ANNUAL REPORT 2002

Research Programme
SUCOZOMA



Sustainable Coastal Zone Management

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Contents

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MESSAGE FROM THE PROGRAMME DIRECTOR;

A vision about co-operation between researchers and users

Within the framework of the MISTRA (Swedish Foundation for Strategic Environmental Research) programme SUCOZOMA, in projects and around results from the programme, we have compiled close to eight years of experience of co-operation with users of research.

Coastal natural resource management is the focus of the SUCOZOMA programme. Within such an area, there are many potential users of knowledge on coastal resources. Recreational boaters, shipping companies, different categories of fishermen, port operators, nature conservation and environmental organisations, local municipalities, and building companies, share an interest in the coastal resources. There is, however, a lack of tradition of collaboration between these stakeholders.

During the years, co-operation between stakeholders and scientists has developed. Where contacts were initially lacking, a dialogue of mutual benefit is now ongoing.

In conjunction with the conclusion of the research programme we try to communicate the results from the research teams to practitioners, who need new knowledge in their attempts to solve concrete problems. Within MISTRA and the SUCOZOMA programme, we refer to this transfer of knowledge as “handing over the baton”.

One conclusion from the research programme is that efforts to improve the coastal environment and achieve sustainable development must be adjusted to local conditions. There is not merely one strategy for coastal zone management. Instead, management should be adjusted to the complex of problems, the stakeholders and the development opportunities that are relevant to that particular area.

As a consequence, municipalities constitute key users of the research. Municipalities are of the right size to be knowledgeable of the local environment and to be able to take action. The Swedish legislation is unique as it puts the responsibility for the environment off the coast on the municipalities. However, special knowledge of, e.g., marine biology and fisheries management is lacking at the local level. Therefore, it is important to make that knowledge known to the municipalities and inform them on where the knowledge can be found.

County Administrative Boards and government agencies have some coastal issues expertise, for example, within fisheries and water quality issues. Expert agencies and County Administrative Boards that have access to the most recent research can provide knowledge to coastal municipalities and other local actors. Despite the fact that initiatives “from above” may trigger a process of change, responsibility for and interest in addressing the imbalances in the coastal resource management must also be present locally in order for a renewal to take place in practice.

My vision is one of interaction and collaboration between scientist and coastal municipalities, as users of knowledge, developing during several years and in several steps. In

the description below I have simplified the relation in order to point to the fact that the scientists actually can contribute good things directly at the local level.

Step 1: Research funded by MISTRA is based on the need of users to have more knowledge. Hence, SUCOZOMA researchers establish contact with one or more coastal municipalities to present the research programme and their ideas. The message they convey is that integrated coastal zone management is a way to manage coastal resources sustainably.

Step 2: The SUCOZOMA researchers understand which the dominating coastal environmental problems are in that particular municipality, at the same time as the local actors get acquainted with the results and methods of the SUCOZOMA programme.

Step 3: Knowledge of the local political landscape develops gradually. Is there a pressure "from below" to introduce coastal zone management? Is there central and regional level interest in supporting the process? Contacts are made with politicians and civil servants in key positions.

Step 4: Relevant knowledge is generated within the SUCOZOMA programme. Relevant in this context means knowledge that is regarded as being of special relevance for that particular coastal area and the action-oriented projects through which the municipality would like to work.

Step 5: The researchers take part in discussions about current projects and promote options for all users to participate. At the same time, the researchers are focused on achieving results and manage conflicts.

Step 6: Contacts with the central level is often part of the researcher's assignment if they are involved and run projects. This may often be the case when local expertise is lacking, It may be a matter of securing funding, or it could be a step towards incorporating the field experiment into a larger pattern.

Step 7: If the project is firmly established and locally rooted, it will survive both political changes and the exchanges of civil servants. Communication between researchers and key persons in the municipalities is central.

Step 8: One essential role of the SUCOZOMA researchers is to take part in the evaluation of the project. This provides feedback to show if the methods used have worked. At the same time, it is important that other scientists and experts get a chance to participate in order for the SUCOZOMA researcher to be critically scrutinized.

Step 9: The experience from working with the municipality is documented. There is now a substantial interest in the work among other coastal municipalities, and among expert agencies working on issues of the coastal environment and development.

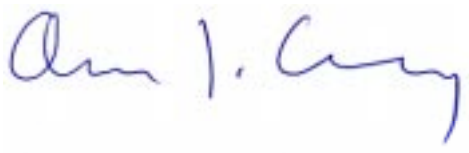
Step 10: The end result of the co-operative project is integrated coastal zone management in practice. The result one can hope for is well-balanced decisions, where the interests of different opposing stakeholders along the coast have been taken into account. Stakeholders have been given the opportunity to influence the process, and the reasons for the decisions taken have been made available to those concerned.

A working climate of collaboration has been created. As a consequence, future adjustments between environmental concerns and user interests can be made in a predictable and well thought-out way. The fact that people know that the most recent scientific facts can be made available and transferred to local conditions whenever needed has made knowledge into a common interest to the parties.

The ten steps demonstrate that knowledge can be transferred from the researcher to the user while at the same time the focus of the research is influenced by participation in the practical process. Thus far, MISTRA has funded this kind of interaction between stakeholders and SUCOZOMA researchers. However, if this method is to be used in more municipalities and in other research projects in the future, other ways of financing will have to be sought.

It should be allowed to use resources from the EU as part of the budget. Such funding is available within. e.g., the EU Interreg and Leader programmes. The objective of these grants is, inter alia, to promote sustainable regional development in coastal areas by basing problem solving and development efforts on new knowledge.

The goal of the SUCOZOMA programme is to generate knowledge and demonstrate how it could be put to good use. For that to happen, for the knowledge to be used in practice along the Swedish coasts, funding and commitment from stakeholders at all levels are called for. Already at the UNCED conference at Rio, more than ten years ago, it was agreed that integrated coastal zone management is a good objective. However, implementation presupposes wide support for the improvement of the coastal environment.



The EU Water Framework Directive and the coast – opportunities and misgivings

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New opportunities with new Water Directive!

In most EU countries the administration of water resources is now being drastically reshaped. By December 2003, all member countries must have national legislation in place that agrees with the provisions of the EC Water Framework Directive – the Water Directive – which was adopted by the EU in 1999. For Sweden, implementing the directive not only entails changes in legislation, but also replacing an ancient administrative system, dating back at least to Axel Oxenstierna in the 17th century, with an entirely new water administration based on natural river basins. The Water Directive calls for a water management based on the actual flow of water in the landscape, and unfettered by borders between municipalities and counties. Management of the water resources in accordance with nature provides new opportunities for long-term sustainable use of water.

For the first time in the history of both Community Law and Swedish legislation, water must be managed with a holistic approach. Different uses and types of water have previously been managed on a case-by-case basis (e.g., water to be used for drinking water, groundwater, and certain waters used for fishing). The new Water Directive covers all water resources in the Union – surface waters and groundwater, freshwater and coastal waters – and regulates both its quality (chemical as well as ecological status) and the quantities that can be abstracted for use, directly or indirectly.

