

Promoting Integrated Management in the Strymonikos Coastal Zone (Greece): A Step-by-Step Process

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The Strymonikos project was part of the EU Integrated Coastal Zone Management (ICZM) Demonstration Programme aiming at promoting concerted actions for the sustainable development of the Strymonikos coastal zone. There were three main problems that we had to face: (a) lack of data regarding the natural environment and human impacts, (b) complex jurisdictions of the bodies involved in the management of the area, and (c) the insufficient level of environmental awareness. These problems were tackled mainly through the following actions: (a) description and monitoring of the project zone, a necessary step for management planning, (b) establishment of a coordination scheme, a step toward integrated management, (c) establishment of an Information Centre for coastal zones in the Strymonikos area, a step to support environmental awareness and to promote cooperation. This step-by-step process and the problems that we have encountered are discussed.

Keywords Greece, ICZM, information, Strymonikos Gulf

Introduction

The Strymonikos project, entitled “Concerted Actions for the Management of the Strymonikos Coastal Zone,” was one of 35 projects providing the raw material for the European Demonstration Programme. It was funded by the LIFE instrument and implemented by two research institutes, namely, the Fisheries Research Institute and the Greek Biotope/

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Wetland Centre. This article describes the steps that we followed in order to promote integrated management of the Strymonikos area. We present the problems that we faced in the process and we define the future prospects for integrated coastal zone management (ICZM) in the project area.

The coastal zone of Strymonikos Gulf is rich in natural resources, scenic landscapes, and features of cultural interest. Moreover, the Strymonikos Gulf is one of the richest fishing grounds in the North Aegean Sea. The permanent population of the coastal zone is around 15,360 people but it rises to 150,000 during summer time. The land area of the zone is 2,625 ha and the marine area is 8,135 ha, so that the total is 10,760 ha. The coastline is 123 km long (Figure 1). Within the project zone, three areas covering a total of 730 ha, have been proposed for inclusion in the European *Natura 2000* network of protected areas (Dafis et al., 1996).

Human activities in the area include mass tourism, poorly controlled building, fisheries, aquaculture, agriculture, forestry, and mineral extraction. These activities are not always practiced wisely, leading to increasing environmental problems, such as pollution and landscape deterioration. These problems will become far more serious in the coming decades, as a result of the expected increase of tourists from the Eastern European countries. Also, mining activities in Chalkidiki are changing and a factory for gold extraction is planned to be created in the area, posing additional threats to the environment. The Egnatia highway, which will connect the Ionian Sea with Asia, is now under construction. Finally, the River Strymon may carry pollutants from its Bulgarian and Greek watershed into Strymonikos Gulf.

The LIFE Project of Strymonikos

When discussing coastal zone management, we have to consider issues such as *what* we are going to manage, i.e., *what* the specific features of the particular coastal zone are or what the environmental problems, if any, are; *how* to manage, a question involving the preparation of specific management plans; and, of course, *who* is going to be responsible for the management, a basic issue that largely triggered the initiation of the ICZM Demonstration Programme. Finally, some complementary actions are necessary for ICZM, such as those related to the dissemination of information and the raising of environmental awareness. Based on the above, the project was organized as a series of tasks, as shown in Figure 2.

Description: This task included a detailed description of the project area, regarding its abiotic, biotic, social, economic, and administrative features.

Monitoring: A monitoring program of key parameters of the zone's marine environment was conducted in order to diagnose possible threats and to propose measures for arresting environmental degradation.

Analysis: Based on the results of the two previous tasks, we focused on identifying and ranking environmental problems and threats, evaluating trends of environmental changes, setting conservation and management aims, and proposing specific management measures.

Concertation: A coordination scheme in the form of a Steering Committee has been established, involving bodies responsible for the project zone's management, in order to set conservation and management aims, to decide on priority measures, and to coordinate their implementation.

Implementation of measures: The main objective of this task was the establishment of an Information Centre for Coastal Zones to support environmental awareness activities, to promote cooperation, and to alert authorities on emerging environmental threats.

Environmental awareness and dissemination of knowledge: Publication of awareness material, presentation of the project and of the EU policy regarding the sustainable use of coastal zone resources, organization of conferences on concerted sustainable management of coastal zones, media work, and technical publications of the results of the project.

