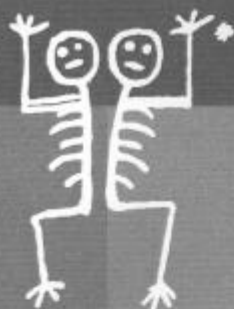


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Sustainable Development of Coastal Zones and Instruments for its Evaluation

Example: The Indicator Programme of the United Nations

Conference Documentation



Sustainable development of the German Baltic coasts: Regional water quality problems and tourism

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Tourism

Tourism along the German Baltic coast has a long tradition. It was already well established in the last century and along the entire coastline. Heiligendamm, for example, was founded in 1794, Boltenhagen 1803, Heringsdorf (Usedom) 1824 or Eckernförde 1830.

Already before World War 2 several resorts had a number of annual overnight stays above 500,000. After a decline, coastal tourism started to increase again. Large holiday centres caused a boom during early 70s followed by a steady growth. After a decline due to the reunification an ongoing boom took place in the new German federal states, too. Between 1992 and 1998 the bed capacity there increased by 86 %. The fast development along the eastern German Baltic coast was supported by more than 1 billion DM governmental investment subsidies creating more than 10,000 jobs.



Picture 1: Ückeritz on the Island of Usedom in August 1999

Nowadays 79,000 beds along the Baltic coast of Schleswig-Holstein and about 107,000 beds along the coast of Mecklenburg-Vorpommern (M.-V.) are available. Tourism contributes to more than 7 % to the total income in M.-V and is the dominating economic factor along the



coasts. Further increase is expected and it is the only perspective for the remote and less developed regions near the Polish border, where the rate of unemployment still exceeds 20 %. The competition between resorts will become harder in future and a decline in some regions is likely. Advertisement, a high standard of facilities, environmental aspects and especially bathing water quality gain importance.

Eutrophication and algae blooms along the Baltic coast

Intensified agriculture as well as increasing population and industrialisation during this century enhanced the nutrient load into the Baltic Sea. Especially coastal waters were subject to heavy pollution and eutrophication. The consequences were hygienic water quality problems, decreased water transparency and algae blooms with surface scum. Several examples are reported, where toxic algae caused damages to fish and duck farms and led to the poisoning of dogs and cattle.

Strong improvements in sewage treatment and ongoing alterations in agricultural practice reduced the nutrient load into the German coastal water significantly during the last two decades.

From a hygienic viewpoint the bathing water quality along the German Baltic coast nowadays can be regarded as satisfying. Algae blooms are still a frequent phenomenon, but do not cause serious trouble.



Picture 2: Blue-green algae scum (*Microcystis*) near Lauterbach, Island of Rügen in August 1999

Regional ‘hot spots’: The Oder Lagoon

Most of the inner coastal waters along the German Baltic Sea still suffer from severe eutrophication that limits their value for bathing and further touristic development.

In this respect the Oder Lagoon is a special ‘hot spot’. The shallow lagoon has a size of 680 km² and is located at the German/Polish border. About 17 km³ of polluted water enter the

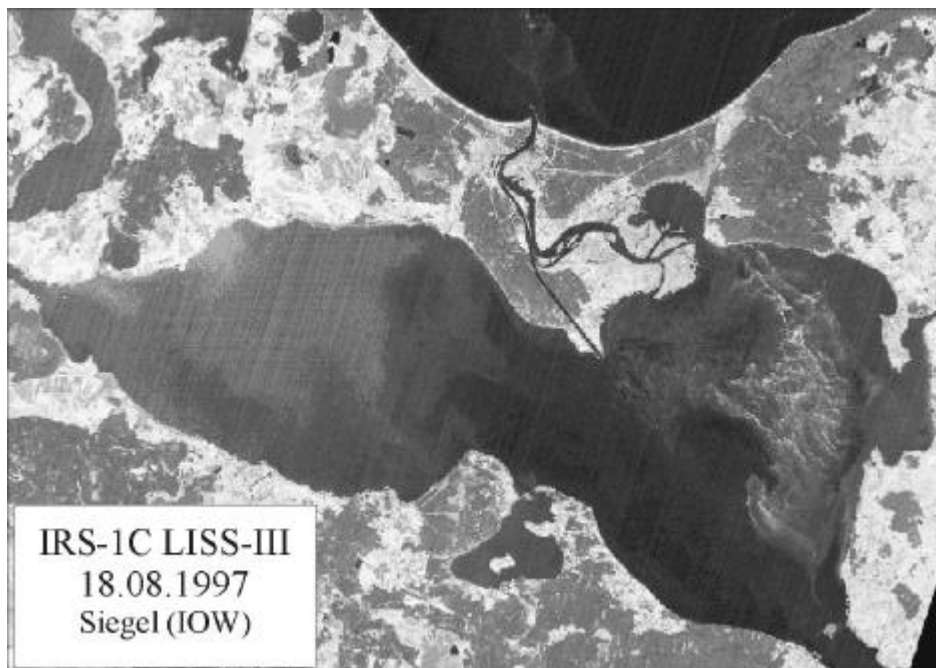


lagoon with the Oder river per year and are the reason for ongoing severe water quality problems and eutrophication.

Intensive algae blooms of potentially toxic species (Anabaena, Aphanizomenon, Microcystis and Nodularia) are the rule in the Oder Lagoon during summer. The satellite image show an example of extended algae accumulations at the water surface during the Oder flood in August 1997 along the coast and in the lagoon.

Due to high amounts of algae and detritus the water has a pronounced brown to green colour and the transparency in the lagoon is often below 1 m. Beside eutrophication hygienic problems still exist. Large amounts of untreated sewage water from the city of Szczecin enter the lagoon. They contain human pathogen viruses which cause a potential infection risk for swimmers in large areas of the lagoon.

Strong efforts are undertaken to develop summer tourism along the coast of the lagoon. These attempts are heavily compromised by an insufficient bathing water quality. Events like the large fish decease are a serious negative advertisement.



Picture 3: The image show the concentration of suspended matter in the Odra lagoon during the Oder flood on August 21, 2000. The entering Oder water is visible in the lagoon by its dark colour. Due to dilution the concentration in the river is lower than in the lagoon. The bright areas indicate floating algae mats formed by Microcystis. Image provided by H. Siegel.

The Oder Lagoon: Fish kill on May 1, 2000

During the sunny period in April 2000, negative effects of the heavy eutrophication of the lagoon became obvious. Already in late April water temperatures in the shallow lagoon exceed 20° C. Blue-green algae and diatoms formed an intensive bloom (> 1,2 g C /m³) during that time and caused a serious fish kill. Along the small beach of Bellin, with a length of less than 100 m, more than 60 dead fishes were found. The other beaches along the wind



exposed south coast of the lagoon showed similar situations. High ammonia concentrations in the water or larger amounts of toxic algae species were not observed. Asphyxiation is the most likely reason for this incident.

The algae bloom produced large amounts of oxygen during the day. Due to high water temperatures the oxygen solubility was reduced and most oxygen was lost to the atmosphere. During night the algae used up most of the dissolved oxygen in the water. A severe lack of oxygen occurred in late night and caused the death of fish and other animals by asphyxiation.



Picture 4: Dead fish along the inner coast of The Oder Lagoon on 1 May 2000.