The Directive covers not only terrestrial river basins, with their lakes, watercourses and groundwater resources, but also estuaries and adjacent coastal waters. In coastal areas where water exchange is limited, water quality is often determined by the quality of the local freshwater inflow, giving the new Directive a central position also in the future management of coastal waters. In this article, we describe the Water Directive and discuss hopes and misgivings concerning its implementation in Sweden, with an emphasis on the management of coastal waters.

Implementation of the Water Directive in Sweden

Like all joint EC legislation, the Water Directive is the result of many compromises. The result is complicated, legally as well as technically, and includes several comprehensive Annexes and numerous references to already existing EC directives of relevance to water management, e.g., the Urban Waste Water Treatment Directive and the Nitrates Directive, which will remain in force, at least initially. In addition, some difficult issues have been left open, to be solved jointly later in the process, or by the individual member state. Despite this, the Directive still provides Sweden good opportunities for strengthening its water management administration and making it more effective.

Besides the provisions for more appropriate river basin management, future water management is to be based on the objective to achieve good water status not later than by the year 2015. The definition of 'good water status' is a difficult issue that has been left open, at least in operational terms. The extent to which the actual status of the water corresponds with the goal(s) will determine how future water use will be allowed to affect the water status, through pollution (good ecological status, good chemical status) or abstraction (good quantitative status).

The Water Framework Directive includes coastal waters. Photo: Roger Lindblom

According to the EU Treaty, Sweden is obliged to introduce legislation, which provides instruments that guarantee that the requirements set out in the Water Directive concerning good water status will be achieved. However, Sweden retains considerable liberty for imposing a higher level of ambition than required by the Directive. For example, we can refrain from making exemptions from the requirements

concerning good water status, even if allowed by the Directive.

Few and large river basin districts – but perhaps too few?

The Swedish Meteorological and Hydrological Institute (SMHI) have identified 119 main river basins in Sweden. In its Governmental Official Report* *Klart som vatten* ("As clear as water", SOU 2002:105), the Committee on Swedish Water Administration (Utredningen Svensk vattenadministration), proposes that these basins, including adjacent coastal areas, shall be managed as five water districts (river basin districts, as defined in the Water Directive). In each of the five districts, a water authority (vattenmyndighet; "appropriate competent authority", to be defined and named by each member state, as expressed in the Directive) is to "be established with the purpose of ensuring fulfilment of the environmental objectives for water. Initially, the official responsibility will be assigned to a delegation at one of the district's County Administrative Boards".

The proposed water districts are based primarily on the geographical areas draining into the large sea basins (Bothnian Bay, Bothnian Sea, Northern Baltic Proper, Southern Baltic Proper, and the Kattegat–Skagerrak area (Västerhavet). Some adjustments have been made to account for the flow of groundwater (which can differ from that of the surface water). One exception, however, is the division of the drainage areas to the Baltic Proper into one northern and one southern district. The border between these two has, at least on the map included in the Committee proposal, been drawn in such an unfortunate manner that the drainage area of Lake Mälaren, which discharges into the Baltic Proper partly through River Strömmen in Stockholm and partly via Södertälje Canal, will be administered by two different water authorities! Such a division is contrary to the Water Directive as well as to the principles propounded by the Committee. At the very least, the location of the border should be changed so that the Stockholm Archipelago, which in the proposal has been split between three different water districts, can be managed as one coherent unit. In fact, it would probably be even better to keep the entire Svealand Archipelago as one management unit.

The question has been raised whether the Committee proposal to merge so many river basins into a few water districts is really allowed by the Directive regulations. According to the Committee, "resources and competence as regards water issues will be concentrated as to achieve high levels of cost-effectiveness and a clear division of responsibilities", which would not be the case with smaller water districts. Such an argument presupposes that only very limited resources will be allocated to the water administration. The Committee also proposes that local water protection be managed by local co-operative bodies (lokala samverkansorgan), presumably established through the municipalities. These local bodies could include municipalities, organisations and Water conservation societies (vattenvårdsförbund), etc. The local co-operative bodies will be given the task of preparing background material for, *inter alia*, the required action programmes for the district, but will not have management responsibility for decisions pertaining to water quality and measures. It is assumed that this work will not require additional funding. Thus the co-operative bodies are expected to carry out important new work, without having power or responsibility, and at no extra cost.

The environmental objectives and their implementation in water districts

In December 2002, coinciding with the publication of the report by the Committee on Swedish Water Administration, the Committee on the Swedish Environmental Code (Miljöbalkskommittén) presented their proposals on changes in the Environmental Code of Sweden, necessary for implementation of the Water Directive (Official Government report SOU 2002:107, *Bestämmelser om miljökvalitet*, "Regulations on environmental quality").

According to the Committee proposal, environmental objectives to be achieved no later than the year 2015 are to be established for each river basin district, under the direction of the designated water authority. The environmental objectives can comprise, for example, environmental quality standards (miljökvalitetsnormer), and will be based on a characterization of the different water resources and areas within the river basin. Water resources and bodies within a river basin can include, e.g., a mountain lake, or a low-land lake in central Sweden, a brook in the southern province of Scania, or an archipelago bay. To achieve the target environmental objective of at least "good" water status will, according to the Directive, require attaining "good" status both chemically and ecologically.

The Water Directive allows for several types of exemptions from and postponements of the requirement to achieve good water status. If achieving good ecological status for a water body is deemed impossible because the water has been heavily modified or is artificial, an alternative requirement – good ecological potential – is applied. As a general rule, water quality should not be allowed to deteriorate from present conditions.

Based on the description of the actual status and how it corresponds to the environmental objectives, an action programme is to be developed for each river basin district (water district) and adopted not later than in 2009. The Committee on the Swedish Environmental Code proposes that the action programmes will be binding on government agencies and municipalities, requiring them to take the measures prescribed by the action plan. According to proposals by both Committees, the action programmes will not, however, be *legally* binding. The authorities will thus not be legally responsible if the objectives of the plan are not met. Nevertheless, their actions are still expected to result in the objectives being met. The district water authority may, thus, decide that municipalities and authorities need to take different types of initiatives on measures, e.g., to adopt changes to a plan or to revoke it.

Swedish coastal waters according to the directive. Illustration: Mats Blomqvist

However, the water authority will not be given the power to influence the result of this initiative. As a consequence, there is a risk that measures necessary for achieving the objective of good water status will be postponed or not taken at all as a result of balancing in relation to other interests.

How does the Directive apply to coasts?

According to the Water Directive, coastal waters comprise "surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters"(see illustration). "Transitional waters" denotes the mostly tidal mixing zones of large river mouths, and it is likely that few or no areas in Sweden will be designated as such (in the Directive, "transitional waters" and "coastal waters" together make up "coastal areas"). The quality of open marine waters is managed under the applicable international conventions, and will later also be dealt with through the Marine Strategy that EU has decided to develop. When preparing action programmes, it is essential to consider that the status of coastal waters with limited water exchange can be largely determined by the water management in adjacent river basins. Consequently, the description and assessment of coastal waters may potentially influence water management in the entire river basins.

