. Therefore, in 1995, all three south Baltic lagoons were designated as 'hot spots' in the Joint Comprehensive Baltic Sea Action Programme (Box 4.2).

Although a significant number of sewage treatment facilities were constructed during the last decade, the environmental conditions of the South Baltic lagoons have not improved to the extent expected, particularly regarding eutrophication. This, probably, happened not only as a result of the resumed input of nutrients from the catchment area due to the recovery of agriculture, but also because of the re-emission of pollutants deposited in sediments, particularly phosphorus. Information regarding the environmental effects of the pollution of the south Baltic lagoons is insufficient due to lack of comprehensive studies on the key issues such as the loss of biodiversity, or the contamination caused by toxic substances and the related biological effects.

Threat of invasive flora and fauna species

There are three ways in which invasive flora and fauna species usually enter transitional water bodies:

a) navigation canals;
b) navigation vessels; and
c) deliberate introduction.

Invasive flora and fauna species are considered to be one of the critical threats for the biodiversity of the transitional waters, particularly the transboundary ones, as the political borders do not usually allow effective application of mitigation measures. Meanwhile, the proliferating invasive species do not recognize political borders. On the other hand, in certain circumstances, invasive species might be helpful in solving pollution problems, e.g., extracting excess nutrients from eutrophic freshwater lagoons by harvesting the zebra mussel (*Dreissena polymorpha*) (Stybel et al. 2008), or ensuring social and economic sustainability of the lagoon societies through the promotion of lucrative aquaculture methods like deliberate introduction and harvesting of the Manila clam (*Ruditapes philippinarum*) in several Adriatic lagoons of Italy (Solidoro et al. 2000).

Leisure fishing may change the population dynamics of native species. Leisure fishermen may demand the introduction of alien species (Chape et al. 2008). Leisure boats may bring invasive species and disturb habitats of endangered local species (Chapter 9 of this code of conduct).

In the case of the South Baltic transitional waters, the threat of invasive flora and fauna species is considered to be moderate compared to other transitional waters worldwide (Boehm et al. 2010). The main problem is the lack of cooperation among the South Baltic countries on this issue.

Increasing vulnerability of the transitional waters due to climate change

The global climate change enhances cyclonic circulation in Northern Europe (EEA 2005), which reduces the volume of the snow cover and the spring flood. However, it increases the probability of a catastrophic coincidence of a lengthy winter rainfall period with the storm surge in the estuaries of the Odra, Nemunas, Pregola or any other larger south Baltic lagoon tributaries. In such a situation, rural and urban communities adjacent to the lagoons become even more vulnerable to inundation. Floods or storms can also cause re-suspension of harmful substances in the lagoon water column, which could result in additional environmental hazards. The ice-breaking events on the south Baltic lagoons might occur even more often due to milder and more volatile winters, and leave hundreds of ice-fishing enthusiasts floating on ice-sheets in need of rescue. The absence of an integrated transboundary forecast and early warning system for natural hazards and calamities, particularly for an eventual catastrophic inundation, further aggravates the situation.

Therefore, there is an urgent need for the national and regional authorities from the countries sharing these transboundary transitional water bodies to cooperate closely in natural hazard prevention and provision of effective joint rescue efforts in the case of an eventual calamity. There are two long-term goals for the transboundary approach in the prevention and combating of natural hazards (Box 3.1). The first is to ensure proper protection of the settlements and property through the renewal and upgrading of the polder system and other land management measures. The second is to ensure closer transboundary cooperation of the rescue and emergency relief agencies for hazard prevention and the effective rescue of people and property in the case of natural calamities.

Effective prevention of natural hazards and risks caused by human activity is only possible after the unequivocal identification by all the countries sharing a transitional water body, particularly by authorities at the national and regional levels. Future threats, like climate change and sea level rise and their potential consequences, are not yet well perceived by society (Box 4.1). The priority issue is to raise public awareness of the increasing vulnerability of the South Baltic lagoons because of climate change and the need for the transboundary cooperation to address the rising threats properly.

Threat of technological hazards and major hydrographical alterations

In the transboundary coastal and transitional water areas, effective combating of technological disasters, e.g. oil spills or other releases of hazardous substances cannot be handled locally. Close cross-border cooperation is critically important to address these hazards properly. The economy, legislative systems, and development priorities of the bordering countries may differ, and therefore, transboundary cooperation and development of the common mitigation strategies might be difficult. This is particularly true for the Curonian and Vistula lagoons shared by the EU and non-EU member states (Box 1.1, Box 3.1, Box 4.2, Box 4.4 and Box 7.3). An excessively bureaucratic and top-down decision-making system hampers the efficiency of addressing transboundary challenges.

Even in the case of the EU member states sharing a transboundary transitional water body, different measurement methodologies might be applied by both countries due to differences in national regulations. This leads to differences in assessing the impact of hazardous activities, e.g., dredging and disposal of potentially contaminated dredged material (Box 3.2 and Box 10.4). A proper respect for the neighbouring country's interests and thorough assessment of a transboundary environmental impact of possible large-scale development projects is still missing in the countries sharing the South Baltic lagoons. Water transport development plans (e.g. dredging of the Szczecin port waterway or upgrading the Kaliningrad and Klaipėda seaports), or anticipated new hydrotechnical constructions (e.g. opening an artificial channel connecting the Polish side of the Vistula lagoon to the Baltic Sea) are barely discussed with the stakeholders on the other side of the border.

Box 3.1: Case Study: Cross-border cooperation in addressing natural hazards and emergency relief in the Curonian Lagoon shared between Lithuania and Russia (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
The Commission for the Prevention of the Extreme Situations and Emergency Relief is one of few truly efficient commissions of the Long-term Cooperation Council between Lithuania and the Kaliningrad Region of Russia (the other efficient ones being the commissions for transport, fish resources and energy). This is due to the professionalism and commitment of the cooperating agencies, and, largely, because the threat of natural hazards and routine rescue needs require very close transboundary cooperation. The availability of a joint action plan for the prevention of the extreme situations and emergency relief on the national and regional level is also one of the keys to success. The cooperation relies on an effective system of operational information exchange. Emergency relief experts from both countries participate in multilateral rescue exercises, training and field operations on a regular basis. The transboundary cooperation of the rescue and emergency relief agencies of Lithuania and Russia is therefore capable of providing proper response to the potential increase in natural hazards and emergencies, extreme flooding, storm surge and ice-drift events.
Overview of the case
The case study highlights the transboundary cooperation between the Lithuanian and Russian rescue and emergency relief agencies in addressing natural hazards in the Curonian Lagoon. Ten thousand inhabitants in both the Lithuanian and Russian parts of the Nemunas Delta might be exposed to a catastrophic inundation. The transboundary cooperation framework consists of the State Fire and Rescue Service of Lithuania and the Kaliningrad Chief Board of the Federal State Agency for Support and Coordination of Russian Participation in International Humanitarian Operations (EMERCOM). Both institutions form the Joint Commission for the Prevention of the Extreme Situations and Emergency Relief. The cooperation is facilitated by the joint trans-boundary action plan for the prevention of the extreme situations and emergency relief. It is impeded by the absence of an intergovernmental agreement between Lithuania and Russia on the Cooperation and Mutual Assistance in the Prevention of Extreme Situations and Emergency Relief.
ICZM tools
As the maintenance of the dikes and water pumping stations in the Nemunas river delta needs considerable, regular efforts, due to the lack of sufficient financial and energy resources, only half of the polder system is properly maintained now. The rest is left unattended and is starting to decline with pump stations out of action (Povilanskas et al. 2002). This situation leaves the larger part of local population exposed and vulnerable to inundation in the event of an eventual catastrophic coincidence of the river flood and the storm surge on the Curonian Lagoon. Hence, there are two long-term goals for the transboundary approach in the prevention and combating natural hazards in the Nemunas Delta and the Curonian Lagoon. The first goal is to ensure proper protection of settlements and property through the renewal and upgrading of the polder system. The second is to ensure closer transboundary cooperation of the rescue and emergency relief agencies in Lithuania and Russia for disaster prevention and effective rescue of people and property. For this, the transboundary cooperation framework has been established, which consists of two organizations directly responsible for the hazard prevention and rescue efforts. Both organizations form the Commission for the Prevention of the Extreme Situations and Emergency Relief at the Long-term Cooperation Council between Lithuania and the Kaliningrad Region of Russia. Its tasks include: 1. General issues concerning the transboundary cooperation related to the prevention of the extreme situations and emergency relief. 2. Regular and effective exchange of information. 3. Preparation and coordination of joint actions on the local and regional level aimed at the prevention of the extreme situations and emergency relief. 4. Technical facilitation of the prevention of the extreme situations and emergency relief.
Success and failure factors
Success factors 1. Good knowledge of the Russian language and functioning system of Russian paramilitary agencies by the senior Lithuanian State Fire and Rescue Service staff. 2. Long-term traditions in joint efforts on the prevention of extreme situations and emergency relief. 3. Modern international experience and capacities for proper addressing potential rise in the number of potentially hazardous events and extreme situations. Failure factors 1. Excessively bureaucratic and top-down decision-making systems in both countries. 2. Complicated border crossing regulations between Lithuania and Russia impede the effectiveness of joint actions: In emergency cases, actions of both agencies are confined to their national territories.

Box 3.2: Case Study: Management of dredged material from the Odra (Szczecin) Lagoon (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
Harmonization of national legislation for the regulation of management of dredged material is crucial for the transboundary environmental cooperation in the Szczecin Lagoon. Previous measures aimed at improving environmental conditions of the Lagoon basin (environmental investments) and strong interests of the institutions responsible for the planning of dredging works ensure a significant support for such an initiative.
Overview of the case
The transboundary waters of the Szczecin Lagoon and Pomeranian Bay on both sides of the Polish-German border are the area of intensive dredging works and investments in hydraulic engineering. These activities result in producing dredged spoil that requires appropriate treatment or disposal. The main sites for carrying out such work in the Szczecin Lagoon and adjacent aquatic areas is the fairway Szczecin-Świnoujście, where the ongoing dredging works are performed regularly to maintain the nautical depth for seagoing vessels. Substantial investments in hydro-engineering were made while implementing plans of extensive expansion of ports and marinas in the Polish part of the area. These efforts resulted in a considerable amount of (usually contaminated) dredging spoil that need to be disposed of safely. Floods or storms can also cause re-suspension of harmful substances in the lagoon water column. Both, Poland and Germany, observe certain regulations with relevant provisions governing the mode, range and test methods applied to control dredging operations and the level of contamination in the dredged spoil. These regulations determine the subsequent handling of the dredged spoil. At the international level, the Baltic Sea area is subject to the arrangements and recommendations of the Helsinki Commission (HELCOM) and a number of EU rules regarding the disposal of the dredge spoil. However, due to differences in national legal regulations, serious differences arise in the interpretation of the bottom sediment test results carried out in Poland and Germany, and, hence, in determining the environmental impact of the hydrotechnical operations. A cross-border cooperative project is proposed to analyse legal regulations and practices concerning the assessment of the dredged sediment contamination in the Szczecin Lagoon and adjacent aquatic areas, and to develop a proposal for solutions harmonizing measurement techniques and assessment principles.
ICZM tools
In 2007, the Helsinki Commission issued the Recommendation on the development of national rules for the assessment of pollution and handling of silt material (HELCOM 2007) that the Baltic Sea countries should consider. The HELCOM Recommendation (2007) is complex and precise in the ways of determining both the degree of sediment contamination and the decision-making procedures for the handling of the dredged material, as well as giving the guidelines for environmental monitoring. Decisions regarding the handling of the dredged material should be taken on the basis of the so-called Action List. The criteria should reflect the experience gained regarding the potential effects on human health or the marine environment. The Action List levels (upper and lower level) should be set on the basis of concentration limits, biological responses, environmental quality standards, flux considerations or other reference values. In Germany, the rules for seawater silt material treatment are specified in the national provisions (1999). In their principles, these provisions correspond to the HELCOM Recommendation (2007) clarifying the scope of research, both in terms of geochemical and biotic sediment testing. The limits for most pollutants are defined at two levels of concentration (lower and upper). Evaluation of the harmfulness of sediments, and, thus, decisions about the procedure for handling the dredged spoil are taken following a thorough analysis of all the factors examined (physical, geochemical and biotic). In Poland, there is only one regulation by the Minister of the Environment (2002) for the assessment of sediment pollution in the water bodies. It sets out the individual threshold values for selected substances. Even in a single case of harmful substances exceeding a threshold, the dredging spoil should be classified as waste, which implies serious limitations in silt re-deposition or management. On the other hand, this regulation recommends conducting the geochemical analysis of trace elements after disintegration of samples by applying a different methodology that is practiced in Germany (and recommended by ISO). This difference in analytical procedures may lead to different marking of harmful substances in the same sediments. A serious shortcoming in the Polish regulation is that only those substances that are cited by name are taken into consideration – there is no provision for extending the list by including new hazardous substances.
Success and failure factors
Modification of the Polish regulations inconsistent with the HELCOM Recommendation is necessary for proper disposal of the dredged material. A potential failure may be related to the unwillingness of the responsible state authorities in Poland to revise the existing system.

The exchange of information is still rather restricted, even if there is a high probability of a transboundary impact of the proposed activities. As can be seen from several good practice cases from the transboundary cooperation in the assessment of a transboundary environmental impact from the construction of the fixed links across the Danish straits (Box 8.1, Box 10.1, Box 10.2 and Box 10.3), an efficient and close cooperation must be established between the responsible national, regional and local authorities in all neighbouring countries, and all transboundary environmental impact assessment procedures must be respected. A strong stance and even an active pressure from the environmentally concerned and well-informed stakeholders, organizations, and independent experts might be necessary to create the right cooperation framework and prevent any transboundary threats.

Maintenance of biodiversity, migration corridors and robust stocks of living resources

Due to their geographical position, the South Baltic lagoons and estuaries are important as 'stepping stones' and migration corridors for many endangered fish and bird species – from eel and wild salmon to rare wading bird species. The EU Bird and Habitat Directives anticipate protection of the most valuable aquatic and coastal habitats of the transitional waters within the NATURA 2000 network. Neighbouring EU member states have to cooperate in protecting the transboundary areas that are designated as NATURA 2000 sites. Such cooperation has to be regularly supported from national and EU funding sources and is the key to the financial sustainability of the transboundary transitional waters' management, as is shown by a good practice example from the management of coastal meadows and floodplains shared by Latvia and Estonia (Box 9.2). Even so, difficulties in the implementation of the EU Bird and Habitat Directives through establishing the NATURA 2000 sites arise when transitional water bodies and their riparian areas are shared between the EU and non-EU countries, e.g. Vistula and Curonian lagoons, Vistula and Curonian spits and the Nemunas river delta shared with Russia. A joint designation of a transboundary Ramsar site on both sides of the border, like in the aforementioned case of coastal meadows and floodplains shared by Latvia and Estonia (Box 9.2), might be helpful, since Russia has signed and ratified the Ramsar Convention.

As a good practice example from the transboundary Curonian Spit (Lithuania/Russia) shows (Box 4.4), once the methodologically coherent basic management and planning foundations are laid for neighbouring cross-border protected areas, then these foundations support the common transboundary cooperation framework in the long term. This common framework is resilient to further deviations, if close cooperation and coordination is maintained on key conservation priorities.

A good practice case from the Polish part of Odra lagoon is particularly valuable considering the sustainable maintenance of the South Baltic transitional waters as important semi-natural habitats and migration corridors listed in the NATURA 2000 series (Box 2.3). It proves that a private initiative backed by sufficient funding and local incentives can ensure long-term conservation and sustainable management of the riparian NATURA 2000 habitats of transitional waters.

Usually the first step in transboundary cooperation is common exploitation of renewable resources – countries sharing the same fish stocks need to negotiate the levels of quotas on a regular basis (international committees taking care of fishing quotas exist in both the Vistula and Curonian lagoons). It does not mean that the process is always smooth and peaceful but, generally, the mutual point of view is negotiated and achieved. A successful example of transboundary cooperation might be the agreements between Denmark and Sweden on the fisheries control in the Sound (Box 2.2).

Cross-border differences in decision-taking and spatial planning systems

Management of transboundary waters is complicated since there is no single government to manage the water body and bordering states have different languages, cultures, as well as different water management legislation and institutional structures. First efforts in joint ICZM planning and establishing of coherent decision-making systems for the South Baltic transitional waters started in 1995 when HELCOM initiated the Baltic Sea Joint Comprehensive Action Programme (JCP). Component 4 of this Programme dealt with Management of Coastal Lagoons and Wetlands (MLW).

ICZM plans were prepared for all three cross-border lagoons – the Curonian, the Vistula and the Odra (Szczecin).

However, many difficulties resulted from different political systems, historical experience and even measurement methods. Different legal and spatial planning systems as well as different approaches and responsibilities of the institutions involved created problems. The lack of a joint language, different funding sources and the long process hampered the cooperation. In the case of the Odra (Szczecin) lagoon, two separate plans with dissimilar spatial coverage and thematic focus were developed for the German and the Polish part of the region (Box 5.4). The aim of a joint plan has been withdrawn. Both plans were not implemented in regional planning documents.

The transboundary cooperation in data sharing and simulation modelling during the ICZM planning process facilitated the objective prioritization of the international investments in solving the hot spots in the South Baltic lagoons and their catchment area (Box 3.3). As a result, a significant number of sewage treatment facilities were constructed. But further transboundary cooperation in the management of the South Baltic lagoons was impeded either by differences in national regulations and unwillingness of the responsible state authorities to revise them (Box 3.2), or different and overly bureaucratic, top-down decision-making procedures, habits and traditions (Box 4.2).

The EU Water Framework Directive (WFD) has accelerated the transboundary cooperation and development of spatially integrative management approaches. Implementation of the WFD requires that the planning and execution of measures to ensure protection and sustainable use of water should take into account the framework of the whole river basin. But the focus of the present approaches is in practice very much on the river basin; coastal and marine issues are largely missing (Box 4.1).

Furthermore, the WFD is not applicable to Russia as a non-EU member state, although Russia shares two of the South Baltic lagoons. Even if the WFD regulations are not legally binding for the Russian side, the WFD assumes that close cooperation with the neighbouring non-EU states will develop. Complementary monitoring and operational system of information exchange is a key issue for the cooperation between Russia, Poland and Lithuania in the context of the WFD. As a good practice example from the Polish-Russian cooperation in the Vistula lagoon shows (Box 1.1), the analysis of monitoring systems, long-term changes in water quality and biota, and application of modelling tools for the assessment of ecological status and forecasts provided the first estimates of the Ecological Quality Ratios under different scenario conditions, which is the key prerequisite of the WFD.

Absence of information exchange, monitoring and risk prevention frameworks

Close and long-term ties between experts, decision-makers and local users are a specific positive feature of the management of the South Baltic transitional waters. In the Curonian Lagoon, two out of four truly effective commissions of the Long-term Cooperation Council between Lithuania and the Kaliningrad Region of Russia are the ones dealing with the cooperation in the Curonian Lagoon, i.e., the joint commissions for cooperation on extreme situations and emergency relief and sustainable use of fish resources (Box 3.1).

In the Odra (Szczecin) Lagoon, which is shared by Germany and Poland, i.e. countries with strong traditions of public participation, the cross-border cooperation is close both at the public administration institutions and NGOs levels (Box 3.2). Even the local rural communities in the lagoon regions are becoming more aware of the necessity for the transboundary cooperation, as they become more participatory and responsive to the priorities of society (Box 4.2).

As a good practice example from the transboundary Sound (Sweden/Denmark) shows, local municipalities are capable of launching a joint programme to control the marine and coastal environment with the assistance of academic institutions (Box 10.2). Such cooperation relies on an effective organization, the Sound Water Cooperation. It consists of all the municipalities and regions bordering the Sound in a joint effort to promote and conserve the marine environment, and therefore assembles local hands-on expertise about the Sound in one place (Box 3.4).

Box 3.3: Case Study: Prioritizing hot spot remediation in Vistula Lagoon (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
Improvement of the environmental conditions of any transboundary water body needs to consider activities on both sides of the border and close transboundary cooperation at the political and management levels. It is also true in the case of the Vistula Lagoon where cooperation at the level of management plans is crucial. Compiling data in terms of the historical and current lagoon quality as well as management plans of investments in the reduction of point and diffuse nutrient sources made possible construction and validation of the MIKE 21 eutrophication model for the whole lagoon enabling analyses and visualization of the load reduction consequences. This methodology, in turn, can show how cross-border cooperation in simulation modelling facilitates objective prioritization of the remediation of hot spots in a trans-boundary transitional water body and its catchment area.
Overview of the case
This study was conducted by the VKI Water Quality Institute as a main contractor and the Danish Hydraulic Institute (DHI), Geoscience and Marine Research & Consulting Co. Ltd., Poland (GEOMOR) and P.P. Shirshov Institute of Oceanology RAS, Kaliningrad. Information was provided about the current state of the Vistula Lagoon based on existing information and field investigations carried out by the Polish and Russian institutions within the project. The current state of the lagoon was compared with historic data concerning developments in loadings and changes in the environmental state of the lagoon itself. A model system was implemented describing the hydraulic conditions in the Vistula Lagoon and the effects of nutrient loadings on the eutrophic and biological state of the lagoon. The current plans for reducing nutrient loadings for major sources in Poland and Kaliningrad were incorporated and their positive impact on the environmental state of the lagoon was evaluated using the model system. The effects of intervention concerning hot spots in Poland and Kaliningrad in particular were investigated. The investments necessary for implementation of the planned interventions were presented. The modelling revealed, that the reduction of loads on one particular side of the border will cause an improvement of water quality conditions mostly locally, the close cooperation at the level of management plans is absolutely crucial. No detailed analysis of the trans-boundary management of the implementation of this very important case study has been carried out.
ICZM tools
HELCOM in its Baltic Sea Joint Comprehensive Action Programme identified numerous hot spots in the drainage basin of the Vistula Lagoon. The Vistula Lagoon itself has been identified as a priority hot spot which needs a comprehensive environmental management programme. Especially taking into account the limited water exchange between the lagoon and the Gulf of Gdańsk, this situation cause serious problems regarding the environmental conditions. Information was provided about the current state of the Vistula Lagoon based on existing information and field investigations carried out by the Polish and Russian institutions within the project. The current state of the lagoon was compared with historic data concerning developments in loadings and changes in the environmental state of the lagoon itself. The project might be described as being extremely effective providing the 'whole lagoon' perspective regarding the impact of load reduction on the lagoon environmental conditions. A modelling tool enabled the spatial and temporal analyses of load reduction consequences as well as generating a list of practical management recommendations.
Success and failure factors
Success factors 1. Strengthening of the transboundary cooperation. 2. Developing the new modelling tool. 3. Providing the lagoon current condition and the assessment of nutrient load reduction consequences. 4. Providing a list of practical management recommendations. Failure factors 1. Sometimes a limited access to the relevant data. 2. Sometimes data quality is poor e.g. due to the lack of inter-calibration between different monitoring agencies. 3. Limited information on the local management strategies.

Box 3.4: Case Study: The Sound Water Cooperation – a transboundary transitional water cooperation network (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
The Sound Water Cooperation is an organization that gathers municipalities and regions on both sides of the Öresund/Øresund Sound in a joint effort to promote and conserve the marine environment. What is perhaps unique about the organization is that almost all municipalities and regions bordering the Sound are represented in the organization and it therefore assembles local hands-on expertise about the Sound in one place. As its representatives are civil servants from their respective municipality/region it also allows the organization to set up goals and priorities for a healthy marine environment in the Sound that can be translated later on into practical action through the municipalities/regions.
Overview of the case
The Öresund/Øresund Sound is a rather specific, yet critically important transitional water body linking the Baltic Sea with the North Sea. Geographically, the Sound consists both of bays with shallow water and central areas in the Sound of depths between 30 and 50 metres. In the shallow bays, the bottom consists of sand and the water comes from the Baltic – and has a low level of salinity. In the deeper areas, the bottom often consists of silt/clay and the salinity is high. To a minor extent, there are also reefs, mussel banks and exposed rock bottoms. Between Amager and Malmö, a shelf runs transversely across the Sound and has a water depth of less than 10 metres. This shelf, the Drogden/Limhamn shelf, generally prevents the seabed water of high salinity from the northern area of the Sound from passing further into the Baltic Sea. The threshold between the Sound and the Baltic Sea is located in the southern part of the strait and has two furrows at a depth of eight meters. Circulation in the Kattegat/Sound is influenced by exchanges with neighbouring seas (the Skagerrak, the Belt Sea, and the Baltic Sea) and depends on meteorological forcing; tides are much weaker here than in the southern North Sea. It is only under certain meteorological situations that water of a high level of salinity from the Kattegat is capable of passing over the shelf of the Sound and into the Baltic Sea. The population around the Sound is approx. 2.5 million, 700,000 living on the Swedish side and 1.8 million on the Danish side. On the Swedish side eight municipalities border on the Sound and nine on the Danish side. In addition, Region Skåne and the County Administrative Board of Skåne border on the Sound on the Swedish side, the latter being a state representative authority in the region and the former the elected governing body of the region. On the Danish side Region Själland and the Capital Region also border on the Sound. The Sound Water Cooperation is an organization working for a healthy marine environment in the Sound. It is based on an agreement made in 1995 between Swedish and Danish municipalities, counties and provinces around the Sound. The agreement is a continuation of the Swedish-Danish cooperation that has existed for 50 years, first as the Sound water committee (1960-1974) and then as the Sound commission (1974-1993).
ICZM tools
The latest agreement from 2006 provides the main ICZM tools applied for the Sound Water Cooperation. This carries out activities in a range of different areas. It works as a source of information on results produced by external actors but also carries out certain studies itself. Among the most recent ones are the Environmental Status of the Sound, Fish in the Sound and Physical Disturbances in the Sound. The organization has its own long-term working programme with priorities for the protection of the marine environment, which is usually implemented by the municipalities participating in the organization. The Sound Water Organisation is divided into a working group and a steering committee. A joint secretariat is located at the municipality of Copenhagen. Financing comes mainly from the organization's partners but some activities have also been financed through an EU Interreg project.
Success and failure factors
It is difficult to point out any immediate success and failure factors affecting the work of the Sound Water Cooperation. It is de facto the only transboundary organization that brings together most Swedish and Danish municipalities and regional administrations around the Sound. However a change of status of the organization into a more governing body of the Sound would improve the possibilities of managing the marine environment in the Sound.

South Baltic transitional waters that are under the influence of large rivers like the Odra, with a large population, a high number of authorities and organizations in the catchment area, as well as complex political and legal structures, require high ranking political commitments, clear objectives and structures as well as an adequate body as a basis for transboundary cooperation and management (Box

4.1). The agreement between Poland and Germany signed in 1992 on cooperation in the field of water management of boundary waters and further agreements between the West-Pomeranian Voivodship and the Environmental Ministry of Mecklenburg–West Pomeranian federal state signed in 1995 and 2002 created the basis for local and regional initiatives (Box 6.1). The Sound Water Cooperation is based on an agreement made in 1995 between Swedish and Danish municipalities, counties and provinces around the Sound. The agreement is a continuation of the Swedish-Danish cooperation that has existed for 50 years (Box 3.4).

A well-functioning joint cooperative body (a cooperative commission, agency, or at least a contact office) is a key prerequisite for effective transboundary cooperation, as well as a system for the regular exchange of information. The regional Agenda 21 office, for example, served as an important basis for cooperation between research and the public, being also a partner of the Environmental Education Centres Network of the Szczecin Lagoon (Böhm et al. 2010).