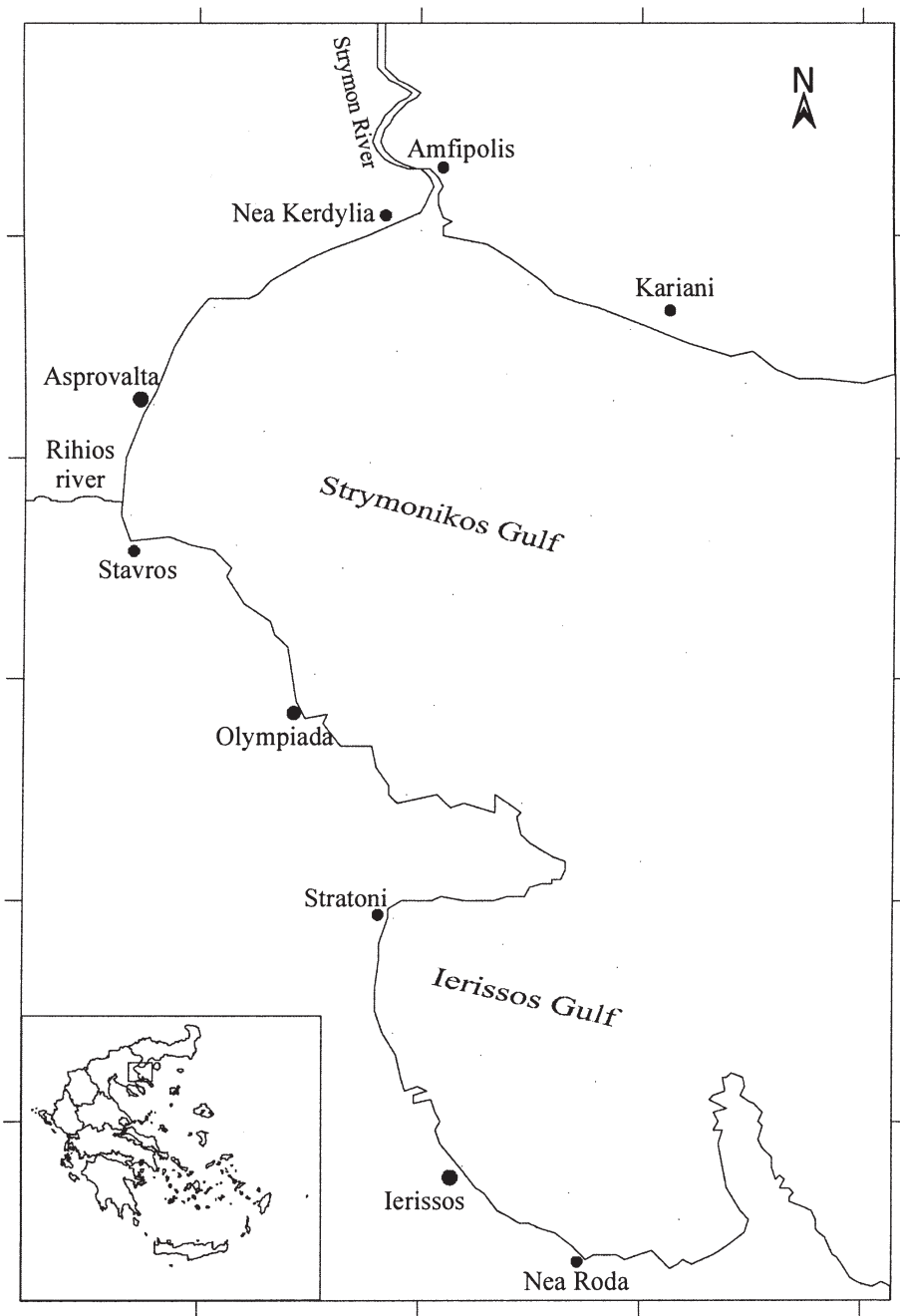


Figure 1. Map of the project area.

The first two tasks (*description* and *monitoring*) answered the question of what to manage, while the *analysis* offers solutions and proposals for the way to manage it. By establishing the Steering Committee, we tried to construct an appropriate body to initiate integrated management of the area. Finally, with the establishment of the Information Centre and our activities within the framework of the final project task, we have tried to support the complementary actions of environmental awareness and information dissemination.