Because of the large natural differences, the definitions of water status cannot be the same along the entire Swedish coast. According to a proposal by the Swedish Environmental Protection Agency, water status classes will be defined separately for four salinity classes, chosen so as to correspond at present to the area's larger sea basins – the Bothnian Bay, the Bothnian Sea, the Baltic Proper and the Kattegat–Skagerrak area (Västerhavet), including the Sound (Öresund). This is the accepted geographical division of the seas around Sweden, and consistent with the prevalent biological conditions, which are mainly determined by salinity. Within each basin, enclosed coastal waters (long retention time > 40 days) will probably be distinguished from less enclosed coastal areas (medium retention time) and open coastal areas (short retention time). In total this adds up to about 4 x 3 =12 sub-areas, and for each sub-area five levels of water status – high, good, moderate, poor and bad – are to be defined.

Despite this rather detailed division, large differences also within sub-areas may well require further subdivisions, into perhaps 20 coastal type areas just in Sweden. In total, these will require between about 60 and 100 definitions of status, each of which shall be based on chemical as well as ecological status. The proper identification of reference conditions, required for defining "high status", and determination of the deviation from these that determine the borderline between "moderate" and "good status" will be most critical. Ecological status in coastal waters is defined using the parameters phytoplankton, bottom vegetation and bottom fauna. Unlike in lakes, watercourses and river mouths ("transitional waters"), the fish fauna is

not a required criterion for determination of the ecological status of coastal waters. However, nothing prevents Sweden from applying this criterion also in coastal waters, thus emphasizing that the status of fish populations is an important element of water quality in coastal areas.

In order to determine whether measures must be taken within a river basin in order to improve conditions in the adjacent coastal area, one needs to determine the status of the coastal waters. Furthermore, significant improvements may be required in the sea area as a whole in order to achieve good ecological status in a given coastal area. Classification of status for the different coastal areas will require considerably improved and more comprehensive knowledge about chemical and biological conditions in our coastal waters than is currently available. So far, Swedish monitoring of the marine environment has focused on the open sea and the outer coastal waters. The regional environmental monitoring has been expected to cover the remaining coastal waters, but resources have been very limited and often used on issues other than coastal waters. In some areas, e.g., the county of Bohus, the Kalmarsund area, and along parts of the coast of Norrland, valuable monitoring activities are carried out by the Water Conservation Societies, and similar activities have also started along the coast of Svealand.

Swedish implementation of the Directive – minimal change rather than maximum impact!

The Water Framework Directive has several positive features. Wise implementation will provide opportunities for effective goal management towards improved environmental quality. The environmental objectives laid down in the Directive are ambitious and based on a comprehensive approach to the aquatic environment, an ecosystem approach similar to the one that we are applying within SUCOZOMA. This creates prerequisites for cost-effective action strategies for reaching and maintaining good water status, based on local conditions and a deeply rooted local commitment, rather than on top-down control from Brussels or Stockholm. It provides a good basis for future sustainable development, but cannot in itself provide for long-term strong coastal management. For that to develop, new research efforts, with support from regional and national authorities, will be required. Within SUCOZOMA we conduct research on how to implement the Water Directive effectively in the coastal zone. The methods under development are also being tried in practical coastal management, in co-operation with the Water Conservation Society of Svealand.

The Water Directive only prescribes the basic functions for the implementation of the environmental objectives, and much of the necessary further development is left to the EU member states, but the proposals by the two Swedish Committees are silent on many of these practical issues. The work within SUCOZOMA to develop environmental planning in the coastal zone may be a useful starting point, for example concerning the division of coastal waters into classes of different retention times, and on how best to include local stakeholders in the planning process. The two Committee proposals presented so far give rise to strong misgivings, in particular because the detailed preparation for implementation of the Directive has been fragmented on a number of new planning committees, which have started work late and conduct it under heavy time pressure. The two Committee proposals do not represent a forward-looking Swedish environmental policy with the objective to actively protect Swedish water resources and to push for better environmental protection within the EU. Instead, the aim appears to be to formally implement the Directive, while making the least possible change in existing Swedish legislation and administration of water resources. The proposed legislation does not provide instruments that can guarantee that the environmental objectives of the water districts will be achieved. Also, the proposed legislation will make implementation of the Directive extremely complicated. Indeed, the water districts are supposed to be based on the watersheds, but the suggested division of power is unclear – the old structures for decision-making are still there and will retain much of their power. Moreover, if large areas are classified as “heavily modified”, there is also a risk that the environmental objectives are corrupted.

The largest risk involved is probably that the new water authorities will be forced to start their work with too limited resources and powers. The two Committee reports have indefinitely postponed the discussion of how to use fees to finance the work of the water districts. Thus, available resources will probably be limited to a minimum during the initial period, when much of the groundwork has to be done. This may not be sufficient to prevent Sweden from being summoned before the EU Court of Justice, to answer for shortcomings in the implementation of the Water Directive. Should this happen, Sweden will have lost an excellent opportunity to move forward its positions on the European environmental front.

The scientist, the fisherman, the fisheries crisis, and the future of a living coast – a discussion

What is the state of coastal fish stocks and costal fisheries? What are the shortcomings of the present management of fish resources, and how have these shortcomings contributed to the crisis in fisheries? Do we have knowledge, and is that knowledge then being used? Is there a need for more or different knowledge? Can fishermen and scientists co-operate in making fisheries management more sustainable?

Mats Ulmestrand, a fisheries biologist with the Institute of Marine Research of the National Fisheries Board, **Anders Ellegård**, a human ecologist with Göteborg University, **Laura Piriz**, a marine biologist and human ecologist with Göteborg University, and **Hugo Andersson**, deputy chair of the Swedish Fishermen's Association (SFR), met for a discussion on these issues. **Anders Carlberg**, programme director of SUCOZOMA, assisted as moderator.

Is there a crisis in fisheries?

Hugo Andersson started out by saying that if one focuses mainly on coastal issues, it is simplistic to claim only that there is a crisis in fisheries. Several stocks along the coast, among them the stock of vendace in the Bothnian Bay, off Haparanda, is growing with the help of local management. Stocks of salmon are also increasing, but in the case of those stocks the competition between fishermen and seals constitutes a serious problem. Concerning the stocks of lavaret (whitefish), there are no decisions by the Swedish water courts that require compensatory releases, despite the fact that the exploitation of hydropower has caused disturbances. As a result, fishery for lavaret has decreased in Sweden but increased in Finland where compensatory releases have been made. As for fisheries for Norwegian lobster and North Sea shrimp along various stretches of the Swedish West Coast (Kattegat–Skagerrak area), the status of the stocks is satisfactory. The big concern is for cod, but fishery for cod is not a coastal fishery. Rather, the cod stock must be managed in the sea as a whole.