Regular funding is necessary for the sustainability of the transboundary management efforts. It may come from the state budget of the countries involved (Box 3.1), from the organization's own members (Box 3.4), or from international financial institutions (Box 4.2). As several cross-border cooperation cases show, any transboundary cooperation that addresses a too wide array of issues and involves too many stakeholders ceases when the project funding expires. Thus, the ICZM-related cooperation projects from the mid-1990s expired soon after their termination. Even the implementation of Agenda 21 for the Odra (Szczecin) Lagoon, i.e., a project relying on a more advanced German-Polish transboundary cooperation (Box 6.1) stopped after the German national financial support for the project expired in 2010.

However, even the onetime cooperation projects that have terminated have resulted in strengthened cooperative ties, reinforced collaboration between monitoring and managing institutions, and better knowledge of the situation in the neighbouring country. These interim results could further lead to an increased capacity of the established transboundary cooperative networks in getting further financial support for more concrete and more effective cooperative projects in the South Baltic area.

3 Conclusions

The critically important management challenges for the South Baltic transboundary transitional waters are the ones that threaten the transitional waters' ecosystem integrity. Environmental problems in the transitional waters arise from the external input of pollutants mostly brought by large tributaries, but also from the mismanagement of the areas adjacent to the transitional waters. Although a significant number of sewage treatment facilities were constructed during the last decade, the environmental conditions of the South Baltic lagoons have not improved to the extent expected, probably due to the recovery of agriculture and re-emission of nutrients deposited in sediments. The South Baltic lagoons and estuaries are important as 'stepping stones' and migration corridors for many endangered fish and bird species. The threat of invasive flora and fauna species is considered as yet to be a moderate one. Global climate change increases the probability of a catastrophic inundation. Yet, cooperation between the countries on natural or technological hazard prevention, or transboundary environmental impact assessment of possible large-scale development projects is still missing in the countries sharing the South Baltic lagoons. The first step in transboundary cooperation is usually the need to negotiate the quotas for the commercial fish landings on a regular basis. The WFD has accelerated the transboundary cooperation and development of spatially integrative management approaches in the South Baltic transitional waters. Even if the WFD regulations are not legally binding for Russia, the WFD assumes that close cooperation with the neighbouring non-EU states will develop. The final conclusion is that South Baltic transitional waters under the influence of large rivers, with a large population, a high number of authorities and organizations in the catchment area, as well as complex political and legal structures, require high ranking political commitments, clear objectives and structures, an adequate body and regular financing as a basis for the transboundary management.

Watchwords

- Problems related to point and diffuse sources of nutrient loads and other different kinds of pollution require a transboundary approach.
- Raise public awareness on increasing vulnerability of the South Baltic lagoons and estuaries because of climate change and the need to address the rising threats properly.
- Close and long-term ties between experts, decision-takers and local users are a specific positive feature of the South Baltic transitional waters' management.
- Complementary monitoring and operational system of information exchange is the key issue for the cooperation between Russia, Poland and Lithuania in the context of the WFD.

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Key issues in transboundary reinforcement of environmental integrity of transitional waters

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Abstract

A high-level political commitment in countries sharing a transboundary transitional water body and a joint umbrella agreement provide a proper framework for the transboundary actions on the management of transitional waters. For the agreement to be truly effective, it must be supported by a dedicated professional agency established by the countries involved, a stakeholders' forum, an integrated management plan and a common platform for sharing information.

1 Introduction

The transboundary management of the transitional waters focuses on four major dilemmas:

1. The need to manage a transitional water body as an integral geographical entity *and* the need to link its management with the management of the catchment area and the adjacent nearshore.
2. Efforts to maintain national planning, management and monitoring systems *and* transboundary efforts to reinforce the transitional waters' environmental integrity.
3. Coastal and aquatic nature conservation *and* economic development in the transitional water areas.
4. Top-down decision making on the national and regional levels *and* the need to strengthen public participation considering the issues of the transboundary relevance.

2 Experiences

River Basin Management *and* Maritime Spatial Planning

The key issue of transitional water management is to integrate it with the management of the catchment areas and the adjacent marine areas. One of the reasons why the integrated management plans for the South Baltic lagoons that had been developed in the mid-1990s only enjoyed a limited success was the limited scope of the plans and planned actions. In the European Union transitional water management is regulated by the EU Water Framework Directive (WFD, 2000/60/EC). It commits EU member states to achieve a good qualitative and quantitative status of all water bodies by 2015. Its spatial scope of regulation comprises river basins, transitional and marine waters up to one nautical mile from shore. The WFD has accelerated the cross-border cooperation on the integrated management of the river basins, transitional waters and the nearshore. It asks for concrete plans and concerted actions by all countries sharing the river basin within a given deadline.

However, the focus of the WFD at present is, in practice, very much on the river basin. Coastal and marine issues are lacking (Box 4.1). The thematic scope of the WFD is too limited to serve as a general management concept. Experiences concerning the implementation of the WFD in large transboundary river basins revealed that a small coastal community usually faces many stakeholders from the river basin. Therefore, the challenge for the communities adjacent to transitional water bodies is to be able to attract attention for their issues and problems.

Box 4.1: Case Study: Integrated Odra river basin and coastal area management (Source: OurCoast ICZM Database; http://ec.europa.eu/ourcoast/index.cfm?menuID=4)

Experiences that can be exchanged
Large river systems like the Odra, with a large population, a high number of authorities and organizations as well as complex political and legal structures require high ranking political commitments, clear objectives and structures as well as an adequate body as a basis for cooperation and management. Coastal zones in the vicinity of large rivers cannot be managed independently from the rivers and their catchments. Spatially integrative management approaches are needed. The Water Framework Directive (WFD) has accelerated cross-border cooperation. But the focus of the present approaches is in practice very much on the river basin; coastal and marine issues are largely lacking. Furthermore, the thematic scope of the WFD is too limited to serve as a general management concept.
Overview of the case
Large rivers have a strong influence on their adjacent estuary and the surrounding coastal area. The Odra river is an outstanding example of the interrelations between river basin, coast and sea and proves the dependency of coastal management on river basin management. Therefore, in 2002, it became an international case study of the UNEP-ICARM programme and of IGBP-LOICZ (Land-Ocean Interaction in the Coastal Zone).
ICZM tools
A report with guidelines and recommendations for an improved Integrated Coastal Area - River Basin Management (ICARM) for the Oder/Odra was produced. Many environmental problems in the coastal zone result from activities in the river basin. An ICARM is needed to complement ICZM activities. Together with other worldwide ICARM case studies a book has been published, presenting different approaches and solutions and showing the benefits of an ICARM approach. The regional report contains a) a systematic analysis of river basin coast issues, b) gives detailed social, economic and ecological background data, c) reflects the present governance and management situation, d) shows future challenges like climate change, transformation processes in agriculture, and changes due to the Polish EU membership, and finally e) analyses present shortcomings and gives recommendations for the future cooperation. The major issues in the Odra region clearly reflect the growing need for coastal area - river basin cooperation and management but it still receives only minor attention. Regional authorities especially, are well aware of major problems and clearly see the links between catchment areas and the coast but without taking action. The public awareness of water-related problems is only poor and in consequence leads to a lack of integrated management. Future threats, like climate change and sea level rise and their potential consequences are not well perceived. Problems and issues in the neighbouring country are not sufficiently reflected in the media either. The coast mainly suffers from activities in the river basin but, at the same time, the coastal area is small compared to the large catchment. Experiences concerning the implementation of the WFD revealed that a small coastal community usually faces many representatives from the river basin. Therefore, the coastal community is not well able to attract attention for its issues and problems. The trans-national Odra region reflects cultural, economic and social differences between Germany and Poland. Therefore, the focus was to improve the cross-border cooperation between Germany and Poland and to foster a joint regional development.
Success and failure factors
Success factors: The UNEP-GPA programme Integrated Coastal Area - River Basin Management (ICARM) served as an umbrella. It ensured the cooperation between the players and increased the motivation of regional authorities and administrations. It facilitated the cross-border cooperation and the search for financial support. Another joint strong driver was the WFD with its clear implementation schedule. In May 2002, the International Commission on the Protection of the Odra against Pollution (ICPO) received the mandate to coordinate the implementation of the WFD within the international Odra river basin. Funding by German National Ministry for Education and Research allowed detailed studies and evaluations about the impact of the river on the coastal zone. Failure factors: A lack of high ranking political and financial support prevented intensified activities on the Polish side. In general, the lack of a joint language reduces the efficiency of cross-border activities.

The EU Integrated Maritime Policy and its key instrument – Maritime Spatial Planning – outlined by the EU Marine Strategy Framework Directive (2008/56/EC) extends and builds on the requirements of the WFD into seas beyond the current WFD limit. In coastal areas, where the MSFD regulations overlap with the WFD, the latter will continue to take precedence except where the MSFD introduces additional requirements (SEA, 2010). The Marine Environment Unit of the Directorate General for Environment of the European Commission has explicitly stated that the MSFD excludes transitional waters that are covered by the WFD (Connor 2010). Hence, the challenge is to find proper planning approaches to represent transitional water management adequately from the WFD perspective, also considering the regulations of the MSFD in the adjacent nearshore. Beyond the EU regulations, the Planning Guidelines for Integrated Coastal Area and River Basin Management (ICARM) provide a broader perspective on the integration of transitional water management with the management of the catchment area and the adjacent nearshore (UNEP/MAP/PAP 1999).

National management systems *and* transboundary management integration

Another key issue is to overcome differences in the national spatial planning, management and monitoring systems in the bordering countries sharing a transitional water body, and to build the common ground for cross-border cooperation. The cross-border cooperation in the transitional water management is obstructed by changes in responsibilities, transfer of staff and the loss of key staff, decreasing motivation due to perceived 'complexity' of coastal zone management and integration of WFD and MSFD requirements in the transboundary context, slow development of concrete projects, the absence of a joint understanding, the lack of a joint language and funds (Box 4.1 and Box 6.1)

A particular issue of the South Baltic Area is the difference in the administrative and legal systems pertinent to transitional water management in the EU member states (Lithuania and Poland) and Russia. Differing management systems, economic interests and priorities on both sides of the border challenge common management efforts and cooperation possibilities (Box 4.2). The Russian Federation has not ratified several international conventions, *inter alia*, the Bern Convention, which is a binding international legal instrument in the field of nature conservation and the Espoo Convention, which involves the environmental impact assessment of development projects with a transboundary impact. None of EU directives is binding for Russia. Hence, it is difficult to get Russian institutions committed to cross-border cooperation in transitional water management.

A high-level political commitment in countries sharing a transboundary transitional water body and a joint umbrella agreement on the key issues of common concern and potential solutions may provide the response to conflicting jurisdictions and political uncertainty. The agreement, particularly supported by initial project funding, can increase the motivation of the authorities and administrations serving as an umbrella for local cross-border initiatives for cooperation (Box 6.1).

As good practice examples from the Wadden Sea and Ireland show, for the agreement to be truly effective, it must be supported by four key elements: a dedicated professional agency, a stakeholders' forum, an integrated management plan and a common information sharing platform (Box 4.3 and Box 6.3). A dedicated professional agency with specified legal responsibility should be established jointly by cooperating countries for the management of the transboundary transitional water body. The agency should be tasked with very specific management objectives. It must have a formal legal mandate with dedicated resources, both, financial resources and personnel.

The main task of the agency is to facilitate development and implementation of a comprehensive integrated management plan for the transitional water body and to foster links with the management of the adjacent catchment areas and the marine nearshore. From the WFD perspective, the plan should be an integral part of a bigger International River Basin Management Plan. Its primary focus must be on the reinforcement of the transitional waters' environmental integrity. It should address the issues of the common concern of the bordering countries in the management of the transboundary transitional water body as a complete entity, without political boundaries, ensuring a stepwise management progress: from the awareness of the necessity, to cooperation, towards common policy and joint management.

Box 4.2: Case Study: ICZM Plan for the Vistula Lagoon (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
For the first time Polish and Russian managers and scientists have worked together on economic, social and conservation issues trying to treat the transboundary lagoon as one ecosystem, disregarding political borders. Many difficulties stemming from different economic and political systems, different historical experience, different approaches and even different measuring methods used by scientists and economists were discussed and partly agreed. The project was the responsibility of and implemented by the regional authorities in Poland and Russia. Some limited participation of local authorities as well as a public hearing accompanied the management plan preparation. Hence, the study can provide experience on how some key local authorities can facilitate development and implementation of the ICZM Plan for a transboundary transitional water body as an integral part of concerted cross-border efforts in a framework of broader international cooperation.
Overview of the case
At the Conference of Prime Ministers of the Baltic Sea States (Ronneby, Sweden, 1990), the Baltic Sea Declaration (1990) was signed. This Declaration initiated the Baltic Sea Joint Comprehensive Action Programme (JCP). Component 4 of this Programme dealt with Management of Coastal Lagoons and Wetlands (MLW). The Vistula Lagoon was one of six selected Baltic lagoons and wetlands where the first steps in preparation of a transboundary management plan were attempted. This was done by the special team (Area Task Team – ATT) composed of local managers, scientists and NGOs from Poland and the Russian Federation.
ICZM tools
During the last decade a sufficient number of sewage treatment facilities have been constructed, however sanitary conditions have not improved to the extent expected. This is most probably not only due to lack of efficient treatment facilities on the Russian side, but also due to the re-emission of pollutants deposited in sediments. Information regarding the environmental effects of the pollution of the Vistula Lagoon is insufficient due to lack of new studies on topics such as the loss of biodiversity and contamination levels caused by toxic substances and the related biological effects. The Integrated Management Plan covered the whole natural system of the Vistula Lagoon: Vistula Lagoon itself, its catchment area and the Vistula Spit. Large numbers of detailed management problems were identified within the following sectors. For Poland: 1. Environment. 2. Water economy. 3. Management. 4. Ports and waterway transport. For Russia: 1. General problems in urgent solution. 2. Particular areas in planning. 3. Investment priorities. 4. Harbours. 5. Marine commercial ports and fishing ports. 6. River ports and shipping in the Lagoon.
Success and failure factors
Success factors: 1. Close cooperation between Polish and Russian scientists and improved cooperation between local authorities from Gdansk in Poland and Kaliningrad in Russia. 2. Democratization process. Local authorities in Poland and in Russia are becoming more participatory, and more responsive to the priorities of society. 3. Stepwise approach and commitment of international financial institutions to support implementation of the planned measures. 4. The groundwork for future cooperation and further development of practical transboundary management. Failure factors: 1. Differing economic interests and priorities. A relevant example is the use of the Baltiysk Strait which is located in the Russian side of the lagoon. Its use is restricted for Polish commercial activity. 2. Different administrative and legal systems in Poland and Russia. 3. Local governments in Poland have been given a significant amount of administrative and economic freedom, while administrative bodies in Russia remain centralized.

Box 4.3: Case Study: Wadden Sea Forum – a transitional water stakeholder body (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
The main positive experience of the WSF activity, which could be replicated in other areas, is effective involvement of stakeholders in the sustainable management of the transboundary transitional water bodies. It is one of the central efforts of the WSF to enhance bottom-up processes compatible with the principles of democracy wherever possible. In order to create a sound basis for the implementation of sustainable development strategies, stakeholders must be actively involved in these processes. Another positive experience of the WSF activity relies on the broad geographical scope. WSF stresses that there are many interactions between the Wadden Sea and the adjacent mainland and that a sustainable development strategy for the Wadden Sea Region must integrate policies for the Wadden Sea proper and the adjacent mainland.
Overview of the case
About 3.7 million people live along the Wadden Sea coast, of which about 75,000 live inside the Wadden Sea Region. A very essential principle is that unreasonable impairments of the interests of the local population and its traditional uses in the Wadden Sea Region have to be avoided. The WSF was established in 2002, following a decision at the 9th Trilateral Governmental Conference 2001 in Esbjerg as a cross-border stakeholder forum and an independent body. It consists of 41 members, representatives of the sectors agriculture, energy, fisheries, industry and harbour, nature protection, tourism, as well as local and regional authorities from The Netherlands, Germany (Lower Saxony and Schleswig-Holstein) and Denmark. The Ministerial Declaration of the 10th Trilateral Governmental Conference 2005 in Schiermonnikoog reinforced the importance of stakeholder participation and recognizes that the achievement of the Guiding Principle of the Cooperation "can only be obtained in cooperation with those who live, work and recreate in the area and are willing to endow its protection". Geographically the WSF deals not only with the Wadden Sea Area but with the wider Wadden Sea Region. With the establishment of the WSF as an independent stakeholder forum, the inhabitants of the Wadden Sea Region have been given an opportunity to get actively involved in the activities of the Trilateral Wadden Sea Cooperation.
ICZM tools
The WSF Breaking the Ice action programme was adopted in 2005. It outlines the starting points for sustainable development perspectives of the Wadden Sea Region. WSF is an independent platform of stakeholders from the Wadden Sea Region. The Ministerial Declaration of the 10th Trilateral Governmental Conference 2005 reinforced the importance of stakeholder participation and recognizes that the achievement of the Guiding Principle of the Cooperation "can only be obtained in cooperation with those who live, work and recreate in the area and are willing to endow its protection". The WSF process is guided by a plenary meeting, a Steering Committee, and a chairman, in accordance with Rules of Procedure. The plenary meeting is the decision-making body.
Success and failure factors
Success factors: 1. WSF is acknowledged as independent trilateral advisory and consultation body to the Trilateral Wadden Sea Cooperation which prepares relevant statements and background information. 2. The dedicated working groups of the WSF comprised of the professionals in the field work on most relevant topical issues to find a balance between different interests in the Wadden Sea Region. 3. A step forward to a healthy and sustainable Wadden Sea Region was also the adoption of a Memorandum of Understanding between the Trilateral Wadden Sea Cooperation and the WSF in 2008. According to the Memorandum, the WSF will be consulted and prepare advice on matters regarding sustainable development of the Wadden Sea Region and will be consulted in the framework of the progress on the implementation of the Wadden Sea Plan and the national ICZM strategies other issues of relevance for the Wadden Sea Region. Failure factors: There is still insufficient or poor cooperation between local, regional, national and EU authorities in the preparation, implementation, enforcement and coordination of rules and regulations in the Wadden Sea Region. A sustainable development perspective for the Region requires better and intensified cooperation between responsible authorities.

Box 4.4: Case Study: Benchmarking of national parks on the Curonian Spit (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
From the results of the study it can be said that once the methodologically coherent basic management and planning foundations are laid at the very early development stage of neighbouring cross-border protected areas, then these coherent foundations support the common transboundary cooperation framework in the long term. It is a critically important precondition for meeting fundamental transboundary cooperation criteria, which are identified by the EUROPARC as Primary Standard Criteria (particularly, sharing the common vision) and Primary Field of Work (nature and landscape conservation compatibility with the guidelines and recommendations for the application of the IUCN Protected Area Management Categories in Europe). If coherent basic management and planning foundations are absent at the early development stage of neighbouring protected areas then it is advisable to establish a joint team of the national park staff and external experts, which, with the help of the EUROPARC experts, should facilitate management coherence of both national parks.
Overview of the case
The Curonian spit barrier is divided between Russia and Lithuania. Kurshskaya kosa national park was established on the Russian side of the spit in 1987, and Kuršių nerija national park on the Lithuanian side followed in 1991. In 2000, the entire Curonian Spit was included into the UNESCO World Heritage List as a single internationally important cross-border cultural landscape. This initial situation provided a good framework for the cross-border coherence of the Curonian Spit management. Yet, differences in the nature conservation approaches between the EU and Russia cause certain deviations in the national park management approaches. The benchmarking study provides a useful tool to accomplish the objective comparison of the current management performance in both national parks and to assess the qualification of the Curonian Spit as a European transboundary protected area.
ICZM tools
For the Curonian Spit, the most suitable management assessment technique is provided by the Trans-boundary Parks - Following Nature's Design initiative developed by the EUROPARC Federation. It directly addresses the issues of the transboundary coherence in the protected area management. The verification and certification of transboundary protected areas by EUROPARC is based on a set of clear, universal criteria and indicators, which have been approved by the European Commission's DG Environment. Ten of the fourteen Basic Standards must be achieved before certification can be achieved: All four Primary Criteria, three out of five Secondary Criteria, all the criteria from the Primary Field of Work and two of four Secondary Fields of Work must be fulfilled. The protected areas must also demonstrate how they involve local communities in the transboundary cooperation and how the socio-cultural differences of the cooperating parties are acknowledged and respected. A preliminary screening of the transboundary coherence in the management of both national parks on the Curonian Spit used a scorecard method. The preliminary results show, that both parks meet minimal criteria necessary to qualify as a European transboundary protected area.
Success and failure factors
Success factors: 1. Similar landscape and its recent evolution on the Curonian Spit on both sides of the border. The management of the Curonian Spit for many centuries, including the better part of the 20th century, was identical on the entire Curonian Spit with few regional differences (Povilanskas 2004). 2. The key to the successful management coherence was the joint development of the initial master plans for both parks in the early 1990s, applying identical functional zoning, forest management and dune conservation approaches. Failure factors: 1. The Russian Federation has not signed the Bern Convention (1979), which is a binding international legal instrument in the field of nature conservation, and the European Landscape Convention (2000), also known as the Florence Convention, which promotes the protection, management and planning of European landscapes. 2. Due to strong state level influence and a lack of full stakeholder inclusion, different philosophies and priorities on both sides of the border challenge common management efforts and cooperation (Moritz 2010).

The cross-border management plan aims at harmonization of management objectives and indicators of good ecological status (GES) at different levels of implementation, ranging from the definitions to harmonized methodologies for their assessment (Box 5.2). Notably, even if a transitional water body is shared by an EU and a non-EU country (like in the case of Vistula and Curonian lagoons), it could be the subject of the integrated transboundary planning and management under the EU WFD requirements. The WFD stipulates that if a river basin (including transitional waters) extends beyond the EU territory, the relevant Member State(s) must seek to establish appropriate coordination with the non-Member State(s) concerned.

A multilingual cross-border information-sharing platform is an important tool for providing information, to give access to data and to support cross-border cooperation. Sharing and exchange of information and knowledge across the border increases awareness on common management issues and challenges and strengthens the commitment for cross-border cooperation among the regional stakeholders. The key questions to be addressed while planning the development of a cross-border information-sharing platform are the following: What is the content of information and what are the main challenges for the bilingual maintenance of the information platform? Who are the end-users and how are they integrated into the information sharing? How are the long-term sustainable maintenance and regular updating of the system ensured by both sides? How are the target groups in both countries motivated to use the information? In the long term, the cross-border information exchange platform can only be sustainable if rules and principles for information exchange are agreed upon, and the committed personnel and funding sources are available on both sides of the border for a longer period of time.

Nature conservation *and* economic development

In many transitional waters biodiversity conservation is the primary concern due to rich and diverse coastal and aquatic habitats. Yet, this issue is complicated because of various economic development interests in the catchment basins, in the marine nearshore and in the transitional bodies themselves (fisheries, harbour and waterway upgrading, development of wind farms, tourism etc.). In the case of the transboundary transitional waters the situation is complicated by the necessity to balance differing interests across the border. Some cross-border management tools facilitate integrated resolving of this transboundary management dilemma: a coherent cross-border management of bordering protected areas, a transboundary environmental impact assessment and mitigation of negative impacts, as well as bilateral interdisciplinary expert groups looking for ‘win-win’ solutions.

Transboundary protected area qualification benchmarks are appropriate tools to assess, whether the bordering protected areas established in or around a transboundary transitional water body under the national or EU legislation (national parks, nature reserves, Natura 2000 sites – SPAs and SACs) are managed in cooperation by the countries sharing the transboundary region (Box. 4.2).

Large-scale development projects might obstruct integrated cross-border biodiversity and habitat protection efforts. Harmonization of national legislation for the regulation of development projects with the transboundary impact in bordering countries is crucial for the transboundary cooperation in this respect (Box 3.2). Furthermore, the Espoo Convention on Environmental Impact Assessment in a Transboundary Context obliges the eventual hazard-source state to involve the affected state in the transboundary environmental impact assessment procedure (Chapter 8 of this Code of Conduct). Both countries must jointly monitor the evolution of the water body and the effects of the implemented projects in order to extend the knowledge of the environmental conditions and to facilitate possible corrections.

In order to compensate for the loss of habitats due to economic development, economic valuation of the threatened habitats should be carried out. Economic valuation conveys useful information for economic values, including assessment of threatened passive use values and the necessity of their compensation and/or mitigation. A coherent systematic cross-border economic valuation survey using a consistent and approbated methodology could deliver valuable data on nature conservation and

development trade-offs in affected areas and facilitate a truly integrated transboundary management of the transitional water body (Box 2.1).

Interdisciplinary task groups under the organizational umbrella of the transitional water management agency should facilitate achieving a proper transboundary balance of nature conservation and economic development needs. The groups should focus on 'hot issues' and consist of ministry as well as local and regional authority representatives and scientific experts (Box 4.4).

Top-down decision taking *and* public participation

Most of management plans are based on the 'top-down' planning principle: they are prepared by professional experts and approved by municipal or governmental bodies. Local communities, direct users and other interest groups are contacted during the planning process at best and do not play any significant role in the decision taking. Lack of understanding of specific management decisions is the major obstacle in negotiating between the top-down planning process and local interests. The problem of under-representation is even graver in the case of the transboundary transitional water bodies. Interest groups on one side of the border are usually left ignorant about the plans on the other side.

Several good practice approaches address the dilemma between the 'top-down' planning and public participation in the transboundary management of the transitional waters: empowering local communities, direct users and other interest groups through educational projects; involving the interest groups into the cross-border information-sharing system; strengthening representation of the direct users and other interest groups in the planning and decision-making process; involving local people into economic activities facilitated by the transboundary management plans. All these good practice approaches are usually achievable as these areas are comparatively sparsely inhabited.

In order to achieve sustainable development in the regions surrounding the transboundary transitional waters it is necessary not only to engage with direct users but it is also essential to raise awareness for the transitional waters, their associated rivers and catchments and to highlight their vulnerability by negative impacts (Box 6.3). This is achieved through cross-border education and training projects. Community members on both sides of the border should be actively involved in cooperation projects to conserve, enhance, understand and enjoy the transitional waters. The projects must inform the direct users about the transboundary management actions and their purpose.

To make local people more participatory and more responsive to the management regulations means creating an informed, involved and committed community. Communication, education, awareness-raising, information and information dissemination are the key elements. For this purpose a bilingual website, a regional electronic newsletter and a bilingual magazine could be effective tools. Involving various interest groups into the cross-border information sharing should be a bottom-up process with the development of a genuine interest and skills among the local interest groups in querying and quarrying relevant information on the transitional waters from the web-based information platform. Special layers of information should be specifically user-tailored to meet the needs of local interest groups and they should be available to the public via the internet platform.

Increasing the representation of non-governmental stakeholders in the planning and decision-making process is best achieved by establishing an independent bilateral advisory and consultation body (a forum) to assist the professional transitional water management agency. Such a forum should prepare relevant statements, background information and stakeholders' recommendations for the priorities and measures of the transboundary management of the transitional waters (Box 4.3). The advisory forum should include direct users, scientific experts and other professionals with hands-on knowledge of the area in order to find a balance between different interests in the transboundary management of the transitional waters. Participation of committed local NGOs is also critical.

Last, but not least, the interest of local communities in the transboundary management of the transitional waters could be maintained by their direct involvement in economic activities, such as offering nature tourism services along the cross-border tourist trails (nature guiding, hiking, biking and

horse-riding tours, lodging, boating etc.). The key issue is to build public acceptance for cross-border cooperation measures by showing the examples, where nature conservation and sustainable economic development go hand-in-hand (Box 2.3).