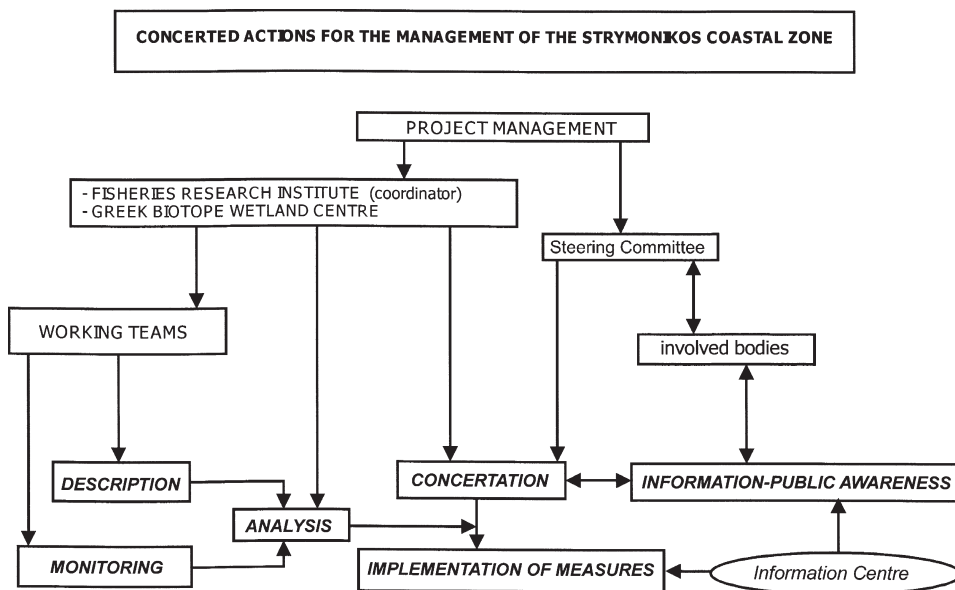


Figure 2. Organization chart of the Strymonikos project.

Problems and Actions: A Step-by-Step Process

There were three main problems faced when designing and implementing the project: (a) the lack of data regarding the natural environment of the area, the socioeconomic status, and the human activities and impacts; (b) the complex and conflicting jurisdictions of the bodies presently involved in the management of the area; and (c) the insufficient level of environmental awareness.

In order to cope with the first problem, data were collected regarding the climatic, hydrological, and geological characteristics of the project zone; sampling conducted of terrestrial flora and fauna, fish fauna, benthic fauna and flora, zooplankton and phytoplankton, and measures taken of water quality and the physicochemical parameters in the sediment. Information about the distribution of plants and animals under protection, as well as land use and land cover, was mapped.

Three institutes, one university, and several external assistants (47 scientists in total) collaborated, representing several fields of expertise. High biodiversity was observed in the study area, both in terms of habitats and species: (a) 24 habitat types, all listed in Annex I of the 1992 *Habitats Directive* (CEC, 1992), 3 of which are of priority, i.e., *Posidonia* beds; (b) 808 species, subspecies and varieties of plants, 46 of which are endemic of the Balkan peninsula; (c) 55 marine macroalgae species and 3 species of marine phanerogames; (d) 164 bird species, 46 of which are listed in Annex I the 1979 *Birds Directive* (CEC, 1979); (e) 21 mammal, 8 amphibian, 18 reptile, and 131 fish species; (f) 321 species of benthic macrofauna, forming 5 assemblages, 1 of which is unique for the Mediterranean Sea; 12 cephalopod and 16 crustacean species recorded in the area are of economic importance. The fish biodiversity observed in the Strymonikos estuaries is among the highest recorded in the Mediterranean Sea (Koutrakis et al., 2000a).

As well as the area's ecological features, the data gathered in the framework of the project task "Description" also concerned human activities and environmental problems. The area's principal economic activities are tourism and fishing, followed by agriculture, mining, and forestry. The fish catch is large and includes economically important fish such as whitebait and sardine, and there are also fish farms. The area contains

notable antiquities and cultural monuments, and moderately well-developed technical and social infrastructure.

The area's principal environmental problems are the lack of planning for urban and tourist development, the disposal of domestic sewage and rubbish, the degradation of surface and ground waters, as well as that of natural habitats, the declining of fish stocks and, finally, the operation of the upstream Stratonis-Olimbiada mines.

The published results of the project task *Description* (Koutrakis & Lazaridou, 1999) were presented in several congresses, and distributed to the bodies involved in the management of the area.

In order to cope with the problem of management jurisdiction and to promote coordination, a Steering Committee was established, with the participation of representatives of the various levels of public administration. The bodies represented were the two Regional Directorates and the four Prefectures, within the boundaries of which the project zone lies, the Ministry of Macedonia-Thrace, the Ministry of Agriculture (Directorates of Fisheries and of Aquaculture, General Secretariat for Forests and the Natural Environment), and the Ministry of Environment, Physical Planning and Public Works (Directorates of Physical Planning and of Natural Environment Management). The Steering Committee supervised all the activities of the project and collaborated closely with the project team by discussing problems and necessary actions, by bringing forward certain problems of the users of the coastal zone, by operating as a control agency for the better use of coastal resources, or even by offering financial help to the project. However, although the Committee supported both the tasks of the project and the ICZM procedure, there were some problems. Since there is no specific law and/or legal management body for the coastal zone, the Steering Committee is not based on any specific legal framework, although the participating bodies do have management, planning, and legislating authority. Moreover, cooperation between different agencies is not defined by any law. Therefore, for the time being there is no adequate legal framework, within which the Steering Committee can continue to operate, since the project is finished.