Participants in the round-table discussion.. From left Anders Ellegård, Hugo Andersson, Laura Píriz and Mats Ulmestrand. Photo: Anders Carlberg

- The two largest problems for coastal fishermen are the heavy damages caused by seals and cormorants in some coastal and archipelago areas, as well as the low profitability due to low prices on fish. For the future, an additional and big problem is the difficulty to recruit young people to become fishermen.

Mats Ulmestrand has many years of experience from research on Norwegian lobster and lobster, and from co-operation with fishermen on the development of different types of fishing gear.

- Even if one does not use the term "crisis" for what is presently happening, one should at least talk about a "strained situation". Decreases in stocks concern mainly bottom-living (demersal) fish species, and the decrease can be attributed both to different predators (seals and cormorants) and to over-fishing. The latter can, in turn, be attributed to the fact that the size of fisheries and the management of the resources – including the use of various kinds of grants – have not in time been adjusted to the actual changes in the stocks. Despite political statements that fisheries should be made sustainable, grants to the further development of fisheries have been mistargeted.

- The considerable deficiencies in the reporting of catches are a serious problem. As a consequence of the uncertainties in reporting, the scientific advice from fisheries biologists has been uncertain. Another and perhaps more serious problem is that as the fishermen are not allowed to be included as partners in management of marine resources they are taken by surprise and experience mistrust when proposals and decisions are published.

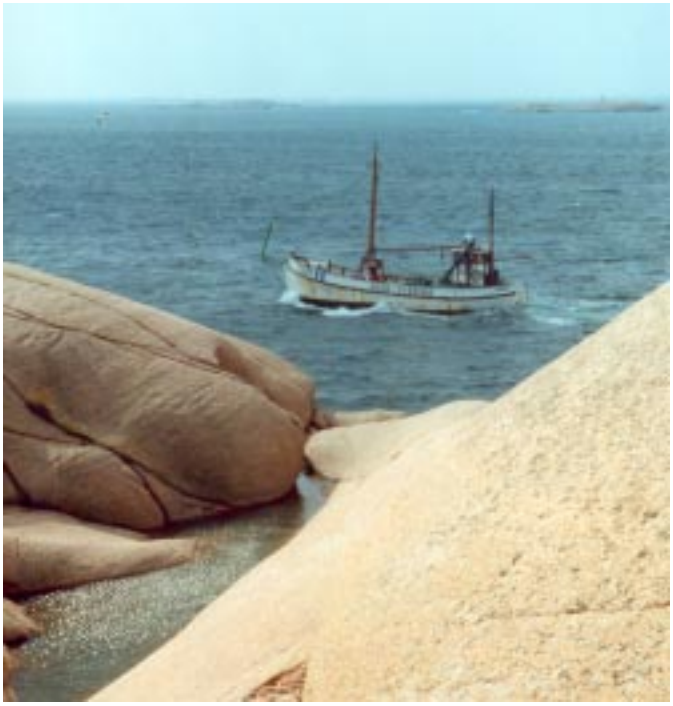
Anders Ellegård, who in his research has studied attitudes among fishermen, referred to a comprehensive questionnaire among professional fishermen on control and management issues. One important and clear conclusion of that inquiry is that fishermen are very critical to the present management system and control, which in their opinion lacks legitimacy.

At the same time the answers to the questionnaire demonstrate substantial differences within the group of fishermen. The typical professional fisherman (the average fisherman) uses nets, fishes mainly whitefish and has a relatively small business. Only a small number of fishermen work from large boats, partly fish for the same species, but also go further out at sea. There is an obvious antagonism between these two categories, but one that has always been brought to the surface. Still, the conflict has

to be managed, e.g., within the SFR, and must be taken into account when management systems are formulated.

Laura Piriz studies the prerequisites for local fishermen to influence management.

- The fishermen's' organisation has held the view that treating everyone the same would result in an equal distribution of resources. This may be the case when there is an abundant resource to share but hardly when the resource is scarce. It has also been convenient for the authorities to regard fishermen as a homogenous group, as that only calls for the need to deal with one organisation.



Fishery is a part of the coastal environment. Photo: Roger Lindblom

- In terms of distributing the resource, no great differentiation is made in the present management between the coastal zone and the open sea. In principle, this can be viewed as correct, as the ecosystem is a "transboundary" one. It can, however, be argued that when it comes to management issues it should be possible to distinguish between fishermen that fish in different areas, with different fishing strategies and under different conditions.

- One underlying cause of the present crisis in fisheries could be that for a long time the fisheries sector, including the management bodies, have assumed that catches reflects what could be regarded as sustainable fisheries. The actual level of exploitation during one or some years does not necessarily reflect what is "sustainable".

- Initiatives have often originated from professional fishermen, **Hugo Andersson** emphasized. The Koster–Väderöarna project is one example of this, where stakeholders in fisheries had to both give and take in order to achieve results. Already available management instruments can be used; but people must provide the necessary contents. With regard to integrated coastal zone management, all options to act, put forward proposals and push them through the system are already in place.

- Proposals for new regulations almost always come from above. The professional fishermen reacted very negatively on the proposal by the National Board of Fisheries to close down fishery for vendace along the coast of Norrbotten (Bothnian Bay) during some weeks in the autumn in quite a few areas. There were demands from fishermen for the elaboration of a system for local management, and the result was a management system which in principle was the same as the one proposed by the National Board of Fisheries. The difference was that the professional fishermen were prepared to accept the system when they had been allowed to participate in the development of it. One of the few news in the new EU Common Fisheries Policy (CFP) is that professional fishermen will be more involved in the process of developing management proposals.

Regional and local initiatives

The development in the Koster–Väderöarna region is another example of possible constructive co-operation within the fisheries sector. The local fishery in the region was under heavy pressure, but thanks to wide support both locally and by the central level a compromise solution could be reached. Thus, central level support can be an important component for local success.

Mats Ulmestrand stressed that the Koster–Väderöarna process started with a conflict between those operating large and small trawlers about shrimp fishery in the area. Before the actual project started, the fishermen held their own meeting and discussed different types of limitations on fishing gear. Some 80 per cent of the fishermen voted against the activities of the large trawlers. Fisheries researchers welcomed that and the fact that the professional fishermen made contact in order to start discussing development of the fishing gear, something that showed confidence in the research.

- The authorities have missed the social dimension in fisheries management and particularly the income aspect, **Laura Piriz** pointed out. It is important that the social structure of the fisheries sector is taken into account when management plans are being developed. So far it has

generally been believed that biological knowledge is sufficient to underpin management decisions which will affects stocks as well as people.

Co-operation and participation

Hugo Andersson said that collaboration is not only a matter of technical measures. For instance, how can fishermen contribute to the collection of data to be used in the assessment process? Within the framework of the regional North Sea Commission, there is a working group and a partnership where fishermen and scientists meet to discuss increased co-operation at all levels, inter alia, in order to create better credibility. Everyone agrees that this collaboration is needed but it is matter of finding the forms.

If fishermen feel that they take an active part in the development of the biological background data, they will hopefully experience and more readily accept the advice given by the International Council for the Exploration of the Sea (ICES) than what is presently the case. ICES also need to formulate its advice in a way that clearly spells out the uncertainties in the material. The uncertainties must be recognized and admitted, but at the same time the political decisions on catch quotas must be allowed to reflect the advice in a way that makes biologists feel that their advice is not always completely disregarded.

