



Szczecin Lagoon – Oder/Odra Lagoon (Germany/Poland)

Gerald Schernewski¹ & Teresa Radziejewska²

¹ Baltic Sea Research Institute, Warnemünde & EUCC- The Coastal Union Germany

² Department of Palaeoceanology, Institute of Marine Sciences, University of Szczecin, Poland

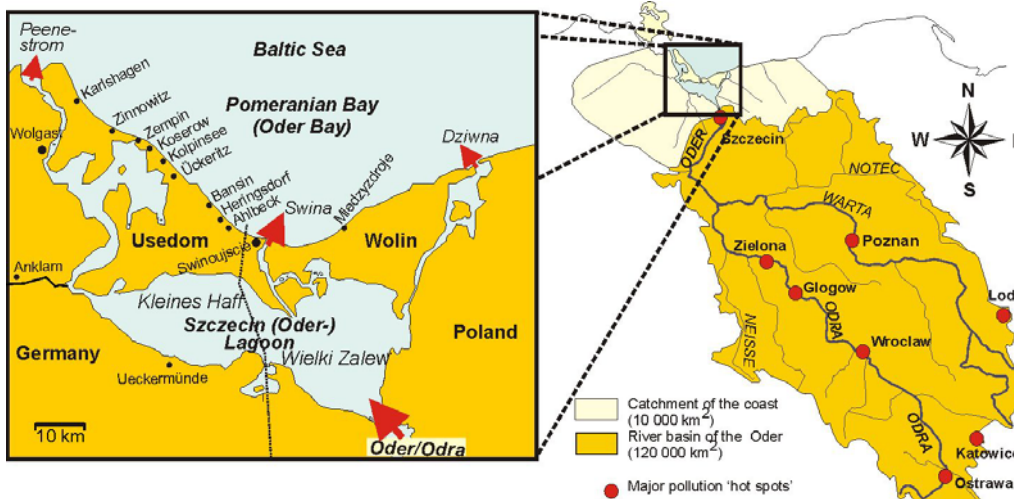
Location: The Odra (German: Oder) estuary is located at the southern Baltic Sea (German - Polish border). It consists of the Szczecin (Oder-) Lagoon and the Pomeranian Bay. The Szczecin Lagoon (687 km²) can be subdivided into the “Large Lagoon” (Polish: Wielki Zalew) on the Polish territory and the “Small Lagoon” (German: Kleines Haff) on the German side. The Lagoon is connected to the Pomeranian Bay via 3 outlets.

Characteristics: The entire estuary is dominated by the discharge of the River Odra (Oder) into the Lagoon. With its length of 854 km and basin area of 120,000 km², the Odra is one of the most important rivers in the Baltic region. The average annual Odra discharge is 17 km³ (530 m³ s⁻¹) and it contributes at least 94% to the lagoon’s water budget.

The Szczecin Lagoon is shallow (average depth of 3.8 m), with a maximum depth of 8.5 m. Only in the shipping channel across the lagoon, dredging maintains a depths of 10.5 m.

The water body is brackish and salinity in the central part ranges between 0.5 and 2 PSU. Intrusions of the Baltic water (6 PSU salinity) mainly via the Swina Channel happen periodically.

The bottom of the shallow areas is formed by eroded sand, which is temporarily covered by a thin and mobile organic-rich fluffy layer. Below a depth of 4 m, silt becomes dominating. The sediments under strong influence of the Odra, show high concentrations of organic matter and heavy metals.



Biology: The lagoon has a long eutrophication history and phytoplankton concentrations are very high (sometimes over 200 mg Chl.a m⁻³). Intensive (toxic) algal blooms, low water transparency, oxygen depletion in some parts, and fish kills are common features. Depending on the trophic system adopted, the present trophic state of the Lagoon is polytrophic or hypertrophic. The primary production in the lagoon is largely light-limited, nutrient limitations may play a role during spring and summer.

Usually, two phytoplankton biomass peaks are observed: Diatoms in spring (e.g. *Cyclotella* sp., *Diatoma elongatum*, and *Fragillaria crotonensis*) and blue-green algae in summer (e.g. *Microcystis aeruginosa*). The gross primary production is around 600 g C m⁻²a⁻¹. The recent data on zooplankton is limited. Rotifers and veligers of the bivalve *Dreissena polymorpha* dominate zooplankton abundance, rotifers and cladocerans supply the bulk of the biomass.

The fish fauna is composed of fresh- and brackish water (e.g., roach, perch, pikeperch, bream, ruffe), migratory (e.