To address the problem of insufficient environmental awareness, an Information Centre was established—the first information center on coastal zones in Greece. Themes related to coastal zones, such as life in the sea, marine plants and animals, and human impacts, are presented with texts, photos, relief models, aquaria, stands with seashells, sponges, and so on, as well as by a film that we created on the ecological and cultural values of the area. The information given is based on data collected in the framework of the project. The establishment of the Information Centre was supported by local authorities in terms of financial help and manpower and by several donations.

The Centre helped to increase the confidence of local people in those involved with the project and led to a very positive public response. In many cases the Centre received complaints regarding environmental problems, and we alerted authorities to environmental threats. Seventeen months after its opening, more than 2,500 people had the opportunity to visit the Centre. Its work was integrated into the environmental education program of the Ministry of Education and we prepared several environmental education school projects. In order to ensure its operation after the end of the project, the Information Centre with all its equipment was donated to the local authorities. Its activities continue and the increasing congregation of visitors provides an additional income to the local community.

Conclusions and Future Prospects

Experience from the Strymonikos demonstration project shows that a good knowledge of the environmental, social, economic and administrative features of the area to be managed is the essential first step in planning integrated management and sustainable

development. Also, continuous monitoring of the area is necessary to detect environmental changes. All data that were gathered in the framework of the project were elaborated and synthesized in a brief, simplified, and popularized document, which was written in Greek, in order to be used in the dialogue among all bodies involved in the zone's management (Koutrakis et al., 2000b). It comprises a brief description of the project zone, together with data on the law system and regulations in force regarding environmental protection of the area. It also comprises an evaluation of the area, on the basis of its ecological, social, and cultural values, as well as on the basis of the environmental problems and risks recorded up to now.

Specific proposals for the implementation of ICZM were developed. These proposals concern institutional changes on a national and a local level, in the framework of the existing legal systems and of laws that are expected to be in force soon, as well as specific measures for tourism, fisheries, aquaculture, groundwater management, and conservation of species and natural habitats. We also propose a monitoring program of the area's ecological status using ecological indicators. This document constitutes a first plan for ICZM in the Strymonikos area, to be implemented by the body, which will be responsible for the management of the area in the future.

Moreover, the Information Centre has proven to be a very useful tool for supporting actions of environmental awareness, training, dissemination of information, and for promoting participation of the public and local authorities as well.

However, coordination in the form of a legally instituted management body is indispensable for the implementation of ICZM. The multiagency partnership of the Steering Committee was just an example of a well-operated and coordinated management scheme, since it was only informal. The deficiencies in legislation are still present and pose substantial obstacles to concerted management of the area.

Our experience has shown that only a legally binding mechanism can promote sustainable management and environmental protection. This could be either in the form of a directive (e.g., CEC, 1992, 1979) or of an engagement for the implementation of a convention (e.g., the Barcelona Convention). Given that the formation of a directive-umbrella for ICZM by the EC is difficult, due to the complexity of coastal zones, and that the Demonstration Programme did not lead to mandatory ICZM at the European level, we suggest that the sustainable management of the coastal zones must be ensured at the national level. Each country should prepare and adopt a national strategy for coastal zones on the basis of ICZM principles, which will guide associated legislative acts and that, among other issues, will institute legal management bodies and ICZM projects.

References

- CEC (Commission of the European Communities). 1979. Directive 79/409/EEC on the conservation of wild birds (2.4.1979). *Official Journal* L 103.
- CEC (Commission of the European Communities). 1992. Directive 92/43/EEC on the conservation of natural habitats and of wild fauna and flora (21.5.1992). *Official Journal* L206.
- Dafis, S., E. Papastergiadou, K. Georghiou, D. Babalonas, T. Georgiadis, M. Papageorgiou, T. Lazaridou, & V. Tsiaoussi. 1996. *The Greek 'Habitat' Project NATURA 2000: An overview*. Life Contract B4-32000/94/756, Commission of the European Communities, The Goulandris Natural History Museum-Greek Biotope/Wetland Centre.
- Koutrakis, E., & E. Lazaridou. 1999. *Description of the coastal zone of Strymonikos and Ierissos Gulfs*. Fisheries Research Institute-NAGREF, Greek Biotope/Wetland Centre. Nea Peramos, Kavala.
- Koutrakis, E., A. Kokkinakis, E. Eleftheriadis, & M. Argyropoulou. 2000a. Seasonal patterns of distribution and abundance of the fish fauna in the two estuarine systems of the Strymonikos Gulf (Macedonia, Greece). *Belgian Journal of Zoology (Supplement 1)* 130:41-48.
- Koutrakis, E., E. Lazaridou, H. Mihalatou, K. Skordas, & M. Argyropoulou. 2000b. *Evaluation of the current status of the coastal zone of Strymonikos and Ierissos Gulfs and management measures*. Fisheries Research Institute-NAGREF, Greek Biotope/Wetland Centre, Thessaloniki.