- It should also be understood that the management process runs along a different time axis compared to the one on advice from ICES, **Hugo Andersson** pointed out. The elaboration of management plans should be seen as a means of setting goals, and management should become more long-term and allow for stepwise adjustments. The multi-year management, as part of the new EU CFP, is a step in the right direction.

- Fishermen can play a more important role in the work to produce the biological background on stocks in the coastal zone, **Mats Ulmestrand** noted. Today, this participation is based on logbooks, but these are not perfect. Logbooks indicate where the trawl has been set but not where fishing has actually taken place. Samples are taken from the catches, the age structure is analysed as well as the discard, and this is used as a background. The problem is that all this data is then aggregated and treated as if it were a matter of one single large stock for the whole of the North Sea and the Skagerrak. The issue of local stocks has not been addressed, knowledge about local conditions is lacking, and there is uncertainty whether there are local stocks. The reason for dealing with local stocks should be that performance in a specific area is of importance to the local stock in that area.

Mixed fishery has, among other things, resulted in fishermen starting to fish for Norwegian lobster in order to balance the fishery for other species. According to **Hugo Andersson**, the basic position of the sector is that the fishing gear used should be as species selective as possible. Catches that may not be landed is a bad thing for everyone, and something that fishermen try to avoid as far as possible. This type of mismanagement is, however, the result of management regulations. Regulations with such consequences should be avoided.

The fishermen have a role in stock-assessment. Photo: Roger Lindblom

Background and means of control

In the above-mentioned questionnaire to fishermen, one could find some support for individual quotas but also, and in all groups of fishermen, massive opposition against individual, transferable and sellable quotas. **Anders Ellegård** emphasized that alternative means to control quantities (quotas, total allowable catches, TACs) should be considered.

Mats Ulmestrand mentioned that the EU Commissioner for Fisheries seems to be moving in this direction. Everybody agrees that the CFP has not been successful and that the next step would be to introduce limitations on the catch efforts with selective gear, in addition to quotas. Then it will be possible to see which fishing effort that gives maximum long-term yield.

Hugo Andersson held the opinion that the discussion is necessary because the system of quotas is blunt and rigid. One should also be aware, though, of the fact that changing a system that has been the very basis for management for such a long time will not be easy. The discussion needs to involve biologists, because new solutions will put demands on the advice and result in multi-species and multi-year programmes.

Mats Ulmestrand said that trends in stocks could be detected with the help of test fisheries. There are also alternative measures, mainly in the form of very large-scale tagging experiments, but it is unrealistic to believe that such experiments could be used on a regular basis. The information that comes from statistics on landing is also weak. Today, the stock assessments are based on samplings of the landings. These are used as a basis for an age analyses that is being utilized for the evaluations used in the model. The model is then adjusted, using the research results and possibly also data from logbooks.

At New Foundland, catches of cod decreased in test trawlings carried out by research vessels within a large randomly selected area. However, landings remained high because fishery was conducted in some few areas with warm water where the remains of the cod stock had gathered. Thus, according to the logbooks, the catches were relatively good – all the way to the crash.

Hugo Andersson underlined that the alternative background information is thin, as it is based on test trawlings by a few research vessels. Previously, data on catch per unit effort (CPU) was used in addition to landing statistics, but the discrepancies between catches and landings turned out to be too large. There are also time delays that make the assessment of the size of the exploitable fish stock more difficult.

A shared resource?

Are professional fishermen, those fishing for household requirements, and anglers sharing a common resource? Professional fishermen seems to guard their priority right of access to the resource. Is professional fisheries an industry like other industries, or are there other reasons – support to sparsely-populated areas or regional policy issues – to favour professional fishery or to treat professional fishermen as a marginal group?

- We put the questions in the questionnaire also to fishermen fishing for household requirements only, **Anders Ellegård** said. When the answers from the questionnaires were compared it turned out that those representing professional fisheries did not want to share its quotas with the other categories. The professional category did, for instance, not want to allow any other type of licence than the one that professional fishermen presently have. In addition, it was felt that side-line fishermen break the rules. Side-line fishermen, on their part, point at their role as people inhabiting the coast all year round, and their role as carriers of traditions in the archipelagos, thus highlighting the sparsely-populated area policy aspects. They hold the view that they have a legitimate right to do more fishing than other groups. The anglers are active, act politically to promote their views, and believe that they have a good understanding of biological issues and fishery issues.

Anders Ellegård pointed out that the issuing of licences could be split so that a certain licence would give the right to conduct a certain type of fishery but would not necessarily give the licence holder a general right to conduct professional fishery. **Hugo Andersson** informed that changes, required by the fishing sector, are underway. It could be a question of licences that are limited to the kind of fishery that the respective fisherman wants to carry out.

Laura Piriz noted that it is not clear which variable provides guidance on how local management should be structured. Research does not provide any unambiguous answer to the question of how ecological, economic and social dimensions and different interests could be balanced and integrated. Studies of local management have rarely included any analysis of anglers, those fishing for household requirements, or commercially focused fishermen. Focus has in most cases been on the latter. **Mats Ulmestrand** mentioned that the categories are not put up against each other, because anglers and those fishing for household requirements have not been under any obligation to report their catches.

Environmental effects an important factor

Hugo Andersson claimed that the environmental issues also play a role. The effects of eutrophication and toxic substances are particularly serious in coastal environments. Much happens in the sea that is not observed directly with the naked eye, but which manifest itself after a long time and is then often much more difficult to address. As of 2007, the problem of dioxins may upset the entire Swedish coastal fishery if the EU Commission cannot be convinced to allow an exemption concerning the limit value in fish from Swedish waters. This is an issue for the archipelago areas – the big boats will manage because they can make use all the fish for oil production, purify the oil from dioxins, and thus stay below the limit values.

If eutrophication along the West Coast is a problem, one may ask why there have so far been very few contacts on these issues between representatives of fisheries and agriculture, **Laura Piriz** said. In discussions with the Swedish Farmers Association (LRF), it is claimed that there is a lack of co-operation. However, there is a lot to be gained from such contacts.

Recreation increases in coastal villages. Photo: Roger Lindblom

Hugo Andersson confirmed that there have been few contacts between fisheries and agriculture, and that is not the way it ought to be. Co-operation has probably been more common on the East Coast, on the Baltic Sea, because of the more traditional combination there of agriculture and fisheries in archipelago homesteads.

Anders Ellegård pointed out that eutrophication issues ought to be linked all the way from the input of nutrients to the effects on fisheries. Laura Piriz emphasized that one must understand what fishermen perceive as important problems in a coastal environment where there are many and varied resource users. Fishermen often stress environmental problems and the competition with seals over the resource. However, it turns out that the competition over the resource between groups of fishermen is often the most important issue, or at least the one that has to be resolved first.

