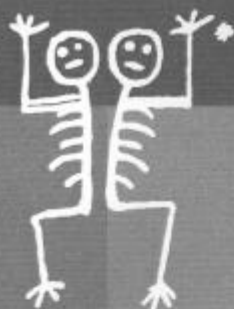


International Conference

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## **Sustainable Development of Coastal Zones and Instruments for its Evaluation**

Example: The Indicator Programme of the United Nations

### **Conference Documentation**



## **Bathing water quality assessment, status and importance of integrated sustainable management along the German Baltic coast**

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### **Introduction**

Increasing public interest in bathing water quality data and improved possibilities to receive and compare water quality information of holiday resorts as well as intensified use for advertisement purposes raise basic questions: How is bathing water quality measured along the German Baltic coast, what is the recent status, is the assessment useful and does it reflect existing water quality problems properly, does water quality effect the development of tourism and what are the challenges concerning water quality management?

### **Bathing water quality assessment and status**

When talking about coastal waters the term water quality is often used instead of bathing water quality and conceal the limits of the assessment. Basis for bathing water quality assessment in Germany and in the European Community member countries is the EC-Directive 76/160/EEC. The basic rule is a fortnightly water sampling during the bathing season. The samples should be analysed for altogether 19 parameters which are divided into 3 groups: microbiological and physico-chemical parameter as well as other substances regarded as indications of pollution. Member States have to report only for those parameters that are taken into account for the European status calculation: 2 microbiological parameters - total and faecal coliforms - and 3 physico-chemical parameters - mineral oils, surface active substances and phenols. Besides, it is recommended that analysis results are posted on each bathing area. For most parameter, guide and mandatory values are defined and according to the number of passed or failed samples, an assessment is made whether the water is in conformity with the imperative (minimum) values or even with the stricter guide values. The results are graded into 5 categories (coloured water quality symbols) and presented in form of maps. A blue quality symbol for example is given to beaches in compliance with the imperative values and on top of that when 90 % of the samples are also in conformity with the stricter guide values. A black symbol is given to beaches where bathing is temporarily prohibited.

For centuries the Baltic Sea is subject to anthropogenic influences and pollution. Despite that, the water quality, in terms of quality for bathing and recreation after the EC-guideline, along most coasts are regarded as good or very good. Since the beginning of the program in 1992 the bathing water quality in Germany shows improvements (European Commission



homepage): In 1999, 93.5 % of the 414 sampling points compared to 42.7 % (1992) comply with mandatory values and 82.6 % even fulfil the guide values. During the same period the percentage of points where bathing was prohibited for the duration of the bathing season decreased from 3.4 % to 0.2 %. 272 sampling points are located along the German Baltic shore and in 1999 only 17 were not complying with mandatory values. Usually this was due to local small scale pollution close to or related to camping sites.

### **Water quality and tourist development**

Along the Baltic coast tourism is one of the most important economic factors. In former West Germany individual bathing tourist industry is fully developed for several decades and a stagnation took place. During socialistic times a large amount of camping sites and central accommodations existed along the East-German Baltic coast, too. After the German reunification the individual tourism and the demand for high quality standards increased and tourism industry became the fastest growing and most important economic sector along the eastern coast, too. Nowadays the possibilities for a further rise of the total number of tourists and overnight stays is limited and competition among the resorts increases. New strategies to attract tourists were developed. High standards of water and environmental quality, a good infrastructure and a wide spectrum of facilities are already a must and an important point in advertisements. Therefore the demand for an approved award of the high quality standard rose.