3 Conclusions

This chapter has outlined the key issues and dilemmas of the transboundary management of the transitional waters. The highlighted approaches to resolve the dilemmas have proved to be successful in practice in the transboundary context of different transitional waters of the South Baltic Area, the Wadden Sea and Ireland. They recognize that a high-level political commitment in countries sharing a transboundary transitional water body and a joint umbrella agreement on key issues of common concern and potential solutions provide the response to conflicting jurisdictions and political uncertainty. The agreement should contain a list of priority issues where joint actions must be taken. For the agreement to be truly effective, it must be supported by three key elements: a dedicated professional agency established jointly by the cooperating countries, an integrated management plan and a common information-sharing platform. The plan should address the issues of common concern of bordering countries in the management of a transboundary transitional water body combining them with the management of the catchment area and the adjacent marine nearshore. The transboundary management of the transitional waters should also be facilitated by a bilateral forum of interdisciplinary expert groups, direct users and other interest groups involved in the planning and decision-making process, the transboundary environmental impact assessment, education projects empowering local communities, as well as involving local people into economic activities facilitated by the plan.

Watchwords

- Consider the transboundary target area as a complete entity, without political boundaries.
- Learn your neighbour's spatial management system, decision-making and implementation rules, priority concerns and aspirations, public participation culture and procedures.
- Accept good practice examples and knowledge from your neighbour.
- Develop and maintain structures for the integrated transboundary transitional water management and cross-border cooperation.

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Towards a strategy for reinforcement of environmental integrity of transitional waters

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Abstract

The planning process for the transitional waters' management is a continuous cyclical process following a sequence of basic steps from analysis to synthesis, action, review, assessment and revision of goals, strategies, priorities and measures. It includes seven phases: initiation, existing situation analysis, identification of conflict and opportunities, identification of goals and alternative courses of action, development of a strategy, implementation, monitoring and evaluation.

1 Introduction

Conceptual Framework and Planning Guidelines for the Integrated Coastal Area and River Basin Management (UNEP/MAP/PAP 1999, p. 35) describes the main approaches in the river basin, coastal and marine area management as follows: 'River basin management and coastal zone management come from two different traditions. River basin management stems from a water resource management perspective […] River basin management focuses on a single resource (water) with multiple uses placing emphasis on environmental management through multi-sectoral coordination with some elements of land-use regulation […] Coastal management stems from two perspectives: marine resource management and physical planning […] Coastal zone management focuses on multiple resource and multiple use management based on physical planning and resource management with a strong emphasis on land-use regulation and physical interventions.'

Management of transitional waters must combine all three management perspectives: water resource management, marine resource management and physical planning perspectives. However, management of transitional waters is not a mere resulting overlap of the river basin, coastal and marine management perspectives. Being highly dynamic and very specific areas in hydrographical and ecological terms, transitional waters differ from both, the tributary rivers and the adjacent coastal and marine areas in the environmental conditions and factors, the natural processes, the human activity characteristics and pressures, the various stakeholders and their needs, and the institutional context, but also the interventions (policy tools) employed.

2 Experiences

Referring to the ICARM Conceptual Framework and Planning Guidelines, the regulations of the EU WFD, MSFD, the Bird and Habitat Directives, and the good practice experience from the reinforcement of the environmental integrity of transitional waters in the South Baltic Area and other regions of Europe, management of transitional waters should be linked to river basin management and coastal management in the following way:

a) On a *local* scale by focusing on:

- controlling waste and litter;
- managing living resources;

- managing critical issues;
- protecting areas of high ecological value such as wetlands, river deltas and estuaries;
- siting of projects and structures.

b) At a *regional, national* and/or *transboundary* level by focusing on:

- controlling water quality;
- controlling point and diffuse source pollution;
- controlling environmental risks and hazards;
- establishing a mechanism for coordinating goals and decisions of all stakeholders;
- integrating socio-economic considerations with environmental issues;
- identifying and evaluating human pressures;
- linking transitional waters with the catchment area and coastal systems.

c) On an *international* scale by focusing on:

- establishing resource monitoring schemes;
- identifying and evaluating human pressures;
- linking transitional waters with the catchment area and coastal systems.

Geographical scope of the transitional waters' management

The delineation of geographical scope of the management of transitional waters is rather complicated. As already mentioned in Chapter 1, the WFD describes transitional waters as 'bodies of surface water in the vicinity of river mouths which are partly saline in character as a result of their proximity to coastal waters but which are substantially influenced by freshwater flows'.

The description means, that the transitional waters as a planning area are bordered by fresh inland waters on the upstream side, whereas on the downstream side the transitional waters are bordered by coastal sea waters. Yet, the exact delineation of transitional waters using the salinity thresholds might be rather arbitrary, particularly, in the coastal water bodies of the tidal seas, e.g. the North Sea. Thus, in the Wadden Sea, which is one of the largest coastal lagoons in the world (Pilippart & Epping 2010), only the Ems, Weser and Elbe river estuaries are designated as transitional waters within the river basin districts managed in accordance with the WFD requirements. The remaining Wadden Sea is designated as coastal waters and is subject to both, WFD and MSFD regulations.

Also in the Baltic Sea Area, some coastal lagoons with distinct features of transitional waters are designated as coastal waters rather than transitional waters for the WFD purposes (e.g., the German part of Odra lagoon). Therefore, a more practical approach is to apply a combination of physical, hydrographical and ecological criteria, which will be relatively different in every case, to single out the transitional water body as a distinct planning and management area.

The vague delineation of the geographical scope of transitional waters raises the issue of the distinctiveness of a management plan. The key question is how much a transitional water management strategy or a plan should be integrated with management strategies or plans for the catchment area and for the marine nearshore. The ICARM Guidelines recommend the development of a single comprehensive management plan for the entire system comprising the coastal area and river basin and not distinguishing lagoons, estuaries or other transitional waters into separate entities.

Although WFD distinguishes transitional waters into a separate management entity, it nevertheless leaves to the EU member states to decide upon the necessity of preparation of a special transitional waters' action programme. Lithuania, Ireland, UK and several other EU member states have prepared special action programmes for their transitional waters, while Poland and other EU member states with large transitional water bodies have not.

Box 5.1: Case Study: Integrated transboundary river basin and transitional water management in Ireland (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
The main positive experience from the transboundary integration of the river basin with transitional and coastal waters in Ireland is a very close and lasting cooperation between both jurisdictions during the plan preparation and approbation phase. The authorities in both jurisdictions agreed on a common timeframe and Significant Water Management Issues report content. For each international river basin district, a single report on significant water management issues was produced; stakeholders and authorities groups were asked to help identify the key issues and views were gathered at public workshops. A single collaborative strategic environmental assessment has been commissioned to cover both jurisdictions. For the plans and programmes of measures, the authorities in both jurisdictions have also agreed to use a common template. This cooperation is continuing in the implementation phase. Ongoing coordination arrangements regarding public participation include reciprocal invitations to attend meetings of the formal stakeholder groups in Northern Ireland and the Advisory Councils in Ireland. Both jurisdictions jointly monitor transitional and coastal waters, as well as representative sites on transboundary rivers and lakes.
Overview of the case
In 2003, the WFD was transposed into law in Northern Ireland by the Water Environment Regulations and in Ireland by the European Communities (Water Policy) Regulations. The main objectives of the WFD are to maintain the "good and high status" of water where it exists, prevent any deterioration in the existing status of waters and to restore at least "good status" in all waters by 2015. The mechanism by which the "good and high status" of water is to be achieved under the WFD is through the adoption and implementation of River Basin Management Plans (RBMPs) and Programmes of Measures for each of the identified River Basin Districts (RBDs). The transboundary framework puts additional requirements on the Programmes of Measures.
ICZM tools
Good ecological status (GES) or good ecological potential (GEP) objectives were identified to be achieved by 2015 as a result of the specially tailored comprehensive Transitional and Coastal Waters Action Programmes (plans). These programmes are developed, agreed upon, and implemented for both International River Basin Districts – the Neagh Bann IRBD and North Western IRBD. They are comprised of the following components: 1. Description of Transitional/Coastal Protected Areas enjoying some protection under the national and EU legislation. 2. Description of status/impacts: 1) Overall status; 2) Status elements; 3) Possible impacts. 3. Pressures/risks (according to Pressure Based Risk Assessments): 1) Land-based pressures; 2) Marine pressures. 4. Action Programme (measures): 1) Bathing Waters; 2) Shellfish Waters; 3) Water Pollution and Services Acts; 4) Birds and Habitats Directives; 5) Urban Wastewater Treatment; 6) Morphology (Controls on Physical Modifications). 5. Site-specific objectives.
Success and failure factors
Success factors: 1. Solid regulatory framework for international river basin management. 2. Strong technical and local expertise in transitional waters' monitoring, planning and management. 3. Progress of networks in coastal zone management. 4. Powerful datasets and interactive databases covering transboundary transitional waters. 5. Focus on ecosystem approach in the management of transboundary waters. 6. There are specially tailored comprehensive Transitional and Coastal Waters Action Programmes (plans) developed, agreed upon and implemented for both International River Basin Districts. Failure factors: 1. No integrated transboundary plan in operation for marine monitoring in both jurisdictions. 2. Perceived "complexity" of coastal zone management in a transboundary context. 3. Fragmented and ad hoc decision taking by the transitional waters' stakeholder bodies.

Box 5.2: Case Study: Comprehensive management plan for the Wadden Sea (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
The Trilateral Wadden Sea Plan (WSP) constitutes the common transboundary policy and management plan for the Wadden Sea Area. It is an agreement of how the countries envisage the coordination and integration of management of the Wadden Sea Area and of the projects and actions that must be carried out to achieve the commonly agreed targets. It is very important, that the WSP expresses a shared vision of the aspired ecological state of the Wadden Sea: ➢ A healthy environment which maintains the diversity of habitats and species, its ecological integrity and resilience as a global responsibility; ➢ Sustainable use; ➢ Maintenance and enhancement of ecological, economic, historical-cultural, social and coastal protection values providing aspirations and enjoyment for the inhabitants and users; ➢ Integrated management of human activities which takes into account the socio-economic and ecological relationship between the Wadden Sea Area and the adjacent areas; ➢ An informed, involved and committed community.
Overview of the case
The Wadden Sea, stretching over 500 km along the North Sea coast of the Netherlands, Germany and Denmark, is the largest transboundary transitional water body and the largest tidal flat and barrier island system with extensive salt marshes in Europe. The Trilateral WSP was adopted in 1997. It constitutes the common transboundary policy and management plan for the Wadden Sea Area. The WSP is a policy and management plan adopted by governments for a transboundary area and therefore has a wider perspective than a traditional management plan for a site.
ICZM tools
The WSP includes the vision, shared principles, targets and policies and management measures combined with actions. The following management principles are fundamental for the common management of the Wadden Sea: ➢ Principle of Careful Decision Making, i.e. to base decisions on the best available information; ➢ Principle of Avoidance, i.e. to avoid activities which are potentially damaging; ➢ Precautionary Principle, i.e. to take action to avoid activities which are assumed to have significant damaging impact on the environment even without a direct evidence; ➢ Principle of Translocation, i.e. to translocate activities which are harmful to the Wadden Sea environment to areas where they will cause less environmental impact; ➢ Principle of Compensation, i.e. that the harmful effect of activities which cannot be avoided, must be balanced by compensatory measures; ➢ Principle of Restoration, i.e. that, where possible, parts of the Wadden Sea should be restored; ➢ Principles of Best Available Techniques and Best Environmental Practice.
Success and failure factors
Success factors: 1. All three participating countries are the „old“ members of the European Union that have a long record of harmonizing the national environmental regulations with the EU requirements. 2. The professional Common Wadden Sea Secretariat is established, which ensures sharing of information, joint monitoring and evaluation of the progress in management. 3. A common Trilateral Monitoring and Assessment Program (TMAP) for the Wadden Sea. 4. There are specially tailored comprehensive Transitional and Coastal Waters Action Programmes (plans) developed, agreed upon and implemented for both International River Basin Districts. Failure factors: When the interests of large businesses are at stake in a trans-boundary transitional water body, interests of local stakeholders and those of affected states are often played down by the potential hazard source state, which tends to apply the minimal possible environmental impact assessment procedures. Thus, neither one of three partner countries had carried out a trans-boundary strategic environmental assessment for the natural gas extraction projects in their national parts of the Wadden Sea area.

Thematic scope of the management of transitional waters

The thematic scopes of the management of transitional waters can range widely – from fulfilling the WFD requirements for water quality to a comprehensive addressing of environmental, social, economic and other issues of local, regional, national, transboundary and international scale. The WFD sets environmental objectives focused on ecological quality, which takes account of the full range of pressures upon the aquatic environment (pollution, abstraction, flow-regulation/transfer and habitat impact). These objectives provide the context for identifying key water management issues. Specific issues of the river basin management that are pertinent to ensuring the ecological quality of the transitional and coastal waters are given in Box 5.1. Different elements determine the ecological quality of different water types: rivers, lakes, transitional waters and coastal waters (Tab. 5.1).

Table 5.1: WFD quality elements for different categories of surface waters (after: Nieuwenhuis et al. 2011)

Quality element	Rivers	Lakes	Transitional Waters	Coastal Waters
BIOLOGICAL				
Phytoplankton	X	X	X	X
Phytobenthos	X	X		
Macrophytes	X	X		
Macroalgae			X	X
Angiosperms			X	X
Benthic invertebrate fauna	X	X	X	X
Fish	X	X	X	
PHYSICO-CHEMICAL				
General conditions	X	X	X	X
Priority Substances	X	X	X	X
Other specific pollutants	X	X	X	X
HYDROMORPHOLOGICAL				
Hydrological				
Quantity and dynamics of water flow	X	X		
Connection to groundwater	X	X		
Residence time		X		
River continuity	X			
Freshwater flow/hydrological budget			X	
Freshwater flow				X
Direction of dominant currents				X
Morphological				
River depth & width variation	X			
Structure & substrate of river bed	X			
Structure of riparian zone	X			
Current velocity	X			
Channel patterns	X			
Lake depth variation		X		
Structure & substrate of lake bed		X		
Structure of lake shore		X		
Depth variation			X	X
Quantity Structure & substrate of the bed			X	X
Structure of the intertidal zone			X	X

Planning process of the management of transitional waters

According to ICARM Planning Guidelines (UNEP/MAP/PAP 1999), planning is a continuous cyclical process following a sequence of basic steps from analysis to synthesis, action, review, assessment and revision of goals, strategies, priorities and measures. The planning process for the transitional waters' management includes at least seven phases: initiation, analysis of the existing situation, identification of conflict and opportunities, identification of goals and alternative courses of action, development of a strategy, implementation, monitoring and evaluation (Fig. 5.1). These seven phases broadly correspond to planning phases recommended by the EU (WFD, MSFD, Habitat Directive, other EU directives), and other methodological frameworks regulating spatial planning procedures (e.g. IUCN – The World Conservation Union).

A proper ***initiation of the planning process*** is crucial for the success of the reinforcement of the transitional waters' environmental integrity. This is the basic inception task that involves organisation and mobilisation for planning. According to the ICARM Planning Guidelines (UNEP/MAP/PAP 1999, p. 45): 'Initiation of the planning process includes identification of the key factors (sometimes called triggering factors) that may contribute significantly to the awareness of the public with respect to coastal and river conservation and management and encourage the adoption of action plans.'

The scope of the ***analysis of the existing situation*** must be directly coherent to the thematic scope of the anticipated transitional waters' management strategy or plan, the key objectives and goals of the management, and to the available resources, both, financial resources and personnel, and the time frame.

There are four main aspects for the analysis of the existing situation needed for the planning and management of transitional waters:

- Baseline studies aimed to assess the background (reference conditions) as well as the current ecological status of the transitional waters based on a certain set of indicators.
- Stocktaking of physical and ecological conditions and other input data needed for the simulation modeling of possible outcomes of the alternative courses of action.
- Inventory of social and economic parameters of human activities in and around the target area.
- Synthesis of the comprehensive knowledge on the situation.

According to ICARM Planning Guidelines (UNEP/MAP/PAP 1999, p. 43), ***identification of conflict and opportunities*** 'deals with the interaction between natural and human ecosystems today and in the future. It includes the analysis of needs and the pressures on the basic stakeholders; these influence decision making in development and environmental management.' (Box 5.3).

Identification of goals and alternative courses of action involves an inventory and in-depth analysis of the key factors in terms of driving forces, pressures, states, impacts and responses affecting the environmental integrity of the transitional waters, in order to identify key management goals and objectives. Alternative strategic options should be highlighted reflecting the different priorities and the feasibility of the planned measures (Box 5.4).

Development of a strategy is the process of translating the identified performance drivers, goals and objectives into a coherent system of targets and policy measures for the step-wise concerted action in the transitional waters' management. Typically, development of the strategy is a result of the comprehensive S.W.O.T. analysis.

Implementation involves the actual implementation of the strategy and is strongly linked to ***monitoring and evaluation*** phase, which provides for procedures and mechanisms to review regularly progress towards the achievement of goals and objectives (UNEP/MAP/PAP 1999).

All planning methodologies emphasize, that the planning process is cyclical allowing for regular review, evaluation and reconsideration of performance factors, goals, objectives, targets, priorities and measures.

Box 5.3: Case Study: Cross border policy co-operation for sustainable development of an estuary – the Scheldt estuary (Source: OurCoast ICZM Database; http://ec.europa.eu/ourcoast/index.cfm?menuID=4)

Experiences that can be exchanged
The development of a sustainable, healthy and multi-functional water system that supports human needs in a shared estuary. The approach takes into account flooding safety, accessibility, healthy & dynamic ecosystems and water quality.
Overview of the case
The Scheldt estuary is situated in northwest Belgium and the southwest Netherlands basin. The Scheldt river has a length of 355 km and the total basin area is 21,863 km^2, spread out across France, Belgium and the Netherlands. The Scheldt estuary region is both an important agricultural and industrial area but also of high ecological importance. The main functions of the Scheldt estuary are navigation, recreation and fisheries. The estuary forms the maritime access to the port of Antwerp, which is one of the largest ports in the world. It is one of the few remaining European estuaries that include the entire gradient from fresh to salt water tidal areas. The brackish tidal water areas and marshlands in the upper estuary are unique and belong to the largest brackish marshes of Western Europe. All of the remaining salt marshes and mud-flats in the Scheldt estuary fall under the protection of the European Habitats Directive. Recreation in the Scheldt basin mainly concerns riverside recreation: in the Dutch part, recreation is concentrated around the river mouth. Recreational and commercial fishery activities take place in the relatively clean areas in the river catchment. The Dutch and Flemish governments are jointly cooperating to develop policies, measures and approaches towards an integrated management of the Scheldt estuary. A special project organisation, ProSes, was created in order to draw up a 2010 Development Outline, which aims at a more sustainable development in the Scheldt estuary. This is being done in close consultation with all stakeholders and under the supervision of a Technical Scheldt Commission.
ICZM tools
Coordination of policies, measures and approaches is essential. Therefore the Dutch and Flemish governments cooperate in the administrative-political and operational fields. The Technical Scheldt Commission (TSC), directed by a Flemish and Dutch chairman, has as its primary task to implement various treaties between the Netherlands and Flanders relating to shipping, pilotage and the deepening of the waterway and to advise Flemish and Dutch politicians on technical issues such as water infrastructure and general management. It took the lead in drawing up an integral vision and presented it to the competent government representatives in January 2001. A special project organisation, ProSes, was created in order to draw up a Development Outline, which aims at a more sustainable development in the Scheldt estuary, in close consultation with all stakeholders and under the supervision of the Technical Scheldt Commission. Both countries will jointly monitor the evolution of the estuary and the effects of the implemented projects in order to extend the knowledge of the estuary and to facilitate possible corrections. The governments of both countries adopted the overall targets in the integral vision and in 2002, the 2010 Development Outline for the Scheldt estuary was started. The aim of the 2010 Development Outline was to define those projects and measures, which, in a first stage, must be started no later than 2010 to ensure the realisation of the long term vision for 2030. Several studies were carried out including a strategic environmental impact study, a social cost-benefit analysis and measures for developing the natural environment. In December 2004 the official version was presented to the government representatives, after intensive communication with the stakeholders and a consultation into the general public's views on the outline. Already in March 2005, the execution of the full 2010 Development Outline was decided upon.
Success and failure factors
The establishment of the Technical Scheldt Committee was a first important step in cooperative relationship between Flanders and the Netherlands with respect to water control and management of the Scheldt estuary. Members (19) of the Committee are from the relevant Dutch and Flemish governments. The triangle formed by ProSes, the Technical Scheldt Committee, and the multi-stakeholders' platform proved to be a successful concept for process directed decision-making. 'Joint fact finding' plays a prominent role in this. In this way commitment of the different participants can be obtained, helping to keep the decision-making process under way. There were tensions, particularly with respect to participation and communication and different stakeholders had differing expectations e.g. the interests of the port of Antwerp do not coincide with those of nature conservation organisations or those of agriculture, the Dutch province of Zeeland felt that the advantages of the Development Outline 2010 did not outweigh the disadvantages for the province and, therefore, had objections to the Outline.

Box 5.4: Case Study: Transboundary Integrated Coastal Zone Management plan for the Szczecin Lagoon (Source: OurCoast ICZM Database; http://ec.europa.eu/ourcoast/index.cfm?menuID=4)

Experiences that can be exchanged
The development of transboundary ICZM plans increases the awareness of joint cross-border problems, issues, responsibilities and possible solutions. It promotes basic ideas of ICZM among decision-makers. The development of a cross-border ICZM plan requires a joint understanding of what ICZM is and what the purpose and function of the plan shall be. It requires, in advance, an analysis of the existing national legal and spatial planning systems. Discussions of how an ICZM-plan can supplement or replace existing planning tools have to take place. The options for implementation have to be explored as well. Further, the plan's function with respect to the Water Framework Directive and the Habitat Directive has to be discussed. Only if these pre-conditions are fulfilled can the plan or aspects of it have a chance to be implemented in a region.
Overview of the case
The Helsinki Commission (HELCOM) works to protect the marine environment of the Baltic Sea from all sources of pollution through inter-governmental co-operation. In the early 1990's, the Szczecin Lagoon belonged to the HELCOM priority regions. High biodiversity and ecological value faced ongoing economic pressure and pollution. In 1996, the HELCOM Baltic Programme Implementation Task Force supported a project to develop an ICZM plan. In 1999, a plan for the Polish part of the lagoon was published and one covering the German territory of the Oder delta was published in 2004. The Szczecin (Odra) lagoon is one of the largest transitional waters in the Baltic Sea. It serves as a transit route for the water discharge from the Odra river catchment area covering western part of Poland and adjacent areas of Germany and Czech Republic. Politically, the Szczecin (Odra) lagoon is divided between Germany and Poland. Approximately 0.8 million inhabitants live around the lagoon including the port city of Szczecin (approximately 420,000 inhabitants) located at the Odra River estuary. Usedom and Wolin islands separate the Szczecin lagoon from the Baltic Sea. These islands are attractive seaside tourism destination. Wolinski national park of Poland is also located on the Wolin island. A co-operation agreement between the West-Pomeranian Voivodship and the Environmental Ministry of Mecklenburg-Vorpommern was signed in 1995. As a consequence, a Joint Environmental Protection Committee with focus groups on environmental protection, water management, solid waste management, protection against emission and spatial planning has been established and meets annually. On the Polish side, the Department of Strategy and Spatial Planning of the West-Pomeranian Voivodship and the Voivodship Inspectorate of Environmental Protection in Szczecin, Poland, together with an expert team, carried out the work. In Germany, the Regional Authority for Spatial Planning Vorpommern was responsible.
ICZM tools
For the German and for the Polish territory of the Szczecin Lagoon two separate ICZM Plans have been developed covering land and water. The plans consist of a report and of maps. The reports include the following aspects: a) a stock-take of the present uses, structures and responsibilities; b) a discussion of future challenges and potential conflicts; and c) lists with priority issues and recommendations. The maps visualize the present environmental setting, protected areas and economic activities. They increase the awareness of present and potential future use conflicts and form a basis for spatial management. Both plans have an advisory character and are not legally binding.
Success and failure factors
The pre-conditions for the development of an ICZM plan in Germany and Poland were different. Different legal and spatial planning systems as well as different approaches and responsibilities of the involved institutions created problems. The lack of a joint language, different funding sources and the long process hampered the co-operation. A different understanding of ICZM, whether ICZM should promote environmental aspects or balance ecological, economic and social aspects, existed among the institutions and the funding organisations. Altogether, two separate plans with dissimilar spatial coverage and thematic focus were developed for the German and the Polish part of the region. The aim of a joint plan has been withdrawn. Both plans were not implemented in regional planning documents.

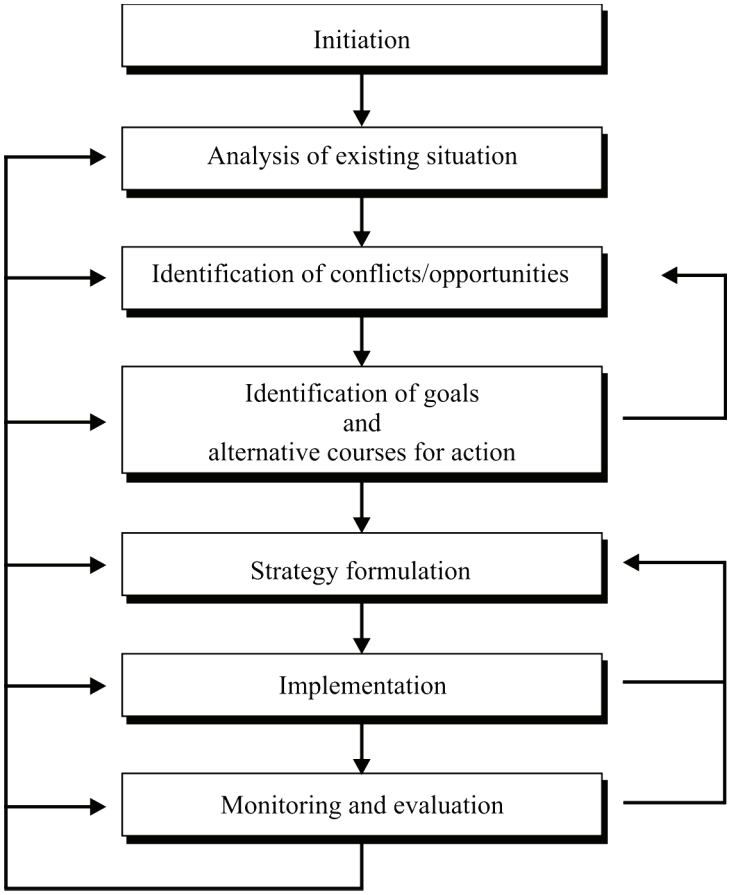

Figure 5.1: Planning process of Integrated Coastal and River Basin Management (UNEP/MAP/PAP 1999)

3 Conclusions

This chapter has outlined the scope and stages of the planning process for the management of the transitional waters. A combination of physical, hydrographical and ecological criteria, which will be relatively different in every case, should be applied to single out the transitional water body as a distinct planning and management area. Thematic scopes of the management of transitional waters can range widely – from fulfilling the WFD requirements for water quality to a comprehensive addressing of environmental, social, economic and other issues of local, regional, national, transboundary and international scale.

The planning process of the transitional waters' management is a continuous cyclical process following a sequence of basic steps from analysis to synthesis, action, review, assessment and revision of goals, strategies, priorities and measures. It includes seven phases: initiation, existing situation analysis, identification of conflict and opportunities, identification of goals and alternative courses of action, development of a strategy, implementation, monitoring and evaluation.

Watchwords

- Aim to integrate the transitional water body, its catchment area and the adjacent nearshore into a coherent planning process.
- Seek for high-level political support for the transboundary planning efforts.
- Transgress your professional field and direct interests and pursue an integrated, interdisciplinary approach.
- Build and foster cross-border partnerships.

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Planning for management of transboundary transitional waters

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Abstract

The planning process for the management of the transitional waters, particularly the transboundary ones, needs to be integrated, inclusive, transparent and dynamic. It should reflect the provisions of the international management frameworks that are pertinent to the reinforcement of the transitional waters' environmental integrity. The planning document for the integrated transitional water management has to specify the concrete management goals, sectoral and cross-sectoral objectives, policy measures, priority actions, necessary resources, commitments concerning funding, actors involved in the implementation, an implementation schedule, tangible targets, indicators and benchmarks for the transboundary management cohesion assessment.