Integration and local management

- There is a tendency to focus on organisational matters, Hugo Andersson continued. Instead, the issues should be addressed through networking and efforts should be made to stimulate increased local participation. This holds true in general for the coastal population as a whole, not only for coastal fishermen.

- Where should the desired local management be based? Anders Ellegård asked. The fisheries units within the County Administrative Boards used to be a natural regional basis, but these units have ceased to exist.

Mats Ulmestrand mentioned the Gullmarn fiord area as an example, where fishermen of their own accord contacted the scientists at the Institute of Marine Research for assistance to come to an agreement among the fishermen themselves. The proposal concerning species-specific fishing and area licences was an important step on the way. It is also vital that a limited group of people using a specific resource experiences that they have both a mutual and an individual responsibility for the resource.

- Regional management in an EU perspective is mostly about large geographical regions such as, e.g., the whole of the North Sea, **Hugo Andersson** underlined. Regional management committees will be set up, and we have great hopes for that. Within the partnership of the North Sea Commission, the structure of a regional management has been discussed and a proposal will be elaborated. Establishing groups for contact and consulting at an early stage is important.

Mats Ulmestrand said that the possibility to limit the catch efforts and to control it is an important prerequisite for successful local management. The catch limits may, however, very well be distributed among vessels (large) and boats (small). Anders Ellegård concurred; in the questionnaire to the professional fishermen, strong support was expressed for such proposals.

Hugo Andersson pointed to the different prerequisites that prevail for fishing on the East Coast and West Coast of Sweden, respectively. On the East Coast, fishing waters are largely privately owned. That is why the restrictions on the free use of fishing gear that you operate by hand have created such a debate among fishermen and the owners

of the water rights. SFR fought the proposal because it completely disregarded the rights of the owners of archipelago homesteads.

Anders Ellegård noted a similarity between the issue of free use of fishing gear that you operate by hand and the proposal for a stop for cod fisheries. Such proposals are introduced in the political game because they are regarded as decisions and restrictions that affect a smaller and weaker voting group in society. At the same time, these political interventions imply that the legitimacy of management is undermined when individuals are steamrollered on grounds that are perceived as arbitrary.

The role of science

How should research be conducted in order to contribute to sustainable management? In **Hugo Andersson's** view the fisheries sector would welcome more contacts between fishermen and scientists.

- Increased and unbiassed co-operation should be initiated and take into account that fishermen, with long experience from practical work, have their own thoughts and theories which might offer scientists some good impulses. Research projects should, inter alia, aim at providing answers to questions raised by the fishermen. It is also very important to continue the dialogue between fishermen and scientists when research results start to emerge.

Laura Piriz stressed that scientists have often responded to causal explanations presented by fishermen of certain problems by rejecting, on scientific grounds, these explanations put forward the fishermen. Instead, scientists should listen carefully to what fishermen have to say about problems, and to their descriptions of phenomena and facts. It is self-evident that the explanations given by fisherman and those given by scientist will differ, because they are based on different knowledge and experience.

Local Participation in Coastal Zone Management in a Swedish Context – Today and Tomorrow

Andrea Morf, Göteborg University

For Sweden, an ideal coastal management process involving physical planning can be pictured as a cycle comprising the following phases (see also figure later on):

- Awareness and identification of problems in the coastal zone;
- Preliminary contacts and organisation for working with the problems;
- Information collection, analysis and first ideas about solutions;
- First phase of public negotiations;
- Specification of solutions, based on the negotiations;
- Second phase of public negotiations;
- Decision-making;
- Implementation;
- Monitoring and evaluation.

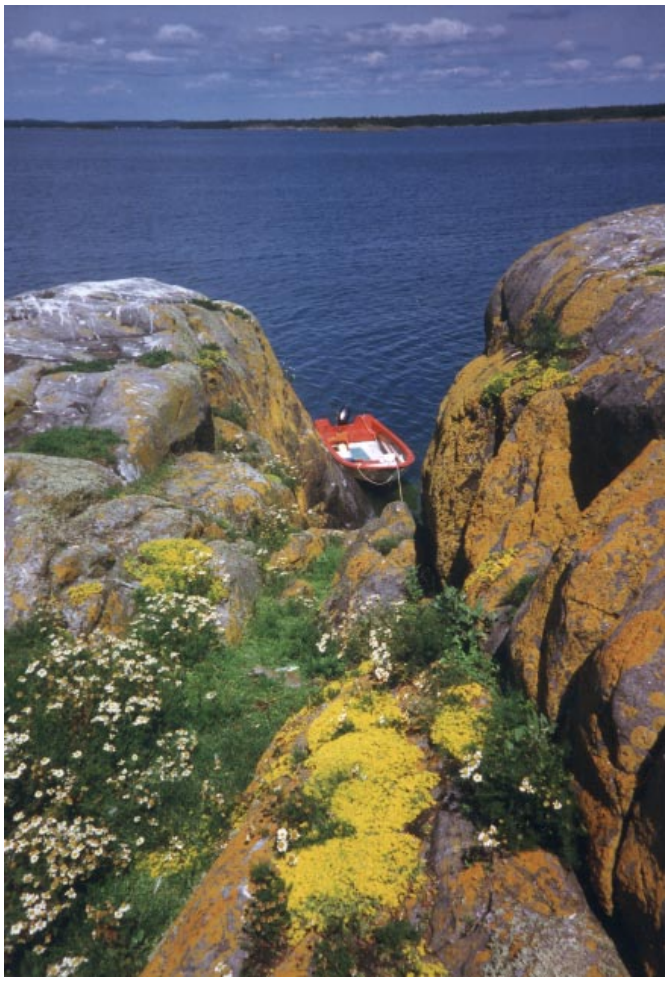
Such a model is useful for describing Swedish coastal resource management when reflecting about the structure of the management system, especially regarding the fragmentation of the management cycle between administrative sectors and the intensity of public participation.

Fragmented Coastal Resources Planning Today

Management of marine resources and activities does not take place in one, but in several simultaneous, often unsynchronised cycles with few links between them. These cycles have their main location on the national or central level. Important decisions about marine activities are taken *sectorally* by national agencies and their regional branches (e.g. within fisheries, marine transport, nature conservation, agriculture, or forestry). Thus, each sector has its own management cycle, with the risk that there is little knowledge of what is going on in other sectors.

There are management cycles on several levels, but few with systematic links between local and national level. The national cycles are mainly built from above. They feed into local level coastal management (i.e. the municipal planning cycle) in a top-down manner. Municipal comprehensive plans regulate mainly national interest claims where coastal waters are concerned, and contain little locally specified coastal water policy.

A fairly complete and cross-sectoral coastal resource management cycle can only be found on *municipal level*.