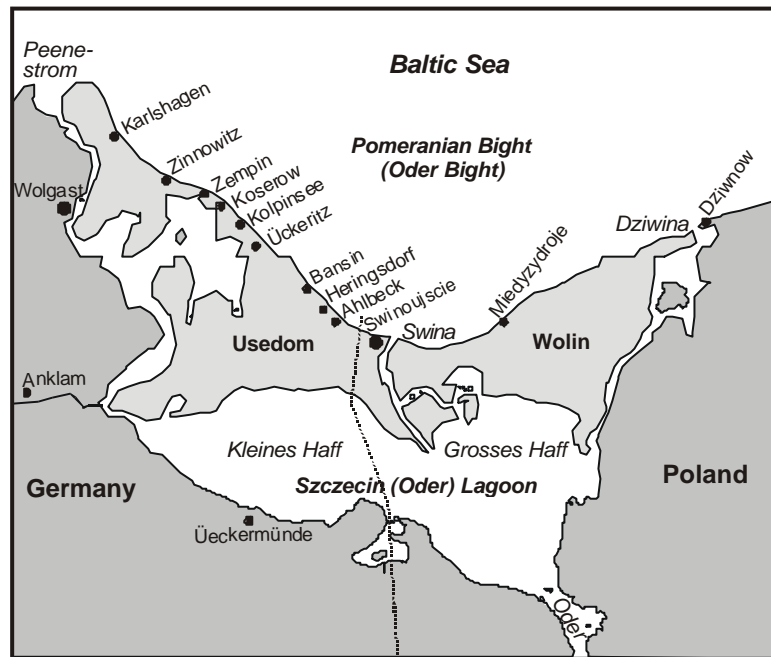
The blue flag serves this purpose. It is an exclusive eco-label awarded to more than 2,500 beaches and marinas in 21 countries across Europe in 2000. The Blue Flag Campaign is owned and run by the independent non-profit organisation Foundation for Environmental Education in Europe (FEEE). The award is based on 27 specific criteria for beaches and 16 specific criteria for marina. Though the specific requirements are different for the two types of sites, they cover the same four aspects: water quality, environmental education and information, environmental management as well as safety and services. Concerning water quality a compliance with requirements and standards such as those of the EEC Bathing Water Directive are an imperative criteria. Further, no industrial or sewage related discharges may affect the beach area and emergency plans to cope with pollution accidents have to be available. No algal or other vegetation may accumulate and be left to decay on the beach, except in areas designated for a specific use and as long as this does not constitute a nuisance. The community must be in compliance with requirements for sewage treatment and effluent quality such as are contained in the EEC Urban Waste Water Directive. Via internet and media, tourists already have good access to environmental and water quality information and quality problems or the lack of quality indications like the Blue Flag therefore can have a serious negative impact on tourist development.

### **Regional water quality problems: The Oder Lagoon**

The Oder estuary at the German/Polish border is still one hot spot concerning water quality problems. The drainage area of the river Oder (Odra) covers an area of about 120.000 km<sup>2</sup>



with a population above 10 million people, a lot of industry and intensive agricultural use. Due to its heavy nutrient load, the Oder river is one of the most important sources of eutrophication and pollution for the south-western Baltic Sea. The coastal zone directly affected by the river Oder can be divided into the inshore Oder Lagoon (Szczecin Lagoon) and on the other side, the outer coastal waters (Oder or Pomeranian Bight). The lagoon and the bight are divided from each other by the islands of Usedom and Wolin and linked via three outlets (Swina Strait, Peenestrom and Dziwna). Bathing tourism on the Baltic Sea coast of the island of Usedom, has a long tradition and enabled the development of several well-known spas, like Heringsdorf, Ahlbeck or Bansin. The EC-assessment certifies the beaches at the Baltic Sea a very good quality and the Oder influence obviously does not have a negative effect. On the other side it is known, that easterly winds transport the Oder water in a narrow ribbon towards west along the coast visible in a high turbidity (Schernewski et al. in press).