1 Introduction

Factors that can trigger initiation of management planning processes for transitional waters are:

- Long-term environmental degradation or urgent problems, e.g. the need to address acute environmental hazards or conflicts over the use of important resources;
- Broader initiatives promoting integrated management, e.g. the EU directive requirements, international agreements, multilateral or national development plans or governmental decisions;
- Increased awareness of the public, arising either from the growing problems or the demand for improved environmental quality (as a key aspect of the quality of life itself);
- International or regional stakeholders' networks of co-operation experiencing the need for a closer and more articulated transboundary co-operation on all tiers and supported by a comprehensive planning document and action plan.

EU Directives are mandatory for all EU member states. Therefore, the initiation of the planning process for the river basins, including transitional and coastal waters, is the task of the national (or regional, in case of large countries) water resource management authorities. Yet, the initiative to start the cross-border cooperation in the transitional waters' management might come from the environmentally concerned and informed society groups. In this case, a start-up team (initiation committee) is very important for the initiation and gaining momentum of the process.

The start-up team is responsible for the initial phase, in which the partnerships are developed. It should comprise influential representatives from the governmental institutions and from the society at large (key stakeholders, academics, NGO activists, public persons). The key criteria for team members are diversity, credibility and personal motivation (Kelleher 1999).

A good team will be active, efficient, multi-disciplinary, transparent in its decision-making, and determined to launch the process but not to lead or dominate it. In the case of transboundary efforts, a proper multilateral representation in the start-up team must be ensured.

2 Experiences

Initiation of the planning process for management of transitional waters

The start-up team must write and circulate a manifesto appealing to a broader audience in all concerned countries and to regional and national political decision makers. This manifesto should highlight the challenge, the key scientific evidence, the general goals, anticipated results and transboundary benefits of the proposed initiative, international obligations of the involved countries to reinforce the transitional waters' environmental integrity, the people, institutions and organizations expected to participate.

Political willingness and commitment by all interested parties is fundamental for the initiation of the cooperation in the transitional waters' management. In the transboundary context, typically it is the two step process.

First, sharing and exchange of knowledge across the border allows for increased awareness on the needs for transboundary efforts and strengthening of the commitment for cross-border cooperation among local stakeholders. The close ecological relationship between the two areas urges for an equally close working relationship in their management.

Second, the success of this informal collaboration further leads to a more formalised collaboration. An umbrella agreement on the ministerial level, particularly supported by an initial funding, is a necessary prerequisite for establishing a cross-border framework for the transitional waters' management and increase the motivation of regional authorities and administrations.

In the case of the Szczecin lagoon, a joint Agenda 21 document, which outlines major fields of activity and has been approved by regional parliaments, served as an umbrella for, and a promoter of the cross-border cooperation (Box 6.1)? The decision to elaborate a trilateral management plan for the Wadden Sea shared by the Netherlands, Germany and Denmark, in order to substantiate the joint coherent protection, was taken by the meeting of the Trilateral Governmental Council (Box 6.2).

In the case of the Berwickshire and North Northumberland Coast shared by England and Scotland, the decision to develop a joint action plan evolved naturally. Since the separate management plans for English and Scottish parts of the coast were due for review, it was decided to try and achieve a more formal working relationship through the development of a jointly produced management plan that would integrate activities through an agreed plan of action (Box 6.3).

Analysis of the existing situation

This step involves a reconnaissance survey of basic characteristics in terms of the structure and dynamics of natural and human ecosystems. Therefore, it deals with the critical processes and factors, their extent and spatial distribution, etc. (UNEP/MAP/PAP 1999). Taking account of the limited resources associated with collection of the relevant data in terms of finances and personnel, only the reasonable minimum of data should be collected, which is truly necessary for the analysis of the existing situation and for the particular level of decision-making.

The realistic aim here is to reduce the uncertainty on which decisions are based, while being prepared to act quickly in cases of political urgency (Kelleher 1999). Without careful design and a systematic approach, volumes of information can be collected at great expense and effort, but these will not enable the critical questions to be answered (UNEP/MAP/PAP 1999). The scope of analysis is determined by thematic scope, management goals and objectives of the management strategy.

First, it is vital to find out what is already known. This may mean stocktaking of information of variable quality on a wide range of topics. The process should identify any obvious gaps in scientific knowledge, their likely implications for the transboundary transitional waters' management and the possibilities of filling the gaps within realistic time and cost. New data should be collected only if the gaps have been identified and if information on these issues is vitally important.

Baseline studies are accomplished to collect data for the assessment of the transitional waters' reference conditions and the current ecological status from which comparisons could be made with future test results, to set up criteria and threshold values for maximum acceptable impacts.

The WFD poses the following requests to the analysis of the quality elements for the classification of the ecological status:

- Characterization of surface water types (typology);
- Type-specific reference conditions for biological quality elements;
- Classification using *Ecological Quality Ratios* (ratios between current quality of surface waters and the reference conditions) based on biological elements;
- Intercalibration of the Member States biological monitoring results.

Reference conditions are conditions in which a water body has suffered no, or only very minor anthropogenic impacts on its hydromorphology, physico-chemistry or biology. This condition can be in the past or present, can be derived from observations, historical data, modelling or expert judgement.

It might be necessary to transgress the narrow categorization of the ecological quality elements specified by the WFD and to include also some lacustrine and/or coastal quality elements into the assessment of the ecological status of the transitional waters. As it was already mentioned, some parts of the transitional waters in geographical sense might be technically designated as coastal waters.

Simulation modelling can provide forecasts of the hydrographical and ecological alterations in a transitional water body under different development scenario conditions, which is necessary for the analysis of possible outcomes of the alternative courses of action. All formulated scenarios should be examined by numerical model simulations and their results should be compared to those obtained from the measurements or historical records of previous reference years.

The inventory of social and economic conditions should involve the compilation and processing of available statistical data, as well as necessary quantitative and qualitative field surveys (focus groups of local users, key stakeholders, environmentalists etc.). The field surveys should use the participatory methods in the localities around the transitional waters including identification of needs, introduction of management changes, monitoring of modifications, and facilitating evaluations by local users.

The synthesis of the comprehensive knowledge on the existing situation includes the production of the derivative layers of the digital (GIS) maps, time series analysis forecasting the development trends and impacts upon the aquatic environment and highlighting different aspects of the environmental and socio-economic situation.

In the situation of the transboundary transitional water bodies, one of the first steps that need to be taken is to reach a common cross-border agreement on the present state of the transitional water body. The countries and agencies involved are often unaware of the differences in the present state assessment, perceived problems, and good environmental status benchmarks. Insight into these differences will result in an improved understanding between the countries that can serve as a starting point for the harmonization of management approaches, plans and policies.

Therefore, the key precondition is that in the transboundary transitional waters' area, the survey team must comprise the personnel from the countries sharing the transitional waters in adequate proportion. Likewise, the data and information collected should describe adequately the situation on both sides of the border. The ultimate objective is to establish the cooperation platform for common concerns taking into account differences in the environmental and socio-economic situation, national policy, legal aspects and regulations.

Considering the status of coastal waters, the MSFD provisions for the good environmental status and the requirements of the Baltic Sea Action Plan should also be taken into consideration (Table 6.1).

Table 6.1: Suggested indicators for the assessment of the environmental status (integrity) of the South Baltic Transitional Waters (classified as both, transitional and coastal waters)

Indicator	Measurement unit	Relevance to WFD	Relevance to MSFD	Relevance to BSAP
Ecological quality indicators				
Phytoplankton	mg/l or µg/l	X	X	X
Macroalgae	various	X	X	X
Angiosperms	various	X	X	X
Benthic invertebrate fauna	various	X	X	X
Fish	various	X	X	X
Invasive species	various		X	X
Physico-chemical quality indicators				
General conditions	Various	X	X	X
Priority Substances	mg/l or µg/l	X	X	X
Other specific pollutants	mg/l or µg/l	X	X	X
External driving forces				
Input of substances from the catchment area	tons, P_{tot} and N_{tot}	X	X	X
Input of substances from the atmosphere	tons, P_{tot} and N_{tot}	X	X	X
Influx of the brackish water from the sea	km^3/year, ‰	X	X	
Social pressures				
Population in the coastal communities	inhabitants	X	X	X
Input of substances from the municipal wastewater discharge	tons of P_{tot} and N_{tot}	X	X	X
Economic pressures				
Commercial landing of fish and shellfish	tons and species		X	X
Commercial cargo shipping	tons and TEU		X	X
Input of substances from the tourist accomodations	tons of P_{tot} and N_{tot}		X	
Number of leisure boats	units		X	
Recreational landing of fish	tons and species		X	
Litter	kg		X	X
Agricultural land use around the SBTWs	% of acreage		X	X
Farming intensity around the SBTWs	livestock number		X	X
Dredging (including the sea channels)	volume (m^3)		X	X
Aquatic nature conservation status and measures	acreage (km^2)	X	X	X

In-depth analysis of social and economic conditions and trends

Due to the present rising of human population density and activities, anthropogenic impacts on transitional waters are increasing. Humans may be the main factor affecting the natural environment of transitional waters but our impacts may also pose a threat to the health of coastal populations. Therefore, for an accurate assessment of the drivers of change and their future development, it might be critically important to conduct a comprehensive survey of social and economic conditions and trends having impact on the environmental integrity of the surveyed transboundary transitional water bodies.

A set of special social and economic indicators might be particularly helpful to assess the current situation and forecast development trends of the transboundary transitional waters. While applying these indicators, several key questions should be answered first:

- Do we have data for indicator computation?
- Is the indicator attractive to the eye and accessible to use?
- Is the indicator easy to interpret?
- Does the indicator highlight problems and issues describing a phenomenon and/or a process?

The groups of indicators proposed below allow for a relatively easy and comprehensive assessing of social and economic conditions and deriving integrated indicators of the socio-economic "drivers" that have impact on the environmental conditions and pressures on transitional waters (Tables 6.2, 6.3 and 6.4). Each indicator should be evaluated for a riparian municipality (the lowest administrative level) adjacent to the transitional water body. For the comparison with other drivers, the indicators should be assessed based on their "strength": development, capacities, population density, funding etc. The comparison is not possible if units are not shown for the whole cluster of settlements around the transitional water body. In the case of a transboundary water body, it is critically important, that the indicators should be equally reliably evaluated for all countries sharing the transitional water body.

Table 6.2: Population structure and environmental profile (additional to the indicators given in Table 6.1)

Population structure indicators	Describing populations living in riparian municipalities adjacent to the transboundary transitional water body	Measurement unit
Average age	People living permanently in the riparian municipalities	years
Birth rate	Describes population reproduction capacity	%
Mortality	Reflects the quality of life and eventual natural depopulation rate	%
Fertility rate	Reflects eventual natural population growth rate	fertility index
Migration rate	Reflects mechanical population change rate	%
People attending lectures in ecology	Reflects the level of environmental education and public awareness and its regional differences	% of total population
Employees in water management	Reflects the professional capacity and extent of water management institutions (of different profiles)	% of total population

Table 6.3: Economic conditions and impacts (additional to the indicators given in Table 6.1)

Economic indicators	Describing economic activities in riparian municipalities and impacts on the transboundary transitional water body	Measurement unit
Costs of fresh water use	Reflects the rate of consumption versus the extraction and availability of fresh water resources	Euro / l
Cost of wastewater treatment	Reflects the operational conditions of the facilities and the willingness of the local people to pay for wastewater treatment	Euro / l
Land cover and use changes	Reflects the long-term trends in the pressures and buffering capacities regarding the agricultural impact on the water body	% (of different land-use types)

Table 6.4: Transboundary cooperation initiatives, action plans and programmes

Indicator	Describing transboundary cooperation initiatives and their role in transboundary transitional water management	Measurement unit
Stakeholders involved	Reflects the scale of involvement and predisposition of stake-holders towards transboundary co-operation in both countries	Number of institutions
Cooperation actions	Implemented transboundary actions prove the willingness to co-operate in both countries	Number of actions
Coherent legal acts	Concerted adoption of coherent legal acts in countries sharing the transboundary water body reflects the scale of co-operation	Number of legal acts

Box 6.1: Case Study: The German/Polish Agenda 21 "Szczecin Lagoon" (Source: OurCoast ICZM Database; http://ec.europa.eu/ourcoast/index.cfm?menuID=4)

Experiences that can be exchanged
Regional ICZM requires a high ranking political commitment and a joint understanding of major issues and potential solutions. This is especially true for cross-border coastal regions. A joint Agenda 21 document which outlines major fields of activity and which has been approved by regional parliaments can serve as an umbrella for, and a promoter of, regional ICZM. The implementation of a regional coastal Agenda 21 requires a high-ranking advisory board, motivation and permanent commitment of major actors, the establishment of a regional contact and promotion office as well as long-term perspectives. Commitments concerning funding, a schedule for implementation and indicators measuring the implementation progress are beneficial.
Overview of the case
In 2002, the Federal State Minister for the Environment in Mecklenburg-Vorpommern, Germany, and the Polish Vice-Marshal for the Environment of the Voivodship Western Pomerania signed the regional Agenda 21 "Szczecin Lagoon". This German-Polish cross border Agenda 21 serves as an umbrella for local initiatives and aims at intensified cross-border cooperation. The agenda contains a list of 10 priority issues where joint actions shall be taken. One priority issue is ICZM. The Agenda 21 covers the entire Oder/Odra estuary region, with the city of Szczecin in the south, the large shallow Szczecin Lagoon and the two Islands of Usedom and Wolin on the Baltic Sea coast. The region has about 840,000 inhabitants (420,000 in the city of Szczecin). The countryside is sparsely populated (about 50 inhabitants per km²) and suffers from economic problems, a high unemployment rate and on-going decline in population. Especially young people leave the region. Further, strong social and economic gradients between Germany and Poland as well as between coast and hinterland exist. Tourism, agriculture and shipping are the most important economic activities in this coastal zone. Along the coastline, tourism is the exclusive economic factor and more than 10 million tourists visit the estuary region per year. However, present economic activities are not sufficient to ensure a sustainable development.
ICZM tools
To implement the regional Agenda 21, several thematic German/Polish working-groups were established. They meet once a year and consist of ministry as well as local and regional authority representatives. To support the implementation of ICZM within the regional Agenda 21, projects on both sides of the border were initiated. The German project was carried out by an interdisciplinary scientific consortium. The project was guided by a separate board which met twice a year and consisted of local and regional authorities as well as district administrations. The project also established a contact office in the region. The regional Agenda 21 "Szczecin Lagoon" is a high ranking political commitment and the basic strategy for a cross-border co-operation between Germany and Poland in the Oder estuary region. It outlines topics for joint co-operation, defines ICZM as a major focus theme and serves as an umbrella for local and regional initiatives and supports local Agenda 21 activities. Based on the regional Agenda 21 "Szczecin Lagoon", several permanent coastal working-groups have been established to support a joint sustainable development of the coastal region. Communication, education, awareness-raising, information and information dissemination with respect to coastal issues, activities and initiatives are important aspects in the regional Agenda 21 "Szczecin Lagoon". For this purpose a bilingual website, a regional electronic newsletter and a bilingual German/Polish magazine (Zielona Arka/Grüne Arche, one issue per year) have been established.
Success and failure factors
The regional Agenda 21 was a high-ranking commitment. It has ensured the co-operation between the actors and has increased the motivation of regional authorities and administrations. It has facilitated the regional communication, the cross-border co-operation and the search for financial support. Failure factors included, inter alia, changes in responsibilities, transfer of staff, the loss of motivation among key-persons due to slow development of concrete projects, the lack of a joint understanding of ICZM and a lack of funding which hampered the progress. The EC Recommendations on ICZM stimulated national coastal management activities and were the background for the funding of the project ICZM-Oder by the German National Ministry for Education and Research (BMBF). This project allowed significant scientific and practical progress but was spatially limited to the German territory. Funding for a counterpart project on the Polish side was not available and lead to an imbalance in activities. Implementation of the Agenda stopped in 2010 after the German project was closed.

Box 6.2: Case Study: Integrated ecosystem approach for Wadden Sea management (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
The key positive experience from the application of the integrated ecosystem approach is that it is multifaceted: It is coherent with applying and integrating relevant EU Directives and ICZM principles; it also aims at harmonizing conservation objectives and good ecological status on the transboundary level and at different levels of implementation, from the definitions to harmonised methodologies for their assessment. Ecological quality objectives (EcoQOs) are used as a tool in the integrated ecosystem approach for setting clear operational environmental objectives directed towards specific management and serving as indicators for the ecosystem health. The development of a coherent and integrated set of EcoQOs is undertaken by OSPAR and the International Council for the Exploration of the Sea (ICES), in coordination with the development of marine indicators in the European Environment Agency (EEA) and environmental objectives in the EU Water Framework Directive.
Overview of the case
The Wadden Sea is one of the largest coastal lagoons in the world (Pilippart & Epping 2010). It is a marine area of outstanding international importance shared by Denmark, Germany, and The Netherlands. Nowhere else in the world is there an area on a similar scale and so multifaceted, which contains such a complex of tidal flats, drainage channels, salt marshes, dunes and islands (Enemark 2005). There has been a gradual shift in the management issues of the Wadden Sea from addressing the problems within the area to an acknowledgement of the importance of managing the Wadden Sea in a larger coastal context and addressing the ecosystem relationship issues. The Wadden Sea conservation and management is based on an integrated ecosystem approach, which aims at preserving the integrity and functioning of the system and allows for a sustainable use of the area within that framework. The Wadden Sea is now subject to a comprehensive nature protection scheme on the national and regional level as well as to extensive protection and management arrangements between the countries in the framework of the Trilateral Wadden Sea Cooperation. Central elements of the trilateral arrangements are the guiding principles, common management principles and the common targets upon which common policies and an integrated ecosystem approach have been agreed on.
ICZM tools
The objectives of the new Wadden Sea Plan that amends the original Plan from 1997 (Trilateral Wadden Sea Plan, 1997) will be achieved by applying the instrument of integrated ecosystem approach coherently, inter alia, to ICZM principles and harmonizing conservation objectives and good ecological status to the extent possible and at different levels of implementation, ranging from developing definitions to harmonised methodologies for their assessment. The Guiding Principle for the Wadden Sea integrated ecosystem approach is "to achieve as far as possible, a natural and sustainable ecosystem in which natural processes proceed in an undisturbed way". Such an ecosystem contains the full range of natural and dynamic habitat types, each of which need a certain quality (natural dynamics, presence of typical species, absence of disturbance, absence of pollution), which can be reached by proper conservation and management. The quality of the habitats shall be maintained or improved by working towards achieving targets which have been agreed upon for the tidal area, the offshore area, estuaries, salt marshes, beaches and dunes, the rural area, water and sediment quality, fish, birds and marine mammals, as well as landscape and cultural aspects. In order to provide a scientific assessment of the status and development of the Wadden Sea ecosystem and to assess the status of implementation of the trilateral Targets of the Wadden Sea Plan, the Trilateral Monitoring and Assessment Program (TMAP) was launched in 1994 (updated in 2008) as the common monitoring program for the Wadden Sea carried out by the Netherlands, Germany and Denmark in the framework of the Trilateral Wadden Sea Cooperation
Success and failure factors
Success factors: 1. There are clear quality level targets set for the maintenance of the key habitats of the Wadden Sea, which indicate the success of the integrated ecosystem approach. 2. The Wadden Sea is an open system and there are many interactions with the adjacent North Sea. Failure factor: Potential lucrative mega-projects, like gas-drilling, which take place in the Dutch part and even in the national park area of the German part of the Wadden Sea, might obstruct the integrated ecosystem approach for the trilateral management of the area.

Box 6.3: Case Study: Joint management of an Area of Outstanding Natural Beauty (AONB) and a transboundary European Marine Site (EMS) in the United Kingdom (Source: OurCoast ICZM Database; http://ec.europa.eu/ourcoast/index.cfm?menuID=4)

Experiences that can be exchanged
This case shows the integration of the management of two of the internationally important designated areas, the Northumberland Coast Area of Outstanding Natural Beauty (AONB) and the Berwickshire and North Northumberland Coast European Marine Site (EMS). Previously these two adjacent areas were managed separately; however increased awareness of the importance of managing land and sea in a consistent and integrated way has led to the production of this initiative. It is believed to be the first of its kind in the United Kingdom.
Overview of the case
A joint management plan has been drawn up that will integrate the management of two conservation areas shared by England and Scotland which had previously been managed separately.
ICZM tools
Previously, the competent and relevant bodies produced and adopted separate plans for the AONB (published 2004) and EMS (published 2001). This has effectively meant that a single, geographical and ecological area has had separate management plans drawn up for the AONB and the EMS on the one hand, and by Scottish and English authorities on the other. However, it has been realised that management needs to ensure that both the single, distinct identity of this coastal area and the local variations of land and seascape character are conserved and enhanced as a unity. Therefore, the responsible staffs of AONB and EMS have collaborated for a number of years on a voluntary basis. Since both management plans are due for review, it was decided to try and achieve a more formal working relationship through the development of a jointly produced management plan that would integrate activities through an agreed plan of Action. Therefore, an integrated plan was developed following consultation with the AONB Partnership, the EMS Management Group and more stakeholders. A concurrent Strategic Environmental Assessment (SEA), as required under the SEA Directive, and an Appropriate Assessment, under the Habitats Regulations, had also been undertaken. The results of these assessments were incorporated into the final plan, which was signed by the competent and relevant authorities and partners in September 2009. This plan incorporates policies that are intended to direct and influence the subsequent formulation of policy by local authorities (and other public bodies) in all relevant areas of activity that impact the AONB, including development management, local transport and conservation. There are four broad management policies that apply to all themes and the entire plan across land and sea, i.e. ICZM including the ecosystem approach, partnership working, climate change mitigation and sustainable development. The plan also includes many other statutory and non-statutory plans and strategies at the national, regional and local level relating to principles such as stakeholder engagement. Consideration has also been given to issues such as biodiversity, economic development, land and sea planning and tourism. An action plan will guide implementation and form the basis of an annual work programme, which will identify the necessary level of resources, the various organisations responsible for implementation and the role of the AONB and EMS staff teams. It will also set annual targets. This five-year plan (2009 to 2014) will be reviewed in 2013 with a view to publishing the next five-year plan in April 2014. Full, public consultation will be undertaken throughout the review and development of the next plan. As with this plan, the next plan will also undergo a Strategic Environmental Assessment and Appropriate Assessment before adoption. The plan is not an end in itself. Monitoring is required in order to identify whether or not the plan is achieving the purposes of the respective designations. This monitoring will take two forms: monitoring performance to establish how well the partnership is progressing in delivering the plan's policies and actions; and monitoring condition to establish whether the special features of the AONB and qualifying features of the EMS are improving or deteriorating.
Success and failure factors
Issues, aims and policies have been developed from the equivalent provisions in the previous AONB and EMS management plans and modified through feedback during the stakeholder consultation process. With regard to the EMS, the policies in the plan are not statutory but the plan is the method by which the relevant and competent authorities have chosen to fulfil their statutory duties with respect to the EU Habitats Directive.

Factors, problems and goals of the management of transitional water

The next step in the planning process for the transitional water management deals with the in-depth analysis of the factors in terms of driving forces, pressures, states, impacts and responses affecting the environmental integrity of the transitional waters. We suggest applying DPSIR as the causal framework for describing the interactions between society and the environment adopted by the European Environment Agency. Data and information on the different elements in the DPSIR chain should be collected during the analysis of the existing situation, and possible causal links between these different aspects should be identified from the simulation modeling and GIS map overlaying and, if necessary, from the application of other analytical tools. The Pressure-State-Effect-Response matrices (UNEP/MAP/PAP 1999, p. 32) could provide a helpful tool for this purpose.

The DPSIR analytical model should serve as the background for the identification of the key problems hindering the reinforcement of the transitional waters' environmental integrity and, hence, for the identification of the main goals of the transitional water management. The key problems and goals for which the transitional water management strategy or plan is needed must be defined in the initial phase, although they are often redefined or reformulated as information and understanding increases. The goals need to be as clear as possible to provide guidance. They may be conflicting but not contradictory. In complex cases, like the transboundary cooperation on management of transitional waters, definition of the problem is a goal in itself (UNEP/MAP/PAP 1999). To turn the problem into a challenge and an opportunity means that the stakeholders participating in the efforts agree on what the key management problems are and what the principal management goal is. The key opportunities and problems impacting the transboundary management of transitional waters are congruent as shown by the different success and failure factors in the numerous case studies provided throughout this Code of Conduct.

Once the management problems and goals are identified and agreed upon, the main management conflicts can be identified and described. Equally important is the identification of possible synergies regarding the anticipated actions. Conflicts and synergies need to be classified in terms of their origin, acuteness and scale (Povilanskas 2004).

The SWOT matrix could provide a helpful analytical tool for structuring and defining management conflicts and synergies in transitional waters. In this case, the internal synergies (inherent for the transboundary transitional waters) should be interpreted as Strengths, whereas the internal conflicts should be interpreted as Weaknesses. Likewise, the external synergies (caused by external driving forces) should be interpreted as Opportunities while the external conflicts (caused by external pressures) as Threats.

Strategy formulation

The identified problems and goals of the management of transitional waters define the planning frame, i.e. whether it should be limited to a more general management strategy, or extended to a more detailed management plan with a priority action programme. Regardless of the frame, the planning process should provide concrete answers to the key questions: What has to be done? Where does it have to be done? Why does it have to be done? By whom does it have to be done? What must NOT be done and why? To answer the above stated questions the planning document has to specify the concrete management goals, sectoral and cross-sectoral objectives. The objectives are operational statements of purpose (policy statements) and can be short or medium-term and when possible expressed in a quantitative form (UNEP/MAP/PAP 1999). The planning document for the integrated transitional water management must also identify the key policy measures, priority actions, necessary resources, commitments concerning funding, actors involved in the implementation, a schedule for the implementation, tangible targets, indicators and benchmarks for the transboundary management cohesion assessment. All these elements have to be linked in a coherent way and related geographically (Box 6.4).

Box 6.4: Case Study: Management of Ireland's transboundary transitional water bodies (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
How to manage marine environments on a cross-border basis for both conservation and development interests on an ecosystems-basis despite conflicting jurisdictions and political uncertainty. This is achieved through a dedicated management agency with specified legal responsibilities.
Overview of the case
Jurisdictional boundaries have never been formally agreed between Ireland's two cross-border bays. In recent years, a number of North-South implementation bodies were established. One of these is the Foyle, Carlingford and Irish Lights Commission (FCILC). The functions of the FCILC in relation to Loughs Foyle and Carlingford are exercised by the Loughs Agency. The Agency aims to provide sustainable social, economic and environmental benefits through the effective cross-border conservation, management, promotion and development of the fisheries and marine resources.
ICZM tools
Legally the Loughs Agency is tasked with the following: a) promoting development of Lough Foyle and Carlingford Lough for commercial and recreational purposes in respect to marine, fishery and aquaculture matters; b) management, conservation, protection, improvement and development of the inland fisheries; c) development and licensing of aquaculture; and d) development of marine tourism. In 2000, an Advisory Forum was established with new members appointed in 2006. This is comprised of almost 50 representatives from both Lough areas who are involved in a stakeholder interest group. Current areas of interest include shellfish, draft netsmen, anglers, fishery owners, tourism, Council/Government, Port/Harbour, industry and environmental interest groups. In addition, members are divided up into various Focus Groups that meet approximately six times per year and work on salmon and inland fisheries; environmental topics; marine tourism including water-based leisure; aquaculture and shell fisheries. In relation to fisheries the Loughs Agency develops improved management plans aimed at restoring fish stocks. The Agency is in the process of implementing key actions identified in the 5 Year Development Plan for Angling Development in the Foyle and Carlingford Areas. This will contribute to stock improvement, infrastructure and product development, marketing and information, accommodation enhancement and training and support across the sector. The Foyle Area fishery is home to one of the most productive Atlantic Salmon systems in the North. It is necessary at times to enforce technical and commercial restrictions, for example, reducing the number of driftnet licenses issued. The Agency's Strategy for the Development of Marine Tourism and Leisure represents a unique opportunity and challenge to plan the development of the two water bodies and their catchment areas as complete entities for marine tourism, without political boundaries. This is driven by a stakeholder approach and continuing consultation and development in partnership with other key agencies in the public sector as well as private sector organisations and interest groups. In developing this strategy, the Loughs Agency is partnered by two cross-border bodies, the East Border Region Committee and the North West Region Cross Border Group who have strategic and funding roles for tourism and economic development in both areas.
Success and failure factors
Success factors: 1. The success of the management regime undoubtedly results from the fact that there is a dedicated agency tasked with very specific management objectives. This Agency has a formal legal mandate with dedicated resources, both, financial resources and personnel. 2. Traditionally, marine and coastal management is based on political boundaries whereas in this instance both sea loughs are managed as geographic entities transcending standard management structures. 3. In relation to management of the fisheries resource, approaches are sufficiently flexible to adapt to changing environmental conditions and in this way can take the precautionary approach into account. Failure factors: A performance review of the last Loughs Agency Corporate Plan (2005-2007) recommended that any future plan should have a greater focus on information and communication.