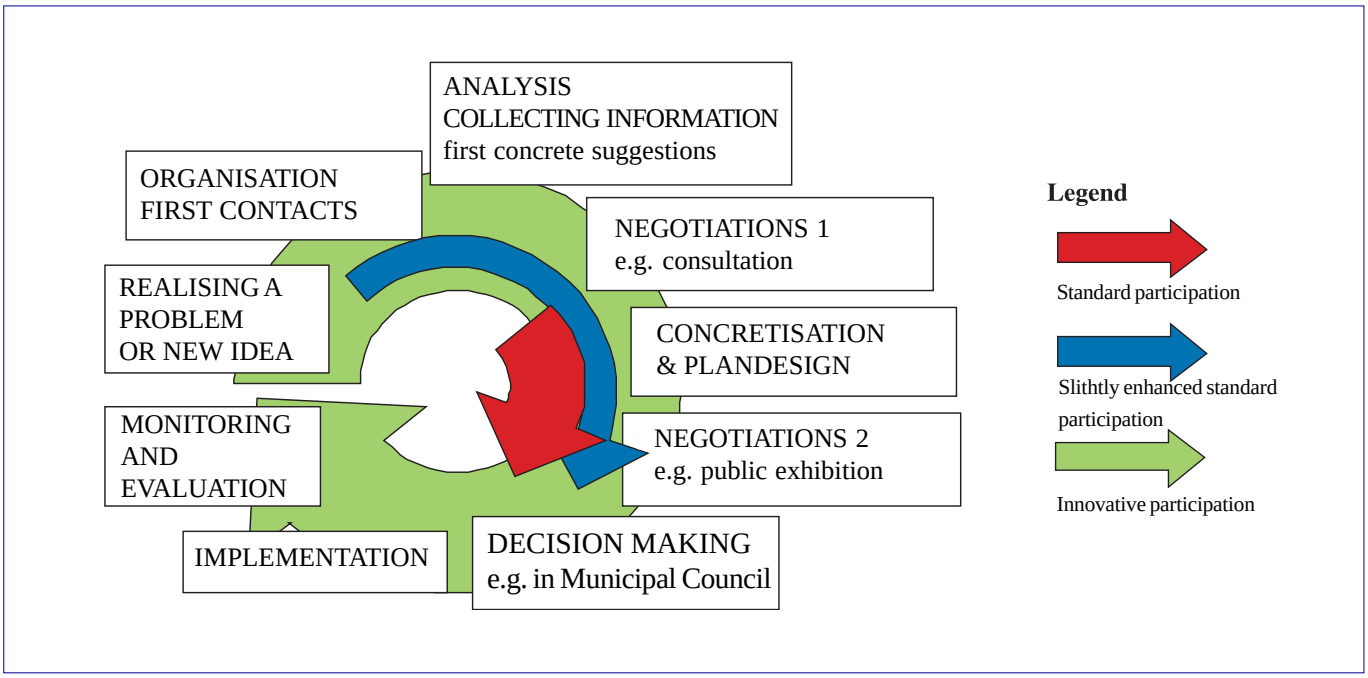


Conservationist and user interest co-exist in the archipelago. Photo: Nils Kautsky

Here, strategic and operational municipal physical planning plays a central role.

There is no permanently established higher-lever co-ordination instrument with a cross-sectoral perspective, other than *regional physical plans*. These plans are to be elaborated and adopted by a special cross-municipal regional planning organ. Recently, there has not been much collaboration across municipal borders regarding cross-sectoral coastal management. No regional plans with a coastal focus have been elaborated on a regular basis: for the West Coast there is no valid regional plan with the exception of an outdated plan from the 1970's. Interesting regional level coastal planning initiatives have, however, recently taken place in the larger Stockholm area.

National-level initiatives to co-ordinate marine policy never led to a lasting cross-sectoral institutional framework,



Standard public participation (red arrow) and slightly enhanced standard participation (blue arrow), and innovative participation (green arrow) in relation to the whole coastal management cycle.

except for the natural resources paragraphs in the Natural Resource Act of 1987, in 1999 integrated in the Environmental Code. A Marine Resource Delegation was active between the late 1970s and 1990, e.g. co-ordinating knowledge collections and supporting method studies on the municipal level. However, in contrast to other countries, there has never been a special agency for coastal and marine resource management.

Municipal Coastal Management

The *municipal-level coastal management cycle* is not completely the responsibility of one agency. Physical planning is mainly involved in the middle part of the management cycle, and a little in the early phases. Thus, planning can only bundle interests and policy making during about half of the cycle. The responsibility for the other half rests with other sectoral offices or external actors. For including new problems or ideas in a new management cycle, planning authorities – so far the only ones with an integrative perspective – depend on information from outside. Decision-making rests with the political bodies, supported by experts from the administration and consultants. Implementation and monitoring responsibilities are spread among a number of sectoral agencies and other actors.

Public Participation in Coastal Management

Public participation at the municipal level is usually restricted to the two statutory public consultation and exhibition phases (see the red arrow of standard public participation in the figure). Municipalities can and have sought contact with local residents at an earlier stage, but so far mainly indirectly, by contacting local organisations and rarely specifically about coastal problems (narrow blue arrow in figure). Participation could, however, be further enhanced (green arrow in figure). In some specific cases and under certain conditions, participation has successfully been broadened in such a way, including discussions about the coastal water surface.

Regarding the national level, an arrow showing public participation would be very thin and relatively fragmented. At the national level, there is so far no statutory mechanism allowing broad and direct public participation in policy formulation of the various sectors. Selected participants, usually representatives from interest organisations, are included in negotiations and sometimes in decision-making. Presently, the interest of higher level authorities for a more active involvement of local resource users is rising. Such initiatives usually strengthen local consultations and contributions to implementation and monitoring, but they seldom imply that decision-making power is delegated to lower levels. Cross-sectoral participation is rare even there.

How Could Swedish Coastal Resource Management Look Like Tomorrow?

An analysis of the structure of the Swedish coastal resource management system reveals the following possibilities for adaptation in accordance with an Integrated Coastal Management-ideal:

- National-level and regional-level management cycles could be interconnected and synchronised to a larger extent;
- Information from the local management cycle could be fed into higher level cycles in a better way;
- The public could be involved to a larger extent and during more phases of the local management cycle. A forum for public debate about coastal resources and for legitimisation of coastal policy could even be institutionalised at regional and higher levels.

If the intention is to adjust the Swedish coastal management system accordingly, two categories of questions need to be raised. The first category requires more "political" answers, whereas the questions in the second category may be answered by ongoing and future research:

"Political" issues

- What shall the goals of such a management process be?
- What shall the purpose and scope of participation be?
- Who is to formulate the goals? How far should management goals be formulated independently of the participation process?
- How much shall this type of management be allowed to cost? Who will pay for it?

"Research" issues

- What is the performance of such an integrative coastal management system?
- What criteria should be used for evaluation?
- What are the differences in performance with low or high participation?
- What are the transaction-costs of this type of management? Who is willing to pay?

The questions in the first category have to be answered based on the specific local contexts and the available knowledge. Some of the questions in the second category are being analysed in the SUCOZOMA research programme and in international coastal management research.

The author's forthcoming thesis will provide material from a local context motivating why the "political" questions are important and need to be answered. The thesis will also provide some case studies for discussing and answering the third question among the "research" issues.