**Fig. 1:** The Oder estuary

The inner coastal zone along the shallow Oder Lagoon suffers from structural problems, short falling economical development and the coasts are less touristic developed. In future bathing tourism is expected to become the most important economic factor here, too and considerable efforts in this direction were undertaken. Examples are towns like Ueckermünde or Mönkebude, which improved their beaches and marinas and now offer various water sport activities. After the EC guideline, the bathing water quality along these beaches is rated to be good. In the national German system the bathing water quality is regarded as reduced due to a visibility of less than 1 m.

On the other hand, the heavy load of the Oder River causes obvious and severe eutrophication. Intensive blooms of potentially toxic blue-green algae species with an



accumulation of foam on the water surface are the rule during summer. Water transparency is always very low and limit the acceptance for recreational purposes. Due to heavy oxygen consumption during night, fish deceases are well known. The last one took place on 1. May 2000 and caused an accumulation of dead fish along the beaches. One problem that is less obvious is the danger of water hygiene problems. The city of Szczecin with a population of about 420.000 inhabitants is located at the river Oder, 30 km upstream of the Oder Lagoon. Sewage treatment is poor and sewage water released into the Oder near Szczecin contain high numbers of enteric viruses of varying composition ( $10^{11}$  to  $10^{12}$  infective units). Usually viruses are sampled and measured only as free viruses in the water. Under these circumstances the decay rate is high and several days after the release a infection risk can be excluded. The situation is different when viruses are attached to suspended particle matter. Due to the slower decay rate, these virus loaded particle make an infection possible along about 40 % of the total coastline of the lagoon. A high infection risk is limited to a small area of several kilometres close to the river mouth, where active virus concentrations exceed  $10^3$  viruses/ $m^3$  in this scenario. Viruses released at Szczecin can even enter the Baltic Sea after about 4 weeks. (Schernewski & Jülich in press).



**Fig. 2:** Beach of the city of Ueckermünde and water quality problems in the Oder Lagoon: Blue-green algae foam (harbour of Dargen on Usedom, August 99) and algae accumulation (Mönkebude harbour, May 2000) as well as fish death along the south coast of the lagoon (May 2000).



### **Consequences and perspective**

The example of the Oder Lagoon underlines several important points. The EC-parameter, the chosen mandatory values and the temporal sampling resolution are not sufficient to indicate even obvious water quality problems that affect the acceptance of a bathing water, too. A poor water quality is only indicated if there is a real risk for health, mainly of gastroenteritis. Viruses are one example that there are still unknown risks and a further improvement of methods and assessment is needed. Concerning viruses, the EC-guideline is aware of this problem and states that even small quantities cause a potential health risk, that enumeration is difficult and expensive and that the results are not accurate.

The very positive water quality assessment conceal problems and prevent necessary measures for further improvement to take place. For the Blue Flag it means that more or less every resort fulfils the bathing water quality standard and is generally able to receive this indication of approved quality standard. This on the other hand might cost the Blue Flag its reputation and its potential to be used for advertisement.

During the last years the European Commission has made water protection one of the priorities of its work. The new European water policy resulted in the Water Framework Directive, which is expected to become law in the European Community during the next years. New in this Water Framework Directive is, beside the intensive participation of the public, the spatial integrated aspect. Water management will then cover entire river basins including their coastal zones and will be independent from existing administrative units. For each river basin district a 'river basin management plan' will need to be established. In several cases, like the Oder, this has to be traverse national frontiers.

The water quality of the Pomeranian Bight and to a much higher degree the water quality of the Oder Lagoon cannot be restored by internal measures inside these systems or local management. The systems are too much linked to the River Oder and its large basin. The large population in the Oder catchment and the poor state of sewage treatment as well as the large and intensively used agricultural area in the hinterland are the main reason for the quality problems in ground, surface and coastal waters. The water quality in the lagoon is merely an indicator and mirror of the pollution in the river basin. Due to its size, economical and ecological importance on one side and its heavy pollution on the other, the Oder System becomes an outstanding case, which reveal the urgent need for spatial integrated and interdisciplinary coastal zone and river basin management.

### **Literature**

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