The standard toolbox of policy measures applied for the management of transitional waters includes:

- Preventive measures;
- Maintenance measures;
- Remedial measures;
- Mitigation measures.

The "FORTI toolbox" of the key types of actions that should be applied for the transboundary reinforcement of the transitional waters' environmental integrity includes:

- Field actions;
- Organizational actions;
- Regulatory actions;
- Technological actions;
- Investment actions.

The concrete and site-specific policy measures and priority actions can be derived from the SWOT analysis in a crisscross way by answering the following questions (Wang 2007):

- How to use internal strengths to take advantage of external opportunities?
- How to utilize the internal strengths to avoid external threats?
- How should we eliminate internal weaknesses to open new opportunities?
- What should we do to avoid the coincidence of the internal weaknesses and the external threats?

The multi-dimensional character of the problems encountered suggests that there could be a range of alternative objectives and policies, which could be pursued (UNEP/MAP/PAP 1999). Alternative strategies, meaning alternative ways to alternative future(s) need to be evaluated in order to select the best one to follow. Multi-criteria techniques are applied to discriminate between the various options.

Usually, the following criteria are applied to take decisions on suitability of the suggested alternatives (Povilanskas 2004):

- Implementation efficiency;
- Social acceptance;
- Economic viability;
- Technical feasibility;
- Certainty/uncertainty;
- Political possibility;
- Public preference;
- Flexibility;
- Costs against benefits.

Who assesses and selects the alternative strategies depends upon the institutional setting of the target area, i.e., whether it is a transboundary one or not, how it is designated in different management frameworks, etc.. Legitimisation, presence/importance/influence, expression of public interest, etc. are among the criteria often used to select between the various stakeholders (UNEP/MAP/PAP 1999).

Full, public consultation should be undertaken throughout the review and development of the plan. Critically important questions to be answered in order to ensure an effective process are:

- How should outreaching towards target groups be managed comprising national networks?
- What specific transboundary cooperation tools should be applied to ensure smooth transboundary cooperation on various levels – regional, sub-regional, local?

Specific issues of information management and public participation in the transboundary planning and management context of the transitional waters are addressed in detail in Chapter 7 and Chapter 8.

3 Conclusions

This chapter provided a detailed outline of the initiation and conducting of the planning process for the transboundary management of the transitional waters. The planning process for the transitional waters, particularly the transboundary ones, needs to be integrated, inclusive, transparent and dynamic. It should be based on the DPSIR analytical model and reflect the provisions of the international management frameworks that are pertinent to the reinforcement of the transitional waters' environmental integrity (relevant EU directives, recommendations of the regional sea environmental commissions, UNEP-MAP-PAP, IUCN, International Council for the Exploration of Seas, EUCC – The Coastal and Marine Union, the Euro-Mediterranean Lagoon Federation, etc.).

The planning document for the integrated transitional water management has to specify the concrete management goals, sectoral and cross-sectoral objectives. It must also identify the key policy measures, priority actions, necessary resources, commitments concerning funding, actors involved in the implementation, a schedule for the implementation, tangible targets, indicators and benchmarks for the transboundary management cohesion assessment. All these elements have to be linked in a coherent way and related geographically. Alternative strategic options need to be evaluated in order to select the best one. Multi-criteria techniques are applied to discriminate between the various options.

Watchwords

- Develop a holistic picture of the transitional water body and the conditions of its good environmental status.
- Be rational, analytical and critical in the inventory of the factors, problems and achievable goals for the transboundary reinforcement of the transitional waters' environmental integrity.
- Look for positive "win-win" types of solutions for the conflicts and challenges.
- Don't imitate, yet innovate while designing policy measures and priority actions for the transboundary management of the transitional waters.

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Information management in the reinforcement of the environmental integrity of transboundary transitional waters

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Abstract

Supplying information across all coastal-relevant policy and authority levels as well as across all sectors is essential for implementation of a sustainable management of coastal regions. In addition to face-to-face communication in meetings and workshops, web-based information tools can improve the information flow. Multilingual internet tools, such as the "Coastal Information System Oder Estuary" and "Coastal Databases" have been developed to support regional and local coastal decision-makers. These tools bundle multidisciplinary coastal-relevant data and information, e.g. results of scientific projects, policies and strategies as well as spatial data. Awareness-raising campaigns, such as photo competitions, can help to disseminate regional information about coastal issues and to make local people more participatory in planning and management processes.

1 Introduction

Sustainable management of coasts and transboundary coastal systems requires target relevant information and information paths. In the various management and planning processes information is essential for decision-making and stakeholder involvement. Availability of data and information, free access, and multilingualism are key elements for the successful use. Particularly, web-based information tools can improve the flow of information in coastal regions. They are accessible at any time, are flexible, and can store great quantities of information.

Useful tools for transfer of information and for transboundary information exchange are web-based information platforms, databases, geographical information systems and bilingual newsletters and magazines. Learning modules and awareness rising campaigns using the internet to ensure a broad access and long-term documentation can serve as methods for environmental education.

2 Experiences

Regional information system

Information, communication and decision-making processes can be improved by web-based regional information systems. Regional information systems offer a wide range of regional information and data, such as statistical data, spatial data, scientific documents, photographs and press reports. Furthermore, a regional information system can have an umbrella function linking regional projects, initiatives and activities. In case of the cross-border "Coastal Information System Oder Estuary" (http://www.ikzm-oder.de/en/, see Box 7.1) three problems should be tackled:

- concentrating potential information for an integrated planning and management approach;
- ensuring the subsequent use of project results;
- improve communication and exchange between stakeholders.

To promote international information and to involve various interest groups in the cross-border information sharing, such as scientists, authorities, the local population, as well as tourists, regional information systems should be multilingual (see Box 7.2).

Box 7.1: Case Study: The Oder Estuary Coastal Information System (Source: OurCoast ICZM Database; http://ec.europa.eu/ourcoast/index.cfm?menuID=4)

Experiences that can be exchanged
Especially in cross-border regions, multilingual regional information systems are important tools to provide information, to give access to data and to support co-operation. Integrated Geo-Information-Systems can increase the awareness of spatial utilization conflicts and support integrated management processes.
Overview of the case
Between 2004 and 2006, the Regional Information System "Oder Estuary" was developed to support regional management. In the following years new technical features were implemented and, based on evaluations, the content was further developed and extended.
ICZM tools
Provision of a Regional Information System, an internet based Geo-Information System "GIS IKZM MV", a meta-data editor and electronic databases. The Regional Information System is a multilingual (German, Polish, English), generally accessible, regional internet platform designed to improve the information flow and information availability in the region as well as to support regional coastal management. The general internet platform stores and provides e.g. background information on major regional policy issues and management themes in the region and makes data, publications and maps easily accessible. It contains an internet based Geo-Information System "GIS IKZM MV" which provides spatial data and maps and supports spatial visualization and planning processes. Databases give access to documents, pictures and events. The aim was to develop a system that is spatially expandable and transferable to other regions.
Success and failure factors
Success factors: Close cooperation between technical developer, content provider and end-users allowed for a fast development. Most parts of the information, data and maps were easily accessible and allowed the system to grow fast. There was strong support from several institutions. Internal evaluations allowed a demand driven development of the content. National and international cooperation ensured the use of the tools by external actors. Failure factors: To index the content according to international meta-data standards turned out to be very time and resource consuming and was not fully completed.

Coastal databases

By integrating international databases into regional information systems the information flow can be enhanced. Additionally, databases enable linkages between different regional, national and international user communities. The main objective of web-based coastal databases is to provide permanent access to the latest and most comprehensive data and information for everybody, at any time and everywhere.

"Coastal Databases" provided and maintained by EUCC-Germany contain world-wide coastal and marine information about projects and regional case studies, events, conferences, education and training programmes, documents, as well as coastal pictures (http://databases.eucc-d.de). The advantage of the "Coastal Databases" is that distribution, input and maintenance of the contents is carried out in a decentralized manner by numerous users rather than making individuals responsible for maintaining a single database. This approach ensures the dissemination of information towards a large and varied user community and promotes the strengthening and updating of databases by users themselves.

Geographical information system

A proper visualization tool for coastal planning and management processes is a geographical information system (GIS). In case of the regional information system for the Oder Lagoon (or Szczecin Lagoon) it is embedded as a special feature for ICZM planning (http://gis.eucc-d.de/ikzm/). The web-based GIS approach allows free access to regional spatial information. Multi-disciplinary spatial data and maps are presented across borders and across land and sea to a large community. Visualizations and the overlay of different themes (layers) increase the understanding and awareness of complex integrated correlations, spatial overlapping and resulting problems. This system is spatially expandable and transferable to other regions.

Transboundary photo competition

Understanding and awareness are pre-requisites for integrated coastal zone management. To make local people more participatory to planning and management processes it is necessary to inform and to invite the community. Awareness-raising campaigns, such as photo competitions, can help to disseminate regional information about coastal issues. Participants submit topic oriented pictures and document historic and present changes of coasts and seas. Sharing their pictures with participants and the coastal community help to demonstrate and understand coastal development. For this purpose EUCC-Germany provides its picture database. It allows a wide access and transboundary or international participation at the same time. Furthermore, a long-term documentation of coastal changes is possible through the establishment of a network of active coastal observers (http://artwei-photo.eu/).

Box 7.2: Case Study: Long-lasting collaboration between the stakeholders of the river Roya basin – France, Italy and Monaco
(Source: OurCoast ICZM Database; http://ec.europa.eu/ourcoast/index.cfm?menuID=4)

Experiences that can be exchanged
Roya/Roia river discharges into the Ventimiglia bight of the Ligurian Sea forming a semi-enclosed transitional nearshore with strong salinity and ecosystem gradients. The Roya river basin comprises three countries: France, Monaco and Italy. Hence a bilingual GIS should be seen as the key tool facilitating trans-boundary information exchange. In a region which is located close to the Italian border and poorly accustomed to environmental cooperation, the approach based on sharing and exchange of knowledge has allowed a new partnership and the possibility to take into account the issues of sustainable development.
Overview of the case
The French Riviera between Monaco and Italy is characterised by a strongly urbanised coast with a long history of tourism. Due to the fact that great portions of the inhabitants in this area are retired persons, the region has, up to now, showed little interest in environmental issues and problems. The relationship between coast and inland (a mountainous and rural country) is limited. However, the newly settled scheme of strategic territorial planning (SCOT) obliges the creation of new partnerships. The integrated approach is more complex here as the main river is transboundary, the river Roya originates in France but flows into the sea in Italy. Accidental pollution of a highly touristic coast has highlighted the weakness of this coastal area and the need for international cooperation. The approach relies simultaneously on a collective, theme-based action, a study of environmental issues and GIS. It allowed the initiation of an integrated approach of the Roya river basin and made the local stakeholders, especially the elected representatives, aware of sustainable-development issues. The objective of this French Riviera initiative was to promote three environmental themes: ➢ Implementation of a warning sequence in regard to marine pollution; ➢ Realisation of a study on environmental issues; and ➢ Realisation of a GIS taking into account the border-crossing context to start a long-lasting co-operation between France, Monaco and Italy.

ICZM tools
The project was supported both by the "Communauté d'agglomération" of the French Riviera (CARF) and the "syndicat mixte" in charge of the SCOT. It was steered by the CARF. During the process a steering committee, which was formed with all the institutional and elected representatives, and a technical group, had to follow up the study on environmental issues. In this framework, the consultation of the local population was also important. The SCOT (planning tool) was the favoured framework to start the process using classical tools like GIS. For the first part on « marine pollution », a cross-border warning sequence was formalised and followed by tests and education. An operational agreement was written. The second part ("study of environmental issues") was entrusted to a research consultancy. It found practical consequences in the SCOT: a Plan of management and sustainable development (PADD) was approved in 2009. For the third part (GIS), the process was launched with technical meetings with the stakeholders (also from Italy) to make an inventory of the available data and formalise update procedures. The process is still under way but not yet finalised. All these initiatives led the CARF to elaborate a cross-border project to continue and fund the co-operation. Thanks to the three actions, the different stakeholders became aware of sustainable development issues and policy integration. It allowed the CARF to organise, in December 2007, an exchange workshop on ICZM showing its determination to continue to invest in this theme.
Success and failure factors
As it was proposed by the French Riviera, the initial initiative was conventional, sector-based and poorly integrated. It is important to highlight the impulse given by the ICZM call for proposals of the DIACT. It contributed to take into account coastal environmental problems in a region which was poorly inclined to issues of sustainable development. The project was also integrated into a network of other DIACT projects so that it could develop and improve.

Box 7.3 Case Study: Information exchange system on ecosystem state in Vistula Lagoon (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
A regular information exchange is possible only if it is based on the long-term commitment of the research institutions on both sides of the border of a trans-boundary water body and depends on personal relationships and collaboration projects of the co-operating institutions on the decision-taking level.
Overview of the case
The purpose of the Project (financed under the EEA and Norway Grants 2004-09, grant number PL0223) is to establish a sound organisational and technical structure of Polish-Russian co-operation for collecting and exchanging information on the ecosystem status of the Vistula Lagoon with the overall objective to ensure the biodiversity and environment protection in the Vistula Lagoon. During last decades attempts to coordinate Polish and Russian monitoring of the Vistula Lagoon has been undertaken. However, this problem still remains unsolved. The project is focused on the creation of both, a scientific and logistic basis for sustainable management of this specific water body through: ➢ Carrying out an assessment of the current monitoring and information exchange systems both in the Polish and Russian parts of the lagoon; ➢ Organising meetings and workshops in Poland and in Kaliningrad; ➢ Developing a common monitoring plan and a database to be shared with the Russian and Polish partners; ➢ Planning the trainings for Polish and Russian experts.
ICZM tools
Complementary monitoring and operational systems of information exchange are key issue for the assessment of ecological status in the context of the Water Framework Directive. Even if WFD rules are not legally binding for the Russian side, both countries will benefit from successful coordination of monitoring activities. Good transboundary cooperation is also extremely important in formulation of protection plans for NATURA2000 areas. Currently, there is limited collaboration in common management of the Vistula

Lagoon between Poland and Russia.

As being financed by the EEA and Norway Grants 2004-09, this project involves cooperation between Polish (Institute of Meteorology and Water Management, IMGW) and Norwegian (Norwegian Institute for Water Research, NIVA) partners but the project implementation requires cooperation of numerous Polish and Russian institutions that are responsible for environmental monitoring of the Vistula Lagoon.

This case study is aimed to test the limits of the cross-border cooperation in monitoring and data exchange between an EU- and a non-EU country. Preliminary results prove the relevance of the study for cross-border management of transitional waters as it shows how difficult the process of setting the right co-operation framework is.

Success and failure factors

Success factors:

1. Well established and functioning EU transboundary regulation drivers for transitional and coastal water bodies: WFD, MSFD and SEA Directive.
2. Strong technical and local expertise in monitoring, planning and managing marine transitional waters in both countries.
3. Progress of networks in coastal zone management.
4. The existence of an EU-Russia Neighbourhood Programme, EEA and Norway Grants Programme and other international instruments financially supporting and facilitating cross-border co-operation between Poland and Russia specifically addressing cross-border management needs of Vistula Lagoon.

Failure factors:

1. No integrated regulatory framework for the management of transitional waters, which could combine WFD and MSFD requirements in both jurisdictions sharing Vistula Lagoon and its catchment area.
2. No integrated transboundary plan or other legally binding agreement in operation for monitoring of Vistula Lagoon in Poland and Russia.
3. Governmental institutions are usually unwilling to share data in their possession, particularly with institutions in another country, even if that institution collects similar data in the same transboundary water body.

Box 7.4 Case Study: Sharing information among stakeholders on the transboundary transitional water management between the Republic of Ireland and Northern Ireland (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged

Vital Signs Ireland allowed students on opposite sides of the Northern Ireland–Republic of Ireland border to observe, collect, and share/disseminate information on the shared water resources bisected by their border. Children were developing links with the community and with local authorities. The program enabled students to collect environmental field data with handheld computers and upload their findings onto a GIS-enabled website, where all parties and the interested public could view their watershed information. Creating a GIS-linked database that is catchment-focused and available to both jurisdictions was a novel approach.

Overview of the case

This innovative aquatic mobile information-gathering programme was developed by the Gulf of Maine Aquarium and Research Institute in the US. Students use handheld computers (running customized *Vital Signs* data collection software) and a suite of field tools to understand local aquatic habitats. Tools include a GPS receiver, camera, and pH, dissolved oxygen, and temperature probes. Students also record river characteristics, streamside data, weather observations, and anecdotal notes. The data are uploaded to the program database and mapping interface. Here, students see their data in context and compare it with that of other schools within their watershed and with other watersheds. This record is taken on a monthly basis and uploaded onto the Vital Signs website. On the website, students can observe their own records and those taken by students in other parts of their river catchment and within other river catchments.

ICZM tools

The *Vital Signs* Ireland programme is used educationally by schoolchildren, while fisheries organisations use it to monitor water and fish quality in the various river catchments that straddle the Northern Ireland/Republic of Ireland border. As well as being an important science learning tool in schools, *Vital*

Signs is also used by professionals responsible for water management, including fisheries, local authorities and industries such as farming, to measure the impact that their activities may have on local river systems. It also promotes the ethos of 'cross-border catchment care', and aims to nurture a sense of ownership and responsibility for the shared aquatic resource, thereby minimising the effects of the political border.

Vital Signs is a software programme developed for handheld computers equipped with Bluetooth technology and digital camera to record information including location, river measurements, water temperature and quality, anecdotal observations and digital imagery about aquatic environments. This environmental data is then transmitted to the *Vital Signs* Ireland website. *Vital Signs* programme is currently being implemented in three river catchments that straddle the border between the Republic of Ireland and Northern Ireland: the Foyle, Melvin and Blackwater. The format and functionality of the website were defined jointly by the cross-border partners. Support administration for the project and training was provided by the Project Officer.

Success and failure factors

Success factors:

1. Development of the *Vital Signs* program was the result of collaboration between IT development institutions, the transboundary cooperation agencies, educators, local communities, and scientists.
2. *Vital Signs* used the latest technology, and software developed by an advanced ICT institute.
3. An education booklet that integrates the Vital Signs programme with the curricula of Northern Ireland and the Republic of Ireland was developed for use by the teachers to support the pupils' learning.
4. All transboundary catchment areas and transitional waters were covered by project activities.
5. The Ordnance Survey maps used for the website were costly, but subsequent lobbying considering that the data was primarily being used for educational purposes resulted in a significant cost reduction.

Failure factors:

1. Cooperation activities and the maintenance of the website declined after the INTERREG IIIA project funding finished.
2. Neither GIS system proved to be sustainable due to difficulties in amateur data management and updating without a dedicated system administration agency.
3. There was no integration of *Vital Signs* with the governmental transboundary cooperation between Republic of Ireland and Northern Ireland.

3 Conclusions

This chapter has outlined key elements of transboundary information management of transitional waters. A bilingual coastal information system for a transitional water body should be seen as the key tool facilitating transboundary information exchange. Its relevance is particularly high considering the needs to support the management integration between the downstream river basin, a transitional water body and the adjacent marine nearshore. A less successful example of a multilingual information exchange system on ecosystem state in Vistula Lagoon between Poland and Russia shows, that the effectiveness of such a system depends on, whether or not governmental institutions in the countries sharing a transboundary transitional water body are willing to share data at their possession with institutions in another country, even if both institutions collect similar data in the same transboundary water body (Box 7.3). As the case study of sharing information among stakeholders on the status of the transboundary transitional water management in Ireland shows, cross-border information exchange systems can be sustainable only if the rules and principles for information exchange are agreed upon and the committed personnel and funding sources are available on both sides of the border for a longer period of time (Box 7.4).

Watchwords

- Supplying information across all coastal-relevant policy and authority levels as well as across all sectors is essential for implementation of a transboundary management of coastal regions.

- Only well-informed and truly environmentally concerned society groups can ensure successful transboundary actions for the reinforcement of the environmental integrity of transitional waters.
- The ultimate objective of the transboundary information exchange is to establish the cooperation platform for common concerns taking into account differences in the environmental and socio-economic situation, national policy, legal aspects and regulations.

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Strategic environmental assessment in a transboundary transitional water body

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Abstract

The transboundary SEA process can be triggered by a public concerned when it considers that it would be affected by a significant adverse transboundary impact of a proposed activity. Public participation could be best organized by a non-governmental forum of local stakeholders from the states sharing a transboundary transitional water body. The nomination of such a forum as a joint body responsible for organizing public participation should be agreed upon by the parties involved.

1 Introduction

Strategic environmental assessment (SEA) is a systematic and anticipatory process, undertaken to analyse the environmental effects of proposed development plans, programmes and other strategic actions and to integrate the findings into decision-making (Resource Manual 2011). It helps to address difficult issues concerning, for example, shared protected areas, waterways, transport connections, and transboundary pollution. Therefore, SEA provides an important platform for the transboundary cooperation in the reinforcement of the environmental integrity of transitional waters.

In the early 1990s, the Convention on Environmental Impact Assessment in a Transboundary Context (the Espoo Convention 1991), and the Convention of the Protection and Use of Transboundary Watercourses and International Lakes (the Helsinki Convention 1992) kicked-off the process for the introduction of the transboundary environmental impact assessment (EIA) and SEA in Europe. In 2003, the Espoo Convention was supplemented by a Protocol on Strategic Environmental Assessment (the Kiev Protocol). SEA is undertaken earlier in the decision-making process than project EIA, and, therefore, serves as a framework for transboundary cooperation.

According to the Kiev Protocol, SEA refers to the evaluation of likely significant environmental effects. The evaluation comprises: a) determination of the scope of an environmental report and its preparation, b) carrying out public participation and consultations, c) taking into account the environmental report and the results of the public participation and consultations in a development plan or programme. The EU Directive 2001/42/EC on the assessment of the effects of certain plans and programmes on the environment (the European SEA Directive) stipulated that all Member States of the European Union should have transposed SEA into domestic legislation by 21 July 2004.

2 Experiences

Development plans undertaken in a transboundary transitional water body or its catchment area by one state might adversely affect the entire transitional water body with negative impacts extending to other state(s) sharing the water body. Hence, there is a need to conduct the transboundary SEA and EIA for major projects anticipated in and around a transboundary transitional water body. According to the Kiev Protocol, SEA is required for plans and programmes that are prepared for agriculture, energy, forestry, fisheries, industry, telecommunications, tourism, town and country planning or land use, transport, waste management, water management, that are likely to have significant environmental

effects and that are subject to preparation and/or adoption by an authority or prepared by an authority for adoption by a parliament or a government. In other words, SEA is presumed for all large-scale (both, private and public) projects that are subject to governmental approval.

The purpose of the transboundary SEA is to assist authorities to take into account:

- Key environmental trends, potentials and constraints that may affect or may be affected by the development plan or programme from a transboundary perspective;
- Environmental objectives and indicators that are relevant to the plan or programme facilitating the assessment and control of likely adverse environmental effects by the potentially affected state;
- Comparison of likely adverse transboundary environmental effects of proposed alternative options of the development plan or programme;
- Measures to prevent, reduce or mitigate likely adverse transboundary environmental effects and to enhance positive effects of the transboundary nature;
- Views and information from relevant authorities and the public in the potentially affected state(s).

The Kiev Protocol sets out the following stages of the process for carrying out SEA:

1. Scoping to determine the content of the environmental report;
2. Environmental report;
3. Public participation;
4. Consultation with environmental and health authorities;
5. Transboundary consultations;
6. Decision on the adoption of the development plan or programme;
7. Monitoring of effects.

According to the Resource Manual (2011), the scoping stage gives an opportunity to focus the report on the important issues to maximize its usefulness to the public, the authorities and decision makers. Determining the scope of the report implies also defining the scope of the analyses that will lead to the preparation of the report. Considering the transboundary impact, the scoping should also take into account the requests of the potentially affected state(s) for collecting certain information (Box 8.1).

The environmental report shall provide the public and the authorities in the state initiating the development plan or programme, as well as in the potentially affected state(s) with comprehensive information on the adverse environmental effects of the anticipated development plan or programme.

The environmental and health authorities should get an opportunity to express their opinion on the draft plan or programme and the environmental report. The affected state(s) should also be invited to enter into consultations regarding the SEA report by the state initiating the development plan or programme, if potentially affected states request so.

The decision on the adoption of a plan or programme has to take into account the environmental report and the opinions expressed by the public and the authorities, both domestic and of potentially affected states. The decision maker has to produce a statement summarizing how that information was taken into account and why the plan or programme is being adopted in the light of reasonable alternatives.

The significant environmental effects of implementation have to be monitored to, among other things, identify unforeseen adverse effects in any of the affected states and enable appropriate remedial action to be taken. Monitoring results have to be made available to the authorities and the public.

Usually, the above elements should complement, but not duplicate the mainstream planning efforts and tasks (e.g. analysis of the existing situation, environmental impact and development alternatives). However, if any hitherto unanticipated development plan or project emerges that might adversely affect the environmental integrity of the transboundary transitional water body then a transboundary SEA has to be accomplished as a supplementary activity.

Box 8.1: Case Study: Transboundary EIA in the construction of the fixed links across the Danish straits (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
In the case of the Sound fixed link, a transboundary EIA was carried out in 1994 when the construction process had already been going on for three years. Despite these constraints, the project was successfully completed and is now seen as a model of environmental sensitivity and protection. In the case of the Fehmarn Belt link, a transboundary EIA is currently under way, taking into account mistakes and lessons learned from the controversies of the Sound fixed link.
Overview of the case
In 1991, the construction of a fixed 16 km long link carrying both road and rail traffic across the Sound between Denmark and Sweden commenced. The link includes a 4 km submerged tunnel, an 8 km, two-deck bridge, and a 4 km artificial island, which links the tunnel and the bridge. The bridge and tunnel were opened for traffic in 2000. Its opponents claimed that the bridge piers, landfills and an artificial island might reduce water exchange in the Baltic Sea. The original design of the fixed link was such that it would have reduced the flow of water through the Sound by 2.5% (EIA 1994). As the Sound is one of the key transitional water straits linking the Baltic Sea with the North Sea, pressure from environmental organizations had led to substantial changes in the design decreasing the reduction of the water flow to 0. Connecting Denmark to Germany, the Fehmarn Belt fixed link will be the largest infrastructure project in Europe. The project consists of a double-track rail line and a four-lane motorway. Initial geological and environmental investigations to determine the fixed link have been initiated after the Fehmarn Belt link treaty was signed by Ministers of Transport of Denmark and Germany in 2008. The Danish and German parliaments have also approved the project. The fixed link will either be a 19 km cable-stayed bridge, or a 20 km submerged tunnel. According to the German Nature Protection Society, the bridge would obstruct 90 million migratory birds every year, and damage the Baltic region's ecosystem (Fehmarn Belt Link 2011).
ICZM tools
In the case of the Sound fixed link, politicians had to engage in promotional activity in search of public consensus and to respond to environmental groups' opposition. The EIA of the fixed link was triggered by Greenpeace, which was granted legal standing in a case concerning absence of a proper EIA for the project. The case resulted in a favourable decision of the Swedish Water Court and, ultimately, approx. € 0.5 billion have been spent to conduct a comprehensive EIA and amend the project accordingly. In the case of the Fehmarn Belt fixed link, Denmark and Germany have informed Sweden of a planned fixed link well in advance, in accordance with the Espoo Convention. In preparation for the project's EIA, a scoping report has been drafted to describe the preliminary content of the continued work (EIA Scoping Report 2010). The Swedish Environmental Protection Agency is the agency responsible for submitting and receiving notifications, and in other ways fulfilling obligations regarding the EIA in transboundary contexts. It has compiled and submitted a summary of requests and remarks from a broad array of Swedish stakeholders that might be affected by the construction of the fixed link – from the Swedish Fishermen's Association to the City of Malmö, the County Administrative Board of Skåne County and the Swedish Maritime Administration. The Swedish EPA, however, was not responsible for balancing any views against each other or submitting a comprehensive statement on behalf of Sweden. The key issues suggested by the Swedish stakeholders for the inclusion into the environmental report were: exchange of water, related to salt concentration and oxygen content between the North and the Baltic Seas, effect on the Natura 2000 areas and endangered species, influence on the fishing and tourist industries from a regional perspective, etc.
Success and failure factors
Success factors: 1. Prompt establishment of a multilateral expert panel. 2. Close cooperation among all interested states. 3. Greenpeace, backed by other environmental organizations, experts and the Swedish Water Court, succeeded in bringing major amendments to the project. Failure factors: 1. EIA of the Sound fixed link was made at such a late stage, that it could not possibly have influenced the final decision (Falkenmark 1999). 2. The search for alternatives of the Sound fixed link was problematic since the objectives for the project were widely dispersed, varying, fluid, and changing over time, and the purposes of the project were manifold and diverse (Markus & Emmelin, 2003).

Public participation is the key to success in a transboundary SEA process. It should enable the public concerned to express the opinion on the draft plan or programme and the environmental report following the principles set out by the UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters (The Aarhus Convention 1998). Article 2.6 of the Kiev Protocol defines SEA as a process that stretches beyond evaluation of the likely environmental effects to include the "taking into account of the environmental report and the results of the public participation and consultations in a plan or programme". The following key efforts ensure effective participation of local users and other stakeholders from the interested states sharing the transitional water body in the transboundary SEA process (Fig. 8.1):

- Triggering the transboundary SEA process;
- Contributing to scoping and environmental reporting;
- Facilitating public participation in all states sharing the transboundary transitional water body;
- Contributing to the transboundary consultations.

Triggering the transboundary SEA process

The Kiev Protocol necessitates that there be "early, timely and effective opportunities for public participation, when all options are open" (Article 8.1). The SEA process should provide appropriate opportunities for the involvement of key stakeholders and the public, beginning at an early stage in the process and carried out through clear procedures. It should employ easy-to-use consultation techniques that are suitable to facilitate active public participation (public hearings, interactive workshops, representation in the cross-border working groups, web-based communication, helpdesks, etc.).

The public participation process should already begin during the determination of whether the SEA is required (Resource Manual 2011). Typically, a transboundary SEA and/or EIA is undertaken by a governmental institution responsible for the development plan or programme. However, if the anticipated plan or programme seems controversial from the onset regarding its likely environmental impact, then the state initiating the project might be reluctant to conduct a transboundary SEA and/or EIA. Even if a political agreement, a plan for cooperation or a transitional water management agency are present, these factors might be insufficient to trigger a comprehensive, transboundary SEA and/or EIA. The political agreement and the cooperation plan might be too biased towards the project promotion regardless of environmental constraints; whereas the management agency might be too dependent on the bilateral funding to pursue an impartial transboundary SEA and/or EIA process.

The transboundary EIA process can be triggered by the public concerned when it considers that it would be affected by a significant adverse transboundary impact of a proposed activity, and when no notification has taken place in accordance with the provisions of the Espoo Convention (Article 3.1). The public of the affected Party should be able to submit an application to its competent authority to enter into a process of discussions with the competent authorities of the Party of on whether there is likely to be a significant adverse transboundary impact according to the provisions of the Convention (Article 3.7). The application should highlight the most likely significant adverse effects of the anticipated plan or programme.

A similar application procedure is relevant to initiating the transboundary SEA process. However, seeing an SEA as an EIA analogy is not purely straightforward, since the SEA, besides being interpreted in the 'EIA-mode', could be also interpreted in the 'planning mode' (Markus & Emmelin 2003). According to the Resource Manual (2011), it is important to note that the scale, scope and range of some SEAs may make the practical public participation arrangements in SEA significantly different from EIA. Public participation in SEA is likely to attract different publics. The complex nature of some SEAs calls for the use of techniques that facilitate focused problem-solving debate rather than mere problem exposure. The requirement to carry out SEA can be determined either by reference to legal obligation (e.g. list of plans and programmes that always require an SEA), or through case-by-case review of whether the plan or programme requires a SEA under the Protocol.

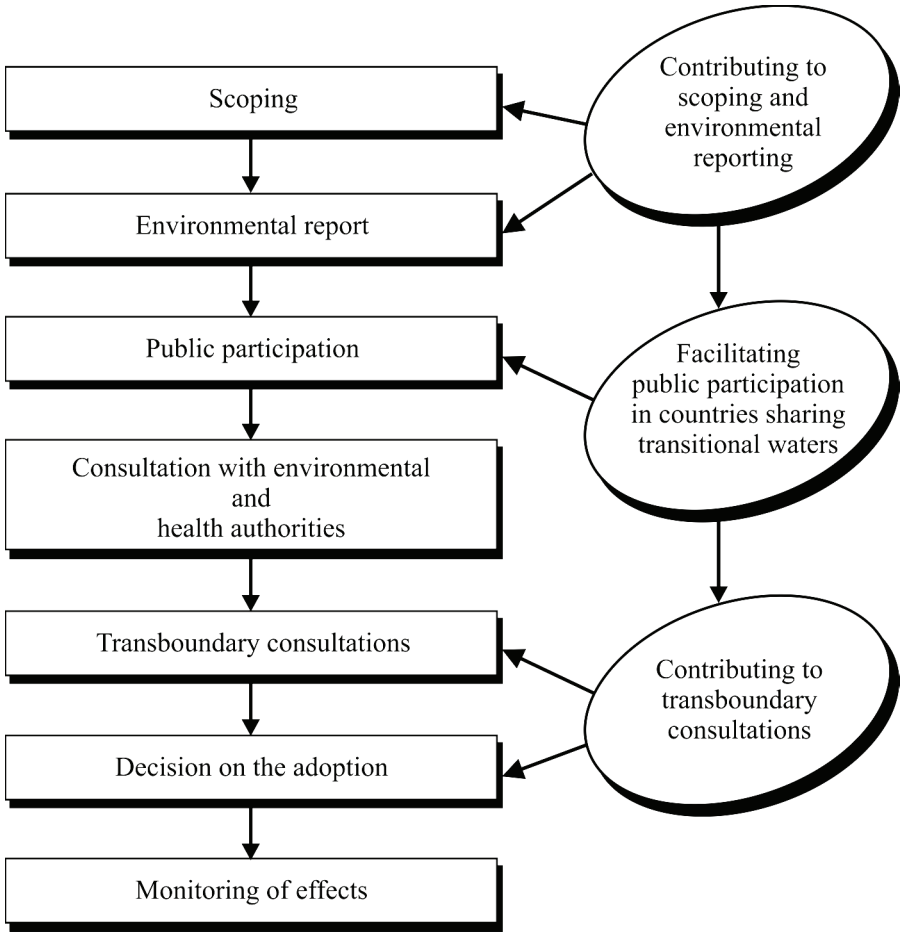

Figure 8.1: Processes ensuring effective participation of local stakeholders in a transboundary SEA

The EIA of the Sound fixed link was triggered by Greenpeace, which was granted legal standing in a case concerning the absence of a proper EIA for the project. The case resulted in a favourable decision by the Swedish Water Court (Box 8.1). The most appropriate institution to trigger the transboundary SEA is a non-governmental forum of local stakeholders from the states sharing the transboundary transitional water body (e.g. the Wadden Sea Forum, Box 4.3). In special cases, like protecting the Pasamaquoddy Bay shared by the US and Canada from the LPG import terminal construction, an *ad hoc* stakeholders' forum was established to defend the local users' interests and became the main institution triggering the transboundary SEA and EIA process (Box 8.3). If the project initiating state has not ratified the Espoo Convention, the Kiev Protocol, or is not an EU member, then the progress of the SEA depends upon the legal capacity, determination and negotiation skills of the interest groups to trigger the transboundary SEA process and to facilitate its progress actively and effectively. The importance of informal contacts between the authorities and stakeholder organizations in all interested states for triggering the process should not be underestimated either.

Contributing to scoping and environmental reporting

Scoping is the pivotal stage of the transboundary SEA process when the potentially affected state can submit its request to the state initiating a plan or programme considering what topics on which scale and depth should be addressed in the environmental report of the anticipated plan or programme. The aim of scoping is to assure that the environmental report is correctly focused, providing enough information on what really matters and not confusing the report with irrelevant matters. It is critically important to ensure, that all relevant groups of local users and stakeholders should be able to express their wishes and considerations regarding the topics, as well as the scale and depth of their analysis.

According to Article 6.3 of the Kiev Protocol: To the extent appropriate, each Party shall endeavour to provide opportunities for the participation of the public concerned when determining the relevant information to be included in the environmental report. In other words public participation at this stage is optional. Yet, such participation may be more effective in gathering and addressing inputs from relevant authorities and the public than concluding reviews of the draft plan or programme and of the environmental report at the end of the plan or programme making process (Resource Manual 2011).

The Resource Manual recommends beginning the consideration of various reasonable alternatives of the draft plan or programme as early as the scoping stage, as all alternatives should be treated equally – there is not one plan or programme plus a number of alternatives, but just a number of alternatives. Therefore, active participation of the stakeholders from all interested states in the scoping stage should ensure that no single alternative is given preference beforehand.

The request of the public concerned regarding the topics of the analysis, their scale and depth, as well as possible alternatives, should be submitted to the state initiating the plan or programme via the national EPA or other governmental institution in the potentially affected state, which is responsible for the international environmental cooperation. Publication of the scoping outcome (a report) is not required. However, it may be useful to record the outcome of the scoping, perhaps as a scoping report, as this would provide the outline of what is to be done when preparing the environmental report. Authorities could make a scoping report publicly available as a matter of good practice. In the case of Ireland, a summary of the responses received from the stakeholders in the scoping stage and how they have been taken into account is contained in a special annex of the environmental report (Box 8.2).

Environmental reporting is the responsibility of the state initiating the plan or programme. Nevertheless, the local users, experts and research institutions from the potentially affected state should actively collaborate and voluntarily contribute to the SEA process by providing relevant data and information available at their disposal. Usually, the local knowledge is pivotal in developing key insights and evidences of environmental effects of the anticipated plans or programmes and their significance. This is particularly true in the case of transboundary transitional waters, where hydrodynamic and environmental processes are complex, and regular cross-border exchange of data and information among the institutions is usually weak or missing.

Facilitating public participation

The Espoo Convention (Article 2.6) states that the Party of origin shall provide opportunities for the public of the affected Party to participate in the transboundary EIA process equivalent to those provided to the public in the Party of origin. ‘The Public’ means one or more natural or legal persons, including experts and NGOs. According to the Kiev Protocol (Article 3.7), “within the scope of the relevant provisions of this Protocol, the public shall be able to exercise its rights without discrimination as to citizenship, nationality or domicile and, in the case of a legal person, without discrimination as to where it has its registered seat or an effective centre of its activities.”

One major difficulty in ensuring effective public participation in the transboundary SEA and/or EIA process is the difference in public participation traditions and regulations in the states sharing a transboundary transitional water body. If a plan or programme with likely environmental effects is undertaken by the state, which has not ratified the Espoo Convention, the Kiev Protocol, or is not an EU member state, then it is necessary to comply with the national EIA and/or SEA procedures of that state. Typically, every modern democratic state has adopted certain procedures for public participation in the environmental assessment processes and for transboundary cooperation in the EIA and/or SEA.

To ensure a truly inclusive and comprehensive public participation process, it is necessary to understand which NGOs and groups of the public may be interested in and have relevant skills for participation in a transboundary SEA and/or EIA. The Protocol’s definition of ‘the public’ is identical to that in the Aarhus Convention and the EU SEA Directive, but differs from the Espoo Convention by its explicit inclusion of ‘associations, organizations or groups’.

Box 8.2: Case Study: Strategic environmental assessment for the Aquaculture and Shellfisheries Management Strategy in the transboundary transitional waters of Ireland (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
Undertaking of the SEA for a strategy of the aquaculture and shellfisheries management in the transboundary transitional and coastal waters of Ireland provided necessary understanding of how the Strategy relates to the existing framework of international, European and domestic obligations and agreements that currently influence the use, and protection of the transitional waters' environments. It also enabled the consideration of the Strategy in the context of the emerging Ireland and UK frameworks for the management of the transboundary transitional and coastal waters. This allows for conflicts or synergies between the Strategy and other plans and policies to be identified, and, in the case of conflicts, resolved.
Overview of the case
In 2010, the Loughs Agency, a bilateral management agency of the transboundary transitional water bodies (the 'loughs') in Ireland initiated the SEA process for the Aquaculture and Shellfisheries Management Strategy. The SEA focused on biodiversity; population; human health; fauna and flora (including habitats and fisheries, with identification of key species, location of designated and/or important habitats, measures that could impact on these habitats); soil; water; air; climatic factors; material assets; cultural heritage, including architectural and archaeological heritage (with reference to known sites, features and areas of archaeological and/or heritage importance, with a zone of avoidance around known sites); landscape, and the interrelationship between the issues. This was undertaken with additional reference to fisheries and angling; amenity, tourism and recreational use; social or socioeconomic issues (SEA 2010). Each SEA topic encompasses a number of receptors and the assessment considered the potential effects on each of these. This SEA covers the full extent of the Lough Foyle and Carlingford Lough water catchments, including the terrestrial (freshwater) areas and the marine area to the 12 nautical mile (nm) limit in Foyle and to the mouth of Carlingford Lough. This is the area of the Loughs Agency's jurisdiction. It includes parts of both Ireland and Northern Ireland. In this way the SEA is inherently transboundary. For the purpose of the SEA, moderate or major environmental effects are grouped into one and considered to be significant, whilst minor or neutral effects are not considered to be significant.
ICZM tools
Methods and tools applied in SEA for a strategy of the aquaculture and shellfisheries management: ➢ Screening; ➢ Scoping, definition of objectives; ➢ Checklists; ➢ Case comparison; ➢ Literature survey; ➢ Model mapping; ➢ Consultation of experts.
Success and failure factors
Success factors: 1. Potential significant environmental effects have been identified and assessed at a strategic level arising from the content of the draft Strategy. 2. The level of detail in the SEA is commensurate with the level of detail in the draft Strategy. 3. The SEA helped identify implementation options which presented opportunities for, or environmental constraints against the development of aquaculture and wild shellfisheries. 4. The SEA assessed the impacts of implementing the draft Strategy. Failure factors: 1. Weak direct involvement of local users and other public concerned throughout all SEA stages. 2. Insufficient attention to the comparison of strategic alternatives. 3. The SEA did not conduct detailed surveys or develop a carrying capacity model and did not examine the commercial viability of development or provide cost benefit analysis. 4. Where there are various permutations in the possible implementation of policy, the SEA did not determine how these different management approaches will be implemented.

Box 8.3: Case Study: The SEA in the Passamaquoddy Bay as a tool to resolve the development conflict (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
The main positive experience of the case study is that it is critically important to establish a legal framework obliging the eventual hazard source state of a transboundary transitional water body to involve the affected state into the transboundary SEA procedure. Another important lesson is that any integrated transboundary management plan must cover not only the catchment area of the border river (at least its lower stream), but also the whole area of a transitional water body and its direct drainage basin. Another positive experience is that the key to the successful defending of the local stakeholders interests lies in the capacity of building grass-root alliances comprised of the stakeholders from both, the affected and the hazard source states. Securing sufficient human and financial resources, establishing broad social networks and mobilizing powerful allies is also a must. The most effective action of the local stakeholders in defending their interests is the combination of lobbying, information dissemination and legal action.
Overview of the case
The tidal Passamaquoddy Bay, which is a transitional water body for the discharge from the St. Croix River catchment basin to the Fundy Bay, is characterized by a great aquatic biodiversity, coastal scenery, rich living resources and attractive nature tourism amenities. In 1993, the Plan for Long-term Cooperative Management of the St. Croix International Waterway was adopted stressing its importance for the regional cross-border natural and cultural heritage conservation. However, the Plan is confined to the St. Croix River catchment area and its inner estuary leaving the Passamaquoddy Bay out of its scope. Such a limitation in geographical scope could not prevent conservation and development conflicts in the Passamaquoddy Bay. The biggest conflict emerged in 2005 when several liquid natural gas (LNG) import terminals were planned for construction on the Maine coast of the Bay. Local stakeholder groups in Canada and the USA, including the native nation of the Passamaquoddy Tribe, resisted the plans to build the LNG import terminals considering them as a threat to environmental integrity of the Bay. The legal resistance lasted for five years until the construction of the LNG terminals on the tribal land was finally cancelled in 2010.
ICZM tools
To the extent that the transport of LNG through the Passamaquoddy Bay is a potential source of transboundary harm, this proposed activity will be subject to the restrictions imposed by the rules regarding innocent passage. The rules respecting transboundary environmental harm are based on two related general principles: the harm principle and the duty to cooperate. The harm principle, codified in Principle 21 of the Stockholm Declaration (1972), imposes a duty on states "to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states." The duty to cooperate requires the source state to notify the affected state of the activity in question, to provide sufficient information to the affected state of the potential environmental impacts and to enter into consultations with the affected state where the affected state is concerned about the environmental impacts of the activity. The preferred approach to implement these obligations is by conducting an EIA and by providing rights of participation to the affected state within that process (Craik 2008). As a result, the US Federal Energy Regulatory Commission (FERC) decided against the proposal on a technicality – that Quoddy Bay LNG did not complete a proper Draft Environmental Impact Statement for a final permit. Hence, the whole conflict was not decided in a civil court, but in the halls of the U.S. bureaucracy.
Success and failure factors
Success factors: 1. Strong and well-organized local stakeholders capable of defending their interests. 2. The Passamaquoddy Tribe has been granted rights to its ancestral land and supreme authority of decision making over its use. 3. The navigation passage from the Fundy Bay to the Maine coast across the Passamaquoddy Bay lies without exception within the jurisdiction of Canada, which could decide on the LNG transportation. 4. The FERC decision to dismiss Quoddy Bay LNG Company from the permitting process, requiring it to reapply as an entirely new project. Failure factors: 1. Although the United States helped shape the UN Convention on the Law of the Sea (1982), and though it signed the 1994 Agreement on Implementation, it has not ratified the Convention itself. 2. Interests of local stakeholders and those of a potentially affected state are often played down by a potential hazard source state, which tends to apply the minimal possible EIA procedures.

The draft plan or programme and the report are made available to the public in general, but only the opinions of the public concerned must be taken into account. Hence, the key requirements for the effective public participation are proper communication skills and organization violating national borders, as well as the professional capacity to assess the quality of the submitted environmental report and identify its flaws. These requirements are best met by a non-governmental forum of local stakeholders from the states sharing a transboundary transitional water body. The nomination of such a forum as a joint body, which is responsible for organizing the involvement of the public concerned, should be the subject of the bilateral agreement between the involved Parties. It would be useful to provide a status for such a joint body that would permit it to receive financial support for public participation in the transboundary SEA and/or EIA. A bilateral agreement concerning the transboundary SEA and/or EIA may be a practical way to overcome differences between legislation and the SEA and/or EIA practice of the different Parties.

A tentative list of the contents of a bi- or multilateral agreement pertinent to the public participation:

- responsibility for organizing public participation;
- time scale;
- financial aspects of public participation;
- translation of materials for the public;
- methods of informing the public and receiving their comments;
- volume and format of SEA and/or EIA materials presented to public;
- methods of informing the public about final decision on a proposed activity, etc.

An agreement should make clear what the roles and responsibilities are in informing the public and in transferring the comments of the public to the competent authority of the Party of origin. The problem of reciprocity and equivalence needs particular attention in bilateral agreements where both the scope and the timing of public involvement differ between the states (Ministry of the Environment 2003).

To achieve a truly participatory, transboundary SEA process, the state of origin must supply sufficient information to the public concerned in the potentially affected state. According to the Kiev Protocol (Article 8.5): “Each Party shall ensure that the detailed arrangements for informing the public and consulting the public concerned are determined and made publicly available.” The Espoo Convention (Article 4.2) stipulates: “The Party of origin shall furnish the affected Party, as appropriate through a joint body where one exists, with the environmental impact assessment documentation. The concerned Parties shall arrange for distribution of the documentation to the authorities and the public of the affected Party in the areas likely to be affected and for the submission of comments to the competent authority of the Party of origin, either directly to this authority or, where appropriate, through the Party of origin within a reasonable time before the final decision is taken on the proposed activity”.

The Party of origin should be responsible for the translation (into the language(s) of the affected Parties) of the documents that are disseminated within the procedure of a transboundary SEA and/or EIA, for providing the information and for receiving the comments. A good and timely translation of the EIA documentation into the language of the affected Party will greatly facilitate meaningful involvement in the SEA and/or EIA procedure of the public concerned. The full SEA and/or EIA documentation should be available in the original language. The examination of the documents – i.e. the opportunity to study the full documentation and to make notes – should be free of charge and of any obstacles, unless part of the documentation is classified. Meanwhile, a non-technical summary including a visual presentation as appropriate (maps, graphs, etc.) should be translated into the language(s) of the potentially affected Party and distributed widely in the areas likely to be affected. Any additional information should be provided to the public of the affected Party upon request.

Choosing an appropriate financial mechanism and proper public participation tools are the most important challenges of the public participation in the transboundary SEA and/or EIA. Typically, the

costs of public participation are covered either by the proponent of the project, the state of origin, or the external sources (e.g. grants, subsidies or donations).

According to the Resource Manual (2011), the key public participation tools should facilitate:

- Providing information;
- Gathering comments;
- Engaging the public concerned in collaborative problem solving.

Good practice examples show that formal public hearings combined with informal interactive workshops are the most effective public participation tools. Public hearings are a formal way of presenting and exchanging information and views on a proposal. An interactive workshop is a structured forum where participants are invited to work together in a group (or groups) on an assessment of an issue or SEA step (Resource Manual 2011). The goals of an interactive workshop are to bring participants together in a structured environment (that is, through large and small-group activities, discussions, and reflection) to resolve issues and build consensus on the assessment. Workshops can be organized to target representatives from a particular group, e.g. experts of one area.

Workshops require a facilitator who is able to engage all participants in the discussion. Therefore they are participatory tools that are best used with smaller numbers of participants. A variety of tools can be used within a workshop, e.g. focus groups and/or visioning. A report has to be prepared as an outcome of the workshop, recording opinions, suggestions or conclusions that have been collaboratively developed and agreed to by all participants, on an issue or proposal.

The Kiev Protocol (Article 8.2) refers to electronic media as primary means to ensure the timely public availability of the draft plan or programme and the environmental report. It would be useful if the stakeholders' forum would develop a special web page on its existing website dealing with the transboundary SEA and would inform all potential participants about SEA procedures. Such a website should contain information about proposed activities with likely transboundary effects and the modalities for public participation in the transboundary SEA (timetable, points of contact, sources of additional information, public hearings and so on), as well as invite feedback. The Internet can enhance traditional techniques but it cannot replace them (Resource Manual 2011). The purpose of the website should be clearly articulated and information should be accurate and timely. The resource implications of maintaining the site need to be carefully assessed.

Contributing to the official transboundary consultations

The Kiev Protocol (Article 10) regulates the transboundary consultations on the SEA when a proposed plan or programme in one state (the Party of origin) is likely to have significant environmental effects on the territory of another state (the affected Party). It is a challenge for the non-governmental stakeholder forum from the states sharing the transitional water body to achieve, that any unanswered questions raised in the public participation stage should be addressed during the transboundary consultations phase, whilst the experts representing the local stakeholders' interests should get actively involved in the official transboundary consultations. The non-governmental forum of local stakeholders should be represented in the governmental transboundary consultations by unbiased and committed experts that know the subject and are involved in the transboundary SEA and/or EIA process from the start.

A non-governmental multilateral forum can facilitate timely achievement of the following objectives:

1. Ensuring that the Party of origin issues the notification to consult, whether the anticipated plan or programme is likely to have significant transboundary effects, and that the potentially affected Party duly responds that it wishes to be consulted.
2. Ensuring that once the transboundary mechanism is triggered, the concerned Parties agree on more detailed arrangements to ensure the necessary consultation with the public concerned and the environmental and health authorities in the affected Party.

3. Ensuring that the relevant information is included in the SEA report and that the quality of the environmental report is sufficient.
4. Ensuring that the SEA report and the results of the transboundary consultations are taken into account during the preparation of the plan or programme and before its adoption.
5. Ensuring appropriate changes to a plan or programme or the introduction of specific measures.
6. Ensuring the involvement of experts and local users with required expertise in complex, controversial or significant plan- or programme-making and assessment processes.

Comments received from the public concerned must be considered according to the same criteria, irrespective of whether they came from the public in the Party of origin or the affected Party. If the transboundary consultations do not provide satisfactory answers regarding the environmental assessment, then affected persons of the affected Party are given a right to appeal against the decision. The project proponent is obliged to provide them with extra information within reasonable time limits. If any unanswered questions still remain, the experts representing the interests of local users and stakeholders in the official transboundary consultations have the right to express their concurring opinion and appeal to an inquiry commission of the Espoo Convention.

3 Conclusions

This Chapter outlines the key issues of applying the SEA in transboundary transitional water management. SEA is presumed for all large-scale (both, private and public) projects that are subject for governmental approval. Public participation must enable the public concerned to express its opinion on the draft plan or programme and the environmental report. It should employ easy-to-use consultation techniques that are suitable for facilitating active public participation. The transboundary SEA and/or EIA process can be triggered by the public concerned when it considers that it would be affected by a significant adverse transboundary impact of a proposed activity, and when no notification has taken place in accordance with the provisions of the Espoo Convention. If the project initiating state has not ratified the Espoo Convention, the Kiev Protocol, or is not an EU member, then the progress of the SEA depends upon the legal capacity, determination and skills of the interest groups.

The key requirements for the effective public participation are best met by a non-governmental forum of local stakeholders from the states sharing a transboundary transitional water body. The nomination of such a forum as a joint body, which is responsible for organizing the involvement of the public concerned, should be the subject of the bilateral agreement between both Parties. The bilateral agreement should also make clear what the roles and responsibilities are in informing the public and in transferring the comments of the public to the competent authority of the Party of origin.

Usually, the full documentation should be available in the original language whereas a non-technical summary should be translated into the language(s) of the potentially affected Parties and distributed widely. Formal public hearings combined with informal interactive workshops are the most effective public participation tools. The Kiev Protocol (Article 8.2) refers to electronic media as the primary means of ensuring the timely public availability of the draft plan or programme and the environmental report.

Watchwords

- Take care to ensure, that the environmental report is correctly focused, providing enough information on what really matters and not confusing the report with irrelevant matters.
- All alternatives of the development plan or programme should be treated equally.
- Choose an appropriate financial mechanism and proper public participation tools.

- Strive to achieve, that all questions and problems raised in the transboundary SEA get satisfactory answers, otherwise, appeal to an inquiry commission of the Espoo Convention.

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Financial sustainability of transboundary cooperation in transitional water management

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Abstract

Development benefits might be the main rationale for maintenance of habitats and ecosystems of the transitional waters. An optimal management financing model and partnership should rely on a professional management agency, whose activity is regularly financed from governmental sources, supported by a non-governmental stakeholders' forum funded from various endowment funds, and providing the economic base for the sustainable local economic activity.

1 Introduction

Shortage of funding is a serious impediment to the transboundary reinforcement of the transitional waters' environmental integrity. Regular funding is needed to conduct the main transboundary co-operation and management activities:

- finance a transboundary transitional waters' management agency;
- cover management and running costs for cooperation projects;
- organize regular cross-border meetings of the decision-makers, local users and other stakeholders (providing facilities, translation, catering, etc.);
- organize and/or participate actively in transboundary SEA and/or EIA processes;
- facilitate transboundary information exchange and dissemination;
- support conservation of the transboundary and/or adjacent aquatic and coastal protected areas of the transitional water body;
- implement joint management plans for the transitional water body and its adjacent areas;
- take other necessary transboundary actions for the reinforcement of the transitional waters' environmental integrity.

Drawing analogy with the financial sustainability of the protected area management (Emerton et al. 2006), we can define the financial sustainability of the management of the transboundary transitional waters as *the ability to secure sufficient, stable and long-term financial resources, and to allocate them in a timely manner and in an appropriate form, to cover the full management costs and to ensure that the transitional waters and their adjacent areas are managed effectively and efficiently with respect to conservation and other objectives.* Financial sustainability of the management of transboundary transitional waters is impossible without a strong and effective agency. According to Inamdar & Merode (1999), financial sustainability of a conservation agency is the ability to secure sufficient resources over the longer term (five or more years) to meet the total costs of an organization. Financial sustainability is high on the agenda of many managers concerned with the transitional water management. Budgetary tightening and public sector reforms in many countries mean that single-source income from government treasury is becoming a thing of the past for many environmental protection and conservation agencies.

2 Experiences

Central to financial sustainability is the ability to secure baseline funds for the running of an organization, and to have sufficient reserves to survive the variations in cash-flow that invariably arise (Inamdar & Merode 1999). Conservation managers are being forced to become more imaginative in how they conceptualize, justify and use allocated funding (Emerton et al. 2006). Increasing financial sustainability of any environmental management organisation means building the capacity to manage resources well, to meet the needs of diverse and changing stakeholders and to do it both now and in the foreseeable future (Inamdar & Merode 1999). The allocation of resources is highly specific and depends on negotiation and careful management of local, as well as regional, national and global expectations (Inamdar & Merode 1999). In the transboundary cooperation framework, the main challenge is to design regional strategies to sustainably finance protected areas at the level of shared ecosystems or areas shared by a group of countries, using international funding sources and bilateral cooperation agencies (Chape et al. 2008). External assistance might be needed: experts from universities as well as the practitioners from other transboundary transitional waters in the countries with similar development level might be helpful.

Core support to the management of transitional waters by governments and global donors

Unless countries view transboundary co-operation in the transitional waters' management as a priority worth funding, the plans or programmes for the reinforcement of the transitional waters' environmental integrity have little chance of being sustainable. Domestic government budgets are the single largest source of funding for nature conservation in most countries worldwide (Emerton et al. 2006). Governments are committed to funding conservation through their endorsement of various environment and development-related agreements, policies and strategies, all of which require or call for funds to be made available for conservation. International experience indicates that long-term, collateral funding of transboundary cooperation in nature conservation can be efficient at relatively low levels (Kelleher 1999). As a share of total government spending, the sums involved are relatively small (Emerton et al. 2006). A long-term government support provides confidence and is evidence of a serious commitment in all countries sharing the transitional water body.

Governments should recognize their obligations to ensure that sufficient resources are provided to achieve the objectives of the transitional waters' management. However, government budgets for conservation are declining, as a result of increasing economic and financial constrains and a growing population needing schools, hospitals and other essentials (Kelleher 1999). Furthermore, governments are seldom able to take investment risks, particularly for conservation needs, since the legitimacy of risking public funds is questionable (Inamdar & Merode 1999). Multilateral funds which combine contributions from various sources, such as the Global Environment Facility (GEF), have over the last decade come to the forefront of international efforts to finance biodiversity conservation, as have funds earmarked for broader sustainable development and poverty reduction (Emerton et al. 2006).

International financial assistance for biodiversity conservation has become increasingly driven by social and economic objectives, and especially by its perceived ability to contribute to poverty reduction. The European Commission no longer treats the environment as a separate sector, but as a cross-cutting issue to be incorporated into all aspects of its development assistance (Emerton et al. 2006). As good practice examples show, combining the socio-economic objectives with the necessity for the habitat and biodiversity conservation could provide a more solid justification to a bilateral and multilateral support for the transboundary transitional water management. The bilateral economic cooperation agreement between Mexico and Belize resulted in establishing two contiguous aquatic protected areas in Chetumal Bay and attracted global donors to support their management (Box 9.1). The bilateral agreement between Latvia and Estonia on transboundary nature conservation based on a socio-economic approach established a Joint Commission on nature areas in a cross-border context and paved the way to seek EU funding to meet the provisions of the Agreement (Box 9.2).

Box 9.1: Case Study: Financing tropical biodiversity conservation of the transboundary transitional Chetumal Bay (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
This case study provides experience on the transboundary cooperation and sustainable financing for conservation of endangered tropical aquatic mammal species and its habitat in two developing countries. The transboundary cooperation in Chetumal Bay combines the use of a vast array of organizational and financial possibilities – from designating contiguous marine sanctuaries on both sides of the border, thus covering the entire bay, to fostering transboundary governmental collaboration framework and promoting grass-root cross-border cooperation, as well as from a one-off financial support of Global Environmental Facility to more sustainable governmental and local schemes to support local sustainable economic development.
Overview of the case
Chetumal Bay is a shallow transitional water body in the Western Caribbean shared between Mexico and Belize. It is an estuary that covers an area of about 2450 km^2. Its depth ranges from 1 to 7 m with a mean of 3 m. The salinity ranges from 8 to 18 ‰ and the water temperature ranges from 24.5°C to 31°C (Morales-Vela et al. 2000). The Rio Hondo River is the major tributary to the bay. Its tri-national watershed extends 13,465 km^2 inland, about 57 % in Mexico, 22 % in Belize and 21 % in Guatemala. The bay has international importance due to its healthy population of the endangered manatee *(Trichechus manatus manatus)*, which inhabit the bay (Robadue Jr. & Rubinoff 2003). Chetumal Bay supports one of the largest populations of manatees in the Caribbean (Morales-Vela et al. 2000). This led the state legislature of Quintana Roo (Mexico) to declare its habitat a Natural Protected Area-Manatee Sanctuary in 1996. The government of Belize created the Corozal Bay Wildlife Sanctuary on the Belizean side of Chetumal Bay in 1998. The protected area comprises the open water areas with seagrass beds, which are part of the manatee's forage, and important habitats for other endangered species of fauna, such as crocodiles (*Crocodylus moreleti)* and the river white turtle (*Dermatemys mawii)* (IUCN Factsheet 2011). Prior to 1990, manatee ribs were used in the handicraft industry, and figurines and bone jewelry were sold in markets. Now, fishing nets and boat traffic represent the biggest potential threats to manatees (Morales-Vela et al. 2003).
ICZM tools
The NGOs focus their efforts on community outreach and environmental education. In parallel, the Quintana Roo state has established a Manatee Sanctuary Committee, where municipality, NGOs, university, and other stakeholders are involved as advisors in its management (Rubinoff et al. 2001). A USAID project supported the establishment of the network of NGOs and public institutions. Management of the Manatee Sanctuary is the responsibility of the Secretariat of Urban Development and Environment, of Quintana Roo state. On the Belize side, a local NGO, the Sarteneja Alliance for Conservation and Development co-manages Corozal Bay Wildlife Sanctuary together with the Belize Forest Department. The GEF-supported Mesoamerican Barrier Reef System Project facilitated development of the transboundary cooperation in Chetumal Bay within the context of the Mesoamerican Biological Corridor Programme. Small external funding projects allowed development of education programmes supporting vocational training and imposing limitations on fishing boat speed and scuba-diving in manatee habitats (Auil 2007). These programmes are dedicated to protect manatee population and diversify the occupation of local people from fisheries towards provision of ecotourism services. Local Mexican and Belizean NGOs helped forming and running the Belize-Mexico Alliance for Management of Common Coastal Resources (BEMAMCCOR), a bi-national effort to advance biodiversity conservation in shared waters such as Chetumal Bay and the Mesoamerican Reef complex.
Success and failure factors
Success factors: 1. Chetumal Bay enjoys continuous international attention regarding biodiversity conservation as a key habitat of a charismatic endangered species (manatee) and as an integral part of the Meso-american Barrier Reef System. 2. Local users and other stakeholders understand that the common goal is to identify and implement common actions needed to avoid further degradation of Chetumal Bay. 3. The entire transboundary transitional water area is protected as the key habitat for manatees. Failure factors: 1. Management plans for the manatee sanctuaries are slowly produced and slackly implemented. 2. The Chetumal Manatee Sanctuary has management limitations, poor implementation of manatee conservation actions, and strong pressure to develop economic activities inside and around the area. 3. Due to weak enforcement, the Manatee Sanctuary is essentially a "paper park" (Wusinich 2002).

Box 9.2: Case Study: Long-term cross-border co-operation in the management of transboundary coastal habitats resulting from successive and simultaneous, short-term funding, North Livonia (Source: OurCoast ICZM Database; http://ec.europa.eu/ourcoast/index.cfm?menuID=4)

Experiences that can be exchanged
A continuous funding base for sufficient time is required to ensure progress in some economically disadvantaged areas. International expertise is also required for the sustainability of the projects.
Overview of the case
On the Estonian-Latvian border, a number of medium to large grants running simultaneously and successively have been necessary for progress in cross-border co-operation. An Agreement between the Ministry of Environmental Protection and Regional Development of the Republic of Latvia and the Ministry of Environment of the Republic of Estonia on the Management of Nature Conservation in a Transboundary Complex was signed in January 2000. It established a Joint Commission on nature areas in a cross-border context for the implementation of the provisions of this Agreement. It was not until 1996 that the first official contacts were made from which a governmental Agreement on joint management was signed. Co-operation in this area has been stimulated by the simultaneous and continuous funding of small term (ca. 1-5 years), inter-related, national and international projects over a decade.
ICZM tools
The first transboundary co-operation was an all NGO affair when the Estonian and Latvian Funds for Nature received a grant (1996-98) from the Regional Environmental Centre for Central & Eastern Europe concerning awareness raising and communication. A Phare Credo project (1999-2000) focussed on tourism development and local authority, cross-border cooperation. Both countries received LIFE grants (no budget details) from 2004-06 with the aim to exchange experiences on coastal biotypes. Whilst these projects were underway, Latvia secured UNDP funds (2005-2008) to protect biological diversity in North Vidzeme Biosphere Reserve with attention on rural development, nature management and landscape planning. Estonia (2005-06), with the same focus, secured ERDF funds for the restoration of lagg-zone and mire-edge habitats. Since then these investments have been cemented by a series of international, cross-border projects. The Dutch government granted funds to develop a management plan for the area (2003-2006). It resulted in a Transboundary Master Plan presenting an analysis of the main issues related to cross-border, biodiversity management and providing directions for cooperative development and management. It was succeeded by two Interreg IIIA projects. The first was funded (2005-2006) to elaborate a coherent policy, joint services, products and infra-structure for environmentally friendly tourism development in the coastal region, involving neighbouring regions and promoting private-public partnerships. The second project was funded (2006-2007) to develop a Transboundary Steering Group formed from the representatives of the partners, governmental and local authorities. The activities involved planning local infra-structure, ecological restoration of aquatic habitats and promotion of eco-tourism and setting up a cross-border monitoring system as a key requirement for the management of transboundary RAMSAR areas. Estonia and Latvia have had much less time to reach effective, cross-border cooperation compared to western European countries. However, in a short space of time they have made notable advances. One tangible output of the cooperation has been the agreement between the two countries to designate (2007) a transboundary RAMSAR site on both sides of the border, only one of seven in Europe. The North Livonian Transboundary RAMSAR site (19,218 ha) incorporates two nature reserves in Estonia and one in Latvia. There is now a management plan for the North Livonian area, which is being implemented with good stakeholder and public support. The Natura 2000 areas are being actively managed by the re-introduction of the Estonian Native Cow to small farm households in order to maintain the semi-natural grasslands.
Success and failure factors
Success factors: Multi-project funding over a lengthy period clearly has benefits. Too often single, short-term grants are awarded in the expectation, or hope, that the work can become self-sufficient within this limited time-frame. Most often, in such cases, the work stops at the end of the grant. Although it is understandable that grant-giving bodies do not want to endlessly fund one operation, many grants kick-start a process which, as in this case, can take up to a decade to mature enough to become self-sufficient. Here, there was also the benefit that Latvia and Estonia were already building on several years of co-operation. Failure factors: North Vidzeme Biosphere Reserve was abolished by Latvian authorities in 2011 as a result of the national protected areas' management reform.

Gathering information on economic benefits of transitional waters to the society

So far, management of transboundary transitional waters has mostly fallen on governments or depended on global donors. However, if economic needs in a country increase, these expenditures are the first to be sacrificed (Breber et al. 2008). Without a local collaborative network, which involves all relevant users of the transitional waters, any top-down conservation system fails to prevent misuse of the resources. It would be a safer guarantee for the continued existence of the riparian wetlands and floodplains of the transitional waters, if they were considered not merely for their ecological functions but admittedly conserved for their yield in natural products with different biodiversity protection policies applied, including top-down regulation and voluntary incentive-based actions (Breber et al. 2008).

The interest in extractive reserves as an option for generating revenues, both for biodiversity conservation and for local and national economies has grown considerably over recent years. Resource use in protected areas can cover a very wide range of activities including the extraction or diversion of water for irrigation or other uses; extraction of flora and fauna and their by-products, capture fishing etc. (Inamdar & Merode, 1999). In order to achieve ecological and economic sustainability of the transboundary transitional waters' management means to enable the communities to utilize the natural resources effectively hereby also enabling the society to protect the nature in actual fact. The challenge is to direct the local community view on the environmental values into one of an asset for the sustainable economic development (Breber et al. 2008).

Protected area managers are increasingly expected to justify their budgets in terms of benefits provided to local communities and the national economy. While some benefits are easily measured – such as local employment, stimulation of rural enterprise or foreign exchange earnings from tourism – it is more difficult to assess the intangible benefits, including cultural or "existence" values and ecosystem services (Chapter 2). Increasingly, managers are assessing and articulating the socio-economic benefits of biodiversity conservation, and managing protected areas in ways that enhance these benefits (Emerton et al. 2006). In some cases, the development benefits are the main rationale for conserving biodiversity and maintenance of natural or semi-natural habitats and ecosystems. For example, many natural, undiked transitional waters, their channels and riparian floodplains serve to mitigate the impact of a flood wave from the watershed or a storm surge from the sea.

There is a growing appreciation that environmental conservation provides direct services, and that the people and organizations that benefit, are prepared to pay for those services (Inamdar & Merode 1999). Yet, besides these use values of natural areas, there also exist non-use values. They reflect the value people place on the existence of such an area, regardless of the importance of other values related to consumption, either of products (such as fish) or experiences (such as recreation) (Chape et al. 2008). As a good practice example from the economic valuation of the Curonian Lagoon region shows, the elicitation of non-use values of the linear habitats of the transitional waters is one of the key socio-economic decision-support tools, which enables weighting the public support for different riparian landscape and habitat conservation policies in relation to their costs (Box 2.1).

Involvement of the private sector and society

Due to diverse services, as well as use and non-use values delivered to the society by the transitional waters, increasingly other institutions and interests are being drawn into their management. The society is beginning to realize that, under the right circumstances, it is possible to reduce the burden of public expenditure by encouraging the private sector (individuals and communities) to capitalize on the value of biodiversity (Inamdar & Merode 1999). Among the many advantages of involving other partners in this way is the opportunity it provides to mobilize resources and tap the energies of different sectors of civil society (Kelleher 1999).

The issue of who should deliver habitat conservation and management services is quite distinct from who should pay for those services. The traditional public sector model is that government is

responsible for both paying for and delivering services. There is another scenario where government sub-contracts work out to the private sector (NGO or commercial organisations). Under this scenario, government pays for a portion of the service, retains the right to regulate, but the contractor delivers the service and retains the right to make a profit. This system, if managed well, can incentivize the contractor to seek investment and increase income from a variety of user groups for the service (Inamdar & Merode 1999).

In the case of the transboundary transitional waters, an optimal management financing model seems to be the one based on the trilateral partnership. Such management and sustainable development partnership should rely on a professional management agency, whose activity is regularly financed from the governmental sources. It should be supported by a non-governmental stakeholders' forum funded from various endowment funds (bilateral development cooperation agencies, philanthropic foundations, NGOs, corporate and individual donations). Finally, the environmental integrity of the transitional waters should provide the economic base for the sustainable local economic activity (e.g., tourism and recreation, sustainable fin- and shell-fishing, etc.).

All three sources of funding (governmental subsidies, voluntary endowments and revenues from economic activities) should be available to support practical management measures, e.g., conservation and maintenance of natural and semi-natural aquatic and riparian habitats. Typically, all states, as well as public and private stakeholders sharing the transboundary transitional water body and its direct catchment area should proportionally share the financial burden of its management. Yet, in certain cases, a richer state could support management and conservation activities of its poorer neighbour relying on the long-term transboundary cooperation agreement and a joint management plan.

Multilateral partnerships can take many forms, particularly when countries with different public participation and private entrepreneurship traditions cooperate. Yet, their common advantage is that they create platforms of negotiation to bring together different groups that are interested in achieving similar goals (Inamdar & Merode 1999). The key characteristics of good public-private partnerships in nature conservation are:

1. Having a shared goal and being honest about what your personal objectives towards that goal are.
2. Entering into negotiation and being prepared to compromise – and being clear about what you are not prepared to compromise over. It is important to set out expectations early so that all participants are sure that they want to be involved in the partnership.
3. Empowering participants – to be able to benefit from and contribute to the partnership in an equitable way.
4. Understanding the costs and benefits of participation in the partnership - and accepting that different stakeholders may measure benefits in many different ways, not just in terms of finances.

Emerton et al. (2006) summarize the diversification of the financing mechanisms for the protected area management recommending consideration of a range of elements and issues, including:

- Building a diverse, stable and secure funding portfolio: minimizing funding risks and fluctuations.
- Improving financial administration and effectiveness: ensuring that funding is allocated and spent in a way that supports finance needs and conservation goals.
- Taking a comprehensive view of costs and benefits: covering the full range of management costs, ensuring that those who bear the costs are recognized and adequately compensated, and that those who benefit from protected areas make a fair contribution to their maintenance.
- Creating an enabling financial and economic framework: overcoming market, price and policy distortions that undermine protected areas or act as obstacles to their financing.
- Mainstreaming and building capacity to use financial tools and mechanisms: factoring financial analysis and mechanisms into planning processes.

Generally, these requirements are also pertinent to ensuring financial sustainability of the transitional waters' management.

Can tourism ensure financial sustainability of the management of transitional waters?

Inamdar & Merode (1999) assert that the significance of protected areas for developing countries is that, while they may attract only a small portion of the national tourist market, they represent a market edge for the developing countries in question. They highlight the following challenges for the successful development of tourism and its contribution as the means to facilitate financial sustainability of protected area management. These challenges, in our opinion, are also pertinent to the transboundary transitional water management:

- ***Resources***: It must be in a position to guarantee a unique attraction – either the viewing of certain charismatic species, or presence of key resources. In the case of transitional waters, close proximity to diverse attractions, such as beaches or attractive landscapes is also expected.
- ***Security:*** in the last decades security has become a major concern for the many industries that are dependent on protected areas, especially tourism. Poor security now effectively precludes a large number of sites from the market.
- ***Access:*** Investors and developers require close proximity to national and international markets and good local transport networks.
- ***Facilities***: high levels of investment in protected area infrastructure must be achieved to improve the attractiveness of a protected area to private investors.
- ***Cost***: The deals and concessions offered by the protected area must look cost-effective to commercial operators and allow them to create a profit for their enterprises.
- ***Benefit sharing and control***: Ensuring that weaker stakeholders – especially people living adjacent to or within protected areas – have an effective voice and are able to benefit fairly from revenues is an essential consideration.

Ecotourism is widely regarded as a panacea for development problems and a universal tool capable of sustaining transboundary cooperation in transitional water areas, in particular, the peripheral ones; yet, "[t]here are, unfortunately, all too many examples across the globe where ecotourism has been regarded as an automatic panacea and inserted into contexts where there is much going on to militate against its sustainability and its potential to contribute towards sustainable development" (Cater & Cater 2011, p. 62). Unless strictly controlled and limited, the construction of facilities for accommodation, visitor centers and other tourism infrastructure along the fringes of the transitional water bodies might lead to the disposal of sewage in the transitional water body and, hence, cause environmental effects even if it is within license limits. Leisure fishing may change population dynamics of native species. Leisure fishermen may demand the introduction of alien species (Chape et al. 2008). Leisure boats may cause noise and disturb habitats of endangered species.

According to Vincent & Thompson (2002) ecotourism sustainability is more likely to occur when:

1. the community is actively involved in the design and development of an ecotourism project and consequently becomes more environmentally conscious;
2. the community leaders develop and support programs for families and children to learn more about environmental conservation and preservation;
3. community tourism decision makers recognize the importance of promoting and publicizing the potential economic benefits as a result of a community's ecotourism development.

In our opinion, four critical issues have to be considered when anticipating the promotion of tourism in the transboundary transitional water area:

- ***Separation*** of nature conservation and tourism management functions in planning the transitional waters management. The joint transboundary water management agency and/or the stakeholders'

forum should not be directly engaged into tourist business development. In this respect, their function is only regulatory and advisory.

- ***Compatibility:*** tourist offers must be compatible with the transitional waters' biodiversity and habitat conservation objectives. There are leisure activities, e.g., speedboating, which are totally incompatible with the aquatic conservation.
- ***Compromise:*** if possible, conservation and management efforts in the transboundary transitional waters should create a synergy with small-scale ecotourism business facilitating local socio-economic development.
- ***Impact:*** large-scale tourism development projects in transboundary transitional water bodies are subject to transboundary environmental impact (SEA and/or EIA) assessment procedures (Chapter 8).

Prudence is the key to financial sustainability of transitional water management

Kelleher (1999) states that in order to ensure financial sustainability of marine conservation, reducing costs is just as valuable as raising revenue. Inamdar & Merode (1999) emphasize that reducing costs is about prioritizing management activities and aligning them tightly to the protected area's strategy and goals. Four processes are used to reduce the costs of protected area management:

- prioritize and focus activities;
- motivate and encourage staff development;
- try to find ways of carrying out necessary activities but reduce fixed costs: contract-out services if appropriate;
- share costs and benefits of protected areas through alliances and partnerships with NGOs, private sector and local community organisations.

According to Inamdar & Merode (1999, p. 18-19), for financial sustainability of nature conservation and management agencies "the main variables are the fixed and variable costs of the organisation, the number of chargeable units (for example, number of tourists or number of concession operators) and the income per unit.

- ***Fixed costs*** are the shared organizational costs. These include all of those costs that are difficult to allocate to any one activity or service.
- ***Variable costs*** are the costs that are incurred as a direct result of running a particular activity.

Organizations with high fixed costs incur the same level of expenses regardless of the demand for their services - they therefore need to have a high level of core funding throughout the year. Conversely, organizations, which contract in support as needed, only incur costs as a result of demand by consumers, so income and expense can be managed easier. The requirement for core funding is reduced. So, in order to achieve financial sustainability two key goals for managers are to:

- reduce the level of fixed costs as far as possible;
- incur costs 'on-demand' by contracting in support only when demand is high.

Donors should extend aid cycles for transboundary cooperation projects

Development assistance donors have supported numerous projects fostering the reinforcement of the trsansitional waters' environmental integrity. Yet the results of the projects are not always sustainable. The best way to reduce the chance of failure is to minimize the total aid provided, consistent with meeting the objectives, and to extend the length of the aid cycle (Kelleher 1999).

Often the problem with donor support is its short-term nature, often tied to three-to-five-year funding cycles, the political agendas of the donor countries themselves, loan conditions (in the case of the multilateral banks), and the frequent inability of donor funds to meet recurrent management costs. The short term nature of donor's funding, including the GEF, often limits its effectiveness in producing

sustainable protected area management outcomes. Some funding mechanisms take a long time and a lot of effort to establish; they therefore do not provide a short-term return, but over the longer term they offer the possibility of steady, reliable financing to meet recurrent costs (Chape et al. 2008)

As the provided good practice case study (Box 9.2) shows, a continuous funding base for sufficient time is required to ensure progress in some economically disadvantaged areas. On the Estonian-Latvian border, a number of medium to large grants running simultaneously and successively have been necessary for progress in cross-border cooperation.

Multi-project funding over a lengthy period clearly has benefits. Too often, single, short-term grants are awarded in the expectation, or hope, that the work can become self-sufficient within this limited time-frame. Most often, in such cases, the work stops at the end of the grant. Although it is understandable that grant-giving bodies do not want to endlessly fund one operation, many grants kick-start a process which can take up to a decade to mature enough to become self-sufficient (Box 9.2).

3 Conclusions

Domestic government budgets are still the single largest source of funding for the transboundary cooperation in the management of transitional waters, yet the importance of the international financial assistance for biodiversity conservation, which has become increasingly driven by social and economic objectives, rises since governments cut these expenditures as economic needs in the countries increase. Development benefits might be the main rationale for conserving biodiversity and maintenance of natural or semi-natural habitats and ecosystems of the transitional waters. An optimal management financing model and partnership should rely on a professional management agency, whose activity is regularly financed from governmental sources, supported by a non-governmental stakeholders' forum funded from various endowment funds and providing the economic base for the sustainable local economic activity. However, ecotourism development should not be regarded as a panacea for the development problems and a universal tool capable of sustaining transboundary co-operation in the transitional water areas. A continuous funding base for sufficient time is required to ensure progress in the transboundary cooperation on nature conservation in some economically disadvantaged areas.

Watchwords

- Financial sustainability of transboundary management of transitional waters is impossible without strong and effective agency;
- Governments have to view transboundary cooperation in the transitional water management as a priority worth funding in order to make the management plans of transitional waters sustainable;
- Direct the local community view on environmental values into one of an asset for the sustainable economic development;
- Prudence is the key to financial sustainability of the transitional water management.

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Research, monitoring, evaluation and review

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Abstract

An interdisciplinary approach is needed when conducting research, monitoring, evaluation and review in transboundary transitional waters, taking both natural and social science into account. National boundaries make these water bodies political, which adds complexity to any research and implementation carried out. Involvement of both scientists and managers is needed to be able to collect and evaluate data in an efficient way and to put effective management plans in place.

1 Introduction

The EU Water Framework Directive states that all EU member states should establish monitoring plans for their river basins, transitional and marine waters in order to assess their ecological status and, ultimately, to achieve the main goal of the WFD, i.e. good qualitative and quantitative status in all water bodies by 2015.

When conducting research, monitoring, evaluation and review of transboundary transitional waters an inter-disciplinary approach is needed, taking both natural and social science into account. Transitional waters are, to a large extent, defined by their hydrological and ecological values. Transboundary waters on the other hand are much defined by transcending international borders and as a consequence political aspects will have to be considered. By looking at both natural processes and the human impact a holistic view of the water body can be achieved and allow for more effective management plans to be developed.

2 Experiences

Research and Monitoring

In order to effectively manage and conserve a transboundary transitional water body proper research and monitoring of natural processes and human impact need to be carried out. The objective of the research and monitoring programme is to establish the environmental status of the water body and to control if previously set goals and ecological quality objectives are met. If some goals are not met proper measures should be put in place to achieve these. For practical reasons it is necessary to limit the monitoring to a few key indicators.

Four main subjects constitute a general framework for any kind of monitoring activity (Ferreira et al 2006, Chapters 5 and 6 of this Code of Conduct):

- Definition of objectives;
- Defining scope, priorities and current state;
- Implementation of quality control;
- Assessment of monitoring success.

The objectives of the research and monitoring programmes directly depend upon the overall goal of the transboundary cooperation plan or programme. In the case of the environmental control for the Sound fixed link, the main objective of the research and monitoring programme was to register the environmental condition and to be able to take action if any parts of the on-going construction exceeded the pre-defined limits on environmental impact. After the completion of the construction the system should also register if the temporary effects on the marine environment abated as they were predicted to do (Box 10.1).

When defining the objectives, indicators may be organized in a PSIR model (Pressure-State-Impact-Response). This model is widely used for environmental monitoring and should give answers to a wide array of questions (Kelleher 1999):

1. What are the pressures of the system?
2. What is the current state of the system?
3. What has the effect been to the management response?

This model could also be complemented by objectives of a more political character such as identifying barriers for transboundary cooperation and power asymmetry between states or regional administrations managing the area. As a good practice example, provided in Box 10.2, the success of the local initiative in establishing a grass-root cross-border environmental monitoring programme depends upon the continued political commitment of local authorities regardless of any change of political leaders and priorities on local and regional levels.

Setting scope and priorities is about defining the current state, both environmental and socioeconomic, of a pre-selected area. It is also about depicting trends, current ones as well as future ones, in order to create likely scenarios for the future. Often logistic and economic resources are not sufficient to fully establish the desired research and monitoring programme and a prioritization needs to be made. Emphasis should then be given to those subjects that are most critical for achieving the objectives of the programme. In the case of transboundary transitional waters, prioritization of monitoring activities should certainly include key processes and key uses of the river basin and the coastal zone (UNEP/MAP/PAP 1999, Chapters 5 and 6 of this Code of Conduct).

Implementation and quality control – data quality is an important consideration for any monitoring programme to ensure objectives are met and conclusions are not misled by inaccurate data. A key role of science is to isolate the causes of a problem and help avoid misconceptions so that management can focus on real causes. A causal chain analysis (CCA) can be conducted in order to trace pathways associated with a certain concern, socioeconomic as well as environmental, back to its roots. Such analysis can identify key factors that directly or indirectly shape human actions that impact the way in which water resources are used.

The success factors of a monitoring programme need to be assessed in order to facilitate necessary adaptations or corrections for future improvements. The assessment is also important to be able to evaluate the cost-benefit of the monitoring programme which, in turn, is something that needs to be proved to funding agencies if they are to be persuaded that continued financing of scientific work is needed. Both natural and social scientists play important roles in the assessment of success factors as they usually have different perspectives of the situation and thus different suggestions for future improvements.

Also noteworthy is the fact, and as an experience described in the case study in Box 10.1, that when setting up a research and monitoring programme in a transboundary transitional water body, the key to its success lies within the environmental awareness and interest among the public authorities and other stakeholders in the area, prior to the very start of the research and monitoring programme. Thorough data collection and research can be carried out and presented in various forms but unless these stakeholders are engaged in a comprehensive way the actual impact of the collected data risks to be limited.

Box 10.1: Case Study: Environmental control for the Sound fixed link (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
An efficient and close cooperation has to be established between the responsible national, regional and local authorities in all neighbouring countries and transboundary environmental impact procedures need to be respected. A strong stance and even an active pressure from the environmentally concerned and well-informed stakeholders, organizations and independent experts helped to set the right cooperation framework and to prevent any transboundary threats and hazards. The Øresundsbro consortium also communicated and cooperated intensely with all interest groups. In order to fulfil the ecological criteria the consortium established a special environmental management system enabling an efficient control of the environmental performance. Also the exchange of staff between Danish and Swedish authorities during the construction period proved successful as it gave both sides insight in each other's activities as well as a direct contact to the other side, to whom any questions and doubts could be directed.
Overview of the case
One of the major environmental challenges when constructing the fixed link was to ensure that the establishment of the link was performed in a way that it did not impair the environment in the Sound or the Baltic Sea, but still was technically feasible and economically reasonable. One of the main concerns expressed before the construction started was that the fixed link would affect the exchange of water and oxygen between the Kattegat and the Baltic Sea, which would affect the marine life in the Baltic. It was stated in the environmental criteria, that no impact on the water flow must occur, which meant that any impact due to the link proper had to be compensated by compensatory dredgings (the so-called zero solution). Assessments based on comprehensive hydrodynamic modelling were carried out and confirmed that he final constructed link fulfilled the zero-solution, i.e. no hydrographical impacts on the Baltic. Monitoring of birds, water quality, fish and benthic flora and fauna during the construction showed only in a few cases negative impacts during the construction phase but also a full recovery at the latest six months after the completion of the construction.
ICZM tools
The main part of the consortium's environmental system was the implementation of the so called control and monitoring programmes. **Contractors spillage monitoring** – These obliged the contractors to measure the spillage from their construction work and the data were continuously reported to the consortium. Whenever the threshold limits were reached the consortium immediately stopped the work. **Consortium's feedback monitoring** – Outside the construction areas the consortium carried out monitoring of selected parameters that reacted to dredging operations, such as eelgrass, mussels and spreading of sediment. Feedback in this case meant that if the limits for environmental impact were exceeded construction was immediately stopped or adjustments in the construction made. Computerized simulation models were also used as a part of the monitoring programme in order to predict unwanted effects. **Authorities' control and monitoring programme** – Run by Swedish and Danish authorities before, during as well as after the completion of the construction. It began in 1995 and documented the extent of changes on the Sound environment. Furthermore, the programme acted as an independent control of the monitoring performed by the Øresundsbro Konsortiet. The programme consists of an annual survey assessing the following parameters: water quality, flora and fauna, fish, common mussels, birds and coastal morphology. The monitoring of plant communities on the artificially created island Pepparholm is nowadays carried out regularly by volunteers and scientists from Danish and Swedish academic institutions.
Success and failure factors
Part of the reason to why the environmental management system functioned so well during the construction of the fixed link is to be found in the environmental awareness. Proper baseline studies were made between 1992-1995 collecting data to understand the biological system in Öresund, and set up operational criteria for maximum acceptable impacts. Based on this the owner consortium drew up a detailed work plan which complied with these criteria. They defined operational threshold values for acceptable sediment concentrations, which then were used in the day to day work. In order to not exceed these values, dredging in both channels (Drogden and Flintrännan) was not allowed at the same time during winter and spring, since this could cause a risk of blocking of herring migration from the Sound to the island Rügen. Dredging in or close to eelgrass beds mainly took place during the winter instead of during the growth period in the summer.

Box 10.2: Case Study: The Sound Coast Control Programme (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
The coast control programme initiated by a coastal municipality in co-operation with the counterparts in the neighbouring country, has shown that elementary knowledge about the local marine environment is essential to be able to evaluate how the marine environment is affected by local polluters and also which measures would be adequate to use in order to mitigate the pollution. The programme has in this sense, through various samples taken, given knowledge about what could be seen as natural conditions and what can be considered as heavily affected by external factors. It has in other words created a base line with data from which comparisons could be made with future test results. Moreover, investigations carried out within the programme show several clear connections between local pollution and levels of toxins in sediments. The discovery of two significant points of emissions of organic pollution has resulted in additional clean-up measures in the industry, both related to release of contaminants to water and air. As a result, the levels of contamination in sediments and mussels in the Sound have decreased.
Overview of the case
The population around the Sound is approximately 2.5 million inhabitants, 700,000 living on the Swedish side and 1.8 million on the Danish side. The case study highlights a local initiative where the bottom-up approach is successfully implemented to monitor environmental conditions in the most critically important part of the transitional water body. Joint efforts for the entire Sound is important for its marine environment but local knowledge of polluters and actions against these are also of crucial importance for the Sound. Municipality of Helsingborg has developed an ambitious marine programme, called Coast Control Programme, in order to get a better knowledge of the marine environment in its waters. Various areas are being examined, some in cooperation with its counterpart in Denmark, Helsingör and the University of Copenhagen, some by the municipality alone. However, the Sound at the level of Helsingborg and Helsingör is at its narrowest point, separating the two countries/cities by only 3,7 km of water which has created a close cooperation across the water on many different subjects, including the marine environment in the Sound. When it comes to pollutants the coast control programme has noted that these pollutants often come from local sources and also frequently have a direct local impact on the marine ecology, despite the strong current in the Sound. These sources of pollution are therefore treated locally, but for the benefit of the entire sound. A decrease of deepwater species such as crustaceans and mussels is however a concern that is shared by actors from both sides of the sound and consequently is addressed together. This case study aims to examine the coast control programme of municipality of Helsingborg and, within the programme, the close cooperation between Helsingborg (SE) and Helsingör (DK).
ICZM tools
Local investigations have been made in the adjacent waters to the large scale industries on the Swedish side in order to analyse the immediate effects these may have on the marine environment. Within the interregional cooperation investigations on the decrease of certain deepwater species such as crustaceans and mussels have been carried out. A slow decrease in numbers of these species has long been noted in the marine nature reserve of Knähaken and samples have been taken by the municipality of Helsingborg and analysed by the University of Copenhagen. An extension of the programme has also been made to include marine biologists in France where, in contrast to Öresund, these species have increased in number.
Success and failure factors
Success factor The success of the local initiative in establishing a grass-root cross-border environmental monitoring programme depends upon the continued political commitment of local authorities regardless of any change of political leaders and priorities on local and regional levels. The programme is still on-going but after the evaluation carried out in 2009 a number of concrete suggestions to improve the programme were formulated. These are taken into account in today's implementation of the programme. Failure factor Limited funding threatening the long-term sustainability of the programme and making its results applicable to only a limited number of cases.

Box 10.3: Case Study: Environmental archive as a future reference – The Öresund fixed link project (Source: ARTWEI Case Study Database; http://www.balticlagoons.net/artwei/?page_id=1770)

Experiences that can be exchanged
The establishment of an archive gathering all reports, research results and documentation surrounding an environmental programme is a useful way to preserve experiences and can serve as a reference for future usage. Such archive can be established in connection with any environmental programme but a key issue is to keep it updated and systematically organized.
Overview of the case
Before starting the construction of the fixed link between Sweden and Denmark ambitious environmental goals were set up. Baseline studies took place before the construction started and environmental monitoring programmes were carried out during the entire construction. This generated numerous reports, research results, data compilation and other environmental documentation related to the Öresund bridge. The situation by the completion of the construction of the fixed link in 2000 was such that there was an efficient electronic archive with all environmental documentation scanned and available for staff on pc workstations. This was thanks to 1-2 staff personnel who continuously had been working with updating and scanning all documentation. Ten years later, in 2010, the archive had however been left un-updated and staff who previously had been working with it had left their jobs. The old archive had been relocated several times and the search for historical documents relied to a large extent on the memory of individual staff persons. Upon this background the Öresund bridge consortium decided to revitalize the archive and at present all reports, videos and documents have been registered in the archive of the consortium. Original reports and documents can now easily be found through search options on titles, author institution and key words. A physical hard copy library has also been established and responsible library staff appointed. The electronic archive as well as the physical library is today accessible upon request to the Öresund bridge consortium.
ICZM tools
The Archive documents the use of numerous ICZM tools including mapping of baseline, impact assessments, modelling and monitoring, environmental optimization of the project, as well as bilateral cooperation models and agreements, that have been applied in the construction of the Fixed Link across the Öresund.
Success and failure factors
The success factor in this case is mainly related to the resurrection of the old archive carried out in 2010/2011. The fact that today there is a systematically organized archive with all environmental documentation surrounding the construction of the fixed link between Sweden and Denmark gathered in one place is an exceptionally valuable asset for future activities. Previous experiences, successes as well as failures, can easily be reviewed and useful lessons can be learnt.

Review

As a future reference and in order to facilitate the review of a programme it is essential to keep a well organised archive of all the data, reports, evaluations and research results that have been produced before, during and after the programme (Box 10.3). Relying on people's memories is not a reliable option for future references or effective review. Memories fade, staff change workplace, others retire which may allow for stories, not 100% accurate, to develop. However a well-documented archive is not a guarantee that it will be used as a future reference for review. First of all it has to be promoted and made easily accessible for anyone who wishes to carry out a review. Even if it's not an open archive for the public, at least those actors who, at some point, were involved in the data collection, monitoring, and evaluation of the programme should be made aware of the existence and content of the archive.

Furthermore it is also essential that requirements for carrying out review, at regular intervals, after the completion of a programme, have been stipulated already at the beginning of the programme based on the outcome of the initial research and testing phase. If no such requirements are made there is a risk that no review will be carried out and thus limiting the lessons learned from the programme.

The natural actors to carry out a review are those who have participated in the programme, have knowledge about the data collected and can identify changes in the data and surrounding environment that have occurred since the programme was initiated. It is however also important to include external actors in the review, who were not part of the actual data collection and implementation, but who still have good knowledge about the subject. These actors are in the position of criticising the programme in a way that the others may avoid and can also identify factors of success and failure that others may not see.

Evaluation

Evaluation of a programme is needed in order to find out what has been accomplished with the actions taken, what success has been achieved and what failed. In a broader sense it is also useful to use the evaluation in order to find out what has changed in the surrounding context since the actions were taken, e.g. environmental or governmental changes (Kelleher 1999). Evaluation could take place at different stages of a programme or implementation plan.

On-going evaluations are carried out during the implementation phase and aim to overview progress and foresee effects likely to occur. Terminal evaluations are, just as the name indicates, conducted at the end of a programme or implementation plan. Impact evaluations usually take place several years after the completion of the programme and serve to measure direct and indirect impacts (UNEP/MAP/PAP 1999).

Whereas in data collection and monitoring several different actors can be involved (scientists, managers, private companies, public authorities, etc.) in the evaluation of a programme, conducted in a transboundary transitional water, it has proved useful to have one body, built up by representatives from all countries involved, to do the evaluation (Box 10.1). The body will function as a common platform where scientists, public authorities and other stakeholders can meet and give their perspective and input on the programme. The presence of scientists and public authorities in such a body is crucial for the acceptance of the evaluation results since, in case any of them is not represented, the risk that this actor will reject the evaluation results is obvious.

In any of the evaluations mentioned above it is always useful to involve local scientists. Especially those who have been involved in the initial research and data collection for the programme can point out if any changes have occurred in the collected data.

3 Conclusions

Scientific research and monitoring in transboundary transitional waters require attention to both ecological and socioeconomic values. When the transitional water also is a shared water i.e. administered by more than one country, an additional perspective related to politics and power also needs to be considered. The idea of establishing a common platform for cooperation, research as well as management, needs to be promoted and the win-win situation for all involved parties should be emphasised. Different kinds of benefits should be pointed out (environmental, economic, etc.) in order to increase the likelihood of a functional cooperation and establishment of management plans where stakeholders from all involved countries and levels are represented.

A key factor for successful implementation of a monitoring programme in transboundary transitional water seems to be the environmental awareness and interest among local, regional and national authorities and stakeholders prior to the start of the programme. The case study example described in Box 10.1 shows that part of the successful environmental cooperation between Sweden and Denmark when constructing the fixed link stems from a strong concern among the public and local authorities for the marine and coastal environment of the Sound. Also, the activity of the international NGOs should not be ignored, as it is highlighted in Chapter 8. It should not be ignored, that Greenpeace, backed by other environmental organizations, experts and the Swedish Water Court, succeeded in bringing major amendments to the project (Box 8.1).

Box 10.4: Case Study: River basin sediment management of the transboundary rivers, Meuse and Scheldt (Source: OurCoast ICZM Database; http://ec.europa.eu/ourcoast/index.cfm?menuID=4)

Experiences that can be exchanged
The case illustrates a step-wise integration approach for the management of a complex hydrological system where an estuary is integrated into a coherent tetra-lateral monitoring and management system of the transboundary rivers. Experiences on co-operation between regions and countries sharing a river system can be exchanged to harmonise approaches needed for successful implementation of the WFD.
Overview of the case
France, Belgium and the Netherlands worked together to reach agreement on various aspects of the management of contaminated sediments of the rivers Meuse and Scheldt. The International Commissions for the Protection of the Meuse (ICPM) and the Scheldt (ICPS) play an important role in drawing up international agreements for improving the quality of water and sediments in the catchments of the two rivers. The methods for assessment, legal aspects, regulation and possible destinations for the management of contaminated sediments have been developed at the national/regional level. These differences hamper the implementation of a river basin approach, as laid down in the EC Water Framework Directive. Four regions/countries were involved: Flanders and Wallonia (Belgium), France and The Netherlands. One of the first steps that need to be taken in the making of a common river basin management is to reach an agreement on the present state of the river system. Therefore, ICPM and ICPS took the initiative to list the differences and similarities in the management of contaminated sediments between various countries/regions. Insight into these differences and similarities will result in an improved understanding between the countries that can serve as a starting point for further harmonisation of the policy.
ICZM tools
The project was divided into the four areas of activity: 1. Legal aspects and regulation of contaminated sediments. 2. Methods for monitoring and assessment of contaminated sediments. 3. Field testing of the common methodology. 4. Destination of dredged contaminated sediments (treatment and re−use). The innovative nature of this initiative lay within the development of a common methodology for monitoring and assessment of contaminated river sediments. Scientific insights regarding the optimisation of costly sampling and the determination of appropriate indicators for eco-toxicological effects were combined to draw out a joint view. Scientists in different geographical regions undertook an effort to develop a common method instead of continuing in a more or less isolated fashion. A common monitoring system and common standards could then be used to define the objective of "good ecological status" in the WFD and to prepare an inventory of the status of sediments in different river basins. Unification of the regulations for contaminated sediments could be possible but will require a long term assessment and involve a lot of parties. There is a broad agreement on the parameters for physico-chemical analysis. A team of specialists agreed upon a proposal for both, the eco-toxicological and biological assessment methods. However, more data are still needed in order to establish reliable common standards. The draft common method was applied in four locations in the Meuse and Scheldt. Results of the chemical assessment show that the four locations have moderate to heavily polluted sediments. Obviously the four locations show different results: in order to better assess the common method, bio-assays on additional locations should be performed. It is important to agree upon a common method for the assessment of sediments in the future. A model has been developed for destinations of contaminated dredged sediments and a decision-support system has been designed. The model includes information on: characterisation of sediments, possible destinations, dredging techniques, transport and treatment technologies. Based on the properties of the dredged sediments, the most suitable treatment technique can subsequently be determined.
Success and failure factors
The atmosphere of enthusiasm and confidence in which the participants worked together was positive. A common knowledge base of divergent and convergent trends is important both because it offers a basis for further cooperation and because it provides a more thorough understanding of why the negotiating positions of the participating countries/regions differ. The divergent trends can be of assistance in identifying topics that might be less fruitful as a focus for seeking co-operation. Those issues that confront each of the four countries/regions with similar practical problems as well as those issues identified as common concerns, probably offer the most fruitful elements for further co-operation through a step-by-step approach.

Watchwords

- An interdisciplinary approach is needed when conducting research and monitoring in transboundary transitional waters, taking both natural and social science into account.
- Strong environmental awareness among local authorities and the public is a key issue for successful implementation of an environmental monitoring programme.
- Preserving all documentation generated before, during and after implementation of an environmental monitoring programme serves as an exceptionally valuable reference for future activities.
- Take efforts and time to develop a common methodology for monitoring and assessment of the environmental status and trends in a transboundary transitional water body (Box 10.4).

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Stakeholders' involvement in nature management in the context of environmental integrity of transboundary transitional waters

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Abstract

Communication in the processes connected with nature management seems to be crucially important, especially in the light of the different interests of various groups of stakeholders.
Improvements in communication can be realized by a variety of activities already undertaken. Web-based information such as Coastal databases or Coastal Information System Oder Estuary that are well established among scientists can be very useful, but for local administrators, groups of local decision-makers and individuals these multilingual internet tools are not always sufficiently understood. The best approach is a variety of actions with special attention to interpersonal contacts such as workshops and study visits. This will make the implementation of such types of nature conservation as NATURA 2000 much easier for the local population.

1 Introduction

The last few decades have seen significant developments in many businesses located in nature areas such as tourism, new forms of agriculture, aquaculture as well as the development of water and land transport and various types of industry. The idea of sustainable development is to maintain a correct balance between economic development and documented natural assets. The European Ecological Network NATURA 2000 is a framework of legal protection that provides the opportunity for realising this aim.

Since the turn of the century, new tools have been widely available for a better exchange of experiences between decision-makers, stakeholders, as well as scientists and all who are interested in all types of development not just in coastal zones. GIS, web-based platforms, databases, especially when there is free access, should be treated as the basic steps to successful sustainable development methodologies.

In the case of transboundary coastal systems in the process of development (from scientific concept to practical implementation) it is very important to get consensus and a common understanding of a group of problems that are to be solved by partners, located in various political and economic systems.

And the personal contacts made in various ways are important, especially in the light of the ecological values of transboundary coastal catchments.

2 Experiences

Coastal systems are dynamic and fragile. Moreover they are very sensitive. This means, that any kind of decision must be based on common experience and acceptance in order to find the best practical solutions for the environment in a location as special as transboundary transitional waters.

The exchange of personal experiences realized through workshops, seminars and study visits seems to achieve good results.

These personal communications must however be improved when it comes to working contacts of particular interest groups, as well as through wider debates and meetings. This second option

especially can make decision procedures more holistic, which is important in the case of coastal systems, in order to stimulate the individual exchange of experiences between professional stakeholder groups.

It is also worth mentioning that in habitats such as coastal ecosystems, comparing particular experiences of stakeholders, i.e. fishermen, with nature conservation specialists can be very inspiring in order to get a common understanding of the problems that need to be solved when implementing systems like NATURA 2000. Common public meetings and discussions will make the final decisions more sustainable in an area like spatial planning.

Another important target group in the process of finding consensus between nature conservation and development is the younger generation, who must be educated, 'in-situ', on the existing examples of particular habitats / ecosystems. The only way to do this is through direct terrain training or other forms of interpersonal contacts based, of course, on theoretical and academic knowledge. An example of such training of young international groups has successfully been realized on the Polish part of the Szczecin Lagoon by using a very attractive form of communication. The studying of nature and sustainability was carried out by phenomena registration using cameras for documentation. This was later used as the specific background for discussions and conclusions made by the participants. This method ensured better involvement and interpersonal communication of the generation of future stakeholders.

Box 11.1: Case Study: Process of NATURA 2000 implementation in the light of Szczecin Lagoon management aspects.

Experiences that can be exchanged
Organizing thematically oriented traditional workshops for the various groups of interests. The audience included spatial planners, local/regional administration, politicians, scientists and students, particular stakeholders (such as tourism branch, fisheries, farmers). This large 'spectrum' of participants can give an overview of the large-scale problems that need to be taken into consideration during decision-making procedures. A precise programme will help to concentrate on important factors, however, the open (brainstorming) discussions are still needed. It must be remembered that large public involvement is needed for such procedures as the preparation of management plan for a NATURA 2000 site.
Overview of the case
During the last few years, but especially during 2010, workshops were organized both at the national and international level. Bilingual presentations prepared by sectoral experts and specialists showed such things as spatial planning aspects of an area as well as legal regulations related to nature conservation. Selected presentations were based on existing databases and are located on a GIS information system. Each presentation was followed by discussions, which gave ad-hoc chances to formulate proper multi-subject solutions. Realization of the ARTWEI project workshop in connection with the implementation of NATURA 2000 in the Szczecin Lagoon is a good example illustrating the importance and necessity of such events.
ICZM tools
Thanks to existing ICZM databases available through the internet much information and data can be used in personal meetings and workshops. A long-term process of ICZM gives room for regular (or non-regular) public discussions on the level of local communities or regions. This is also crucially important in the context of requirements connected with the implementation of NATURA 2000.
Success and failure factors
Success factors: 1. Direct, interpersonal contacts between various groups of decision makers. 2. Possible face-to-face presentation of subjects, which in transboundary spatial planning contexts must be taken into consideration. 3. International support for the best solutions 4. Common identification of possibilities and existing problems. 5. International, personal integration of partners.

Failure factors:

1. Meetings/ workshops are still considered as time consuming in relation to their outcomes.
2. In the context of transboundary areas, historical aspects and the language problems (Polish/German) made contacts difficult.

Box 11.2: Case Study: WE – young people see nature. A project dedicated to youth for improvements needed for sustainable development

Experiences that can be exchanged
The younger generation needs a new impact in understanding nature conservation aspects. Due to the development of new information systems theoretical knowledge is much easier to get. However it must be compared with a real, in-situ, contact with nature.
Overview of the case
Twice a year, since 2006, international camps have been organized in Poland and in The Netherlands with about 20 – 24 people each time, including nature and photography teachers. The subjects were connected with typical nature conservation, sustainable development and communication. Participants have documented phenomena, threats and beauty by using cameras. Meetings and lectures, but also many social events have been organized, also based on art aspects. The important result of this project was enlarging the general knowledge about interactions between nature and human development, which was learned by the younger generation in an attractive way.
ICZM tools
Personal involvement and information exchange, showing possibilities to connect existing databases with practical aspects of management from various countries.
Success and failure factors
Success factors: 1. Involvement of the younger generation in knowledge of coastal processes. 2. Showing similarities of problems in various coastal locations. 3. Connecting attractive forms of teaching with the needs of public participation in solving possible conflicts and problems. Failure factors: 1. Possible language problems between participants. 2. No equivalent level of nature and sustainability knowledge .

3 Conclusions

Dissemination of information and knowledge of transitional waters must be understood as a complex of using various tools. Actual lessons learned show that a combination of web-based regional information systems and interpersonal direct contacts give the best results in transboundary management of transitional waters and coastal systems.

Information, communication and decision-making processes are actually improved by web-based regional information systems. Regional information systems offer a wide range of services in decision-making procedures, but personal contacts should also be seen as an added value in the decision-making. This kind of communication must be carried out as a long-term activity in information exchange of transboundary waters.

Watchwords

- Personal contacts of stakeholders / decision makers is significantly important for the general implementation of sustainability in transboundary management of coastal regions.
- Workshops, meetings, courses or trainings must allocate time for 'brainstorming coastal discussion', which gives a chance for a holistic solution to development problems.

- Personal contact can be understood as a specific guarantee for long-term establishment of consensus for environmental, but also socioeconomic aspects.
- Personal contacts make the general understanding of existing differences more acceptable.

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List of Acronyms

WFD Water Framework Directive

MSFD Marine Strategy Framework Directive

ICZM Integrated Coastal Zone Management

TAC Total Allowable Catches

UNEP United Nations Environment Programme

ICARM Integrated Coastal Area and River basin Management

ICPO International Commission on the Protection of the Odra against Pollution

EUCC Coastal & Marine Union

JCP Baltic Sea Joint Comprehensive Action Programme

RBMP River Basin Management Plans

RBD River Basin Districts

WSP Wadden Sea Plan

ICES International Council for the Exploration of the Sea

EEA European Environment Agency

SEA Strategic environmental assessment

EIA Environmental impact assessment

TAC Total allowable catch

List of Boxes

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