Andrea Morf, Human Ecology Section, Göteborg University. Andrea works within the SUCOZOMA project *Planning for sustainable management of water quality and natural resources in the coastal zone.* The article is based on a presentation made at a seminar organised by the Edberg Foundation in January 2003 in Karlstad and in an enlarged version part of the seminar's anthology *"Vatten-århundratets ödesfråga?"* (Water - a crucial issue of the century).

The demand for recreation drives development in many coastal areas. Photo: Roger Lindblom

Basic facts about the SUCOZOMA programme

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See also MISTRA, the Swedish Foundation for Strategic Environmental Research:
www.mistra.org

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Hugo Andersson, Swedish Fishermen's Association
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Stellan Hamrin, Ministry of the Environment
Cathy Hill, WWF, Sweden. As of 1 September 2002: Stockholm County Administrative Board
Sören Norrby, Keep Sweden Tidy/Swedish Boating Union
Torbjörn Tirén, Uppsala County Administrative Board.

PROJECT DATA

Project 1.1: Conflict mitigation through local resource management

Project goals:
To map conflicts of interest on the use of natural resources on the coast. Tools for conflict mitigation are, according to the SUCOZOMA assessment, an active element of integrated and sustainable coastal zone management.

Project manager:
Karl Bruckmeier

PhD students:
Andrea Morf
Laura Piriz

Other project members:
Anders Ellegård
Merle Jacob
Pekka Salmi

Total project budget 2001–2003:
SEK 2,700,000

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Project 1.2.1: Assessment of different strategies for management of coastal fisheries

Project goals:
To demonstrate how bio-economic analysis can be used as a basic component in sustainable management of fish resources.

Project manager:
Thomas Sterner

Other project members:
Håkan Eggert
Björn Olsson

Total project budget 2001-2003:
SEK 1,650,000

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Photo: Roger Lindblom

Project 1.2.2: Economic valuation of coastal ecosystem services

Project goals:
In general: To provide economic information that can be used in developing policies concerning the use of the coastal zone. In particular: Through research that generates increased knowledge about the economic value of the goods and services provided by the ecosystems in the coastal zone provide a better basis to assess which balances between different uses of the coastal zone that are economically motivated.

Project manager:
Tore Söderqvist

Other project members:
Mikael Sandström
Åsa Soutukorva
Teresa Norling

Total project budget 2001-2003:
SEK 1,500,000

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Project 1.3: Planning for sustainable management of water quality and natural resources in the coastal zone

Project goals:
To develop a basis for instruments that can be used for adaptive planning and integrated management of coastal resources.

Project manager:
Lena Gipperth

Other project members:
Inga Carlman
Elisabet Henriksson
Andrea Morf
Harald Sterner

Total project budget 2001-2003:
SEK 4,200,000

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Project 2.1: Bioremediation through mussel farming

Project goals:
To develop models for strategic location of mussel farms, which implies food production adjusted to eco-cycles at the same time as a positive environmental effect is achieved by recirculation of nutrients from the sea to land, thus counteracting the negative effects of eutrophication of coastal waters. In addition, improved knowledge about occurrence and behaviour of toxic dinoflagellates, especially *Dinodhysis spp.*, and practical experience of detoxcification of mussels are included in the project objectives. Further, the development of simple field tests for detecting *Dinophysis* cells and DST toxin will be tried. Investigation of the occurrence of pathogenic microorganisms in the coastal water, and a risk assessment in relation to mussel farming will also be conducted.

Project manager:
Odd Lindahl

Other project members:
Ann-Sofi Rehnstam-Holm
Bengt Lundve

PhD students:
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Susanne Svensson
Fredrik Norén
Marie Johansen

Total project budget 2001-2003:
SEK 3,150,000

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Project 2.2: Adaptive management of nutrient releases in Baltic coastal zones

Project goals:
To develop models for adapting coastal discharges of nutrients to local conditions, in accordance with the EU Water Framework Directive.

Project manager:
Ragnar Elmgren

Other project members:
Anders Engqvist
Susanna Hajdu
Helena Höglander
Ulf Larsson
Candida Savage
Jacob Walve

Total project budget 2001-2003:
SEK 4,350,000

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Photo: Roger Lindblom

Project 3.1: Methods for local management of recruitment areas in Baltic archipelagos

Project goals:
To develop methods for local management of recruitment areas for coastal fish in the Baltic Sea.

Project manager:
Peter Karås

Other project members:
Alfred Sandström

Total project budget 2001-2003:
SEK 2,700,000 SEK

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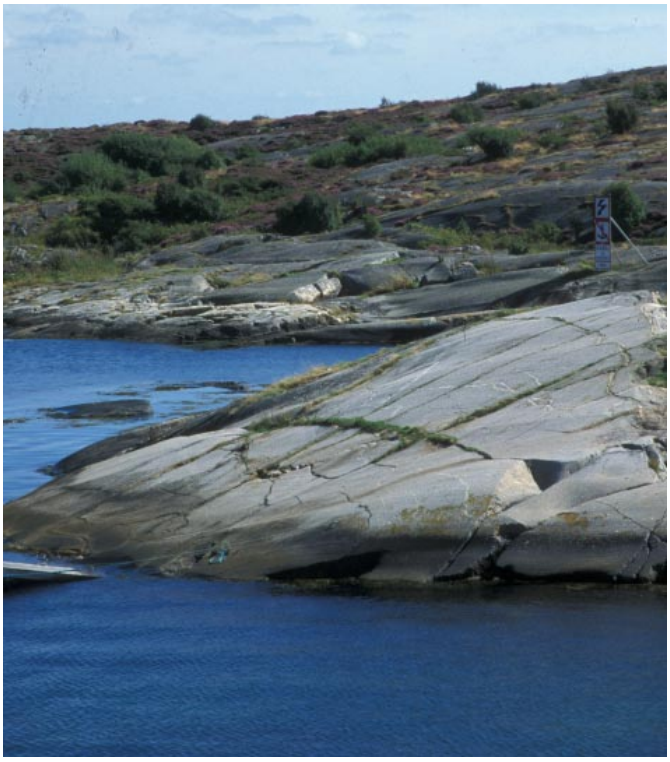
Photo: Roger Lindblom



Project 3.2: Biological criteria for sustainable local and regional fisheries management

Project goals:
To investigate the ecological and genetic prerequisites for management of fish stocks at different administrative levels.

Project manager:
Nils Ryman

Assistant project managers:
Linda Laikre
Per Nilsson
Gunnar Thoresson
Mats Ulmestrand

PhD students:
Stefan Palm
Kari Saulamo
Anette Ungfors

Other project members:
Karin Tahvanainen

Total project budget 2001-2003:
SEK 4,800,000

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The SUCOZOMA – Sustainable Coastal Zone Management – research programme is a comprehensive effort to solve important problems in the coastal zone focusing on the archipelagos of the county of Bohus (Bohuslän) and the Baltic Sea.

Researchers from different disciplines co-operate across disciplines to highlight problems and suggest solutions that can be implemented in practice.

The need for research is great because the coastal resources are subject to heavy pressures by many different interests (stakeholders) which often result in conflicts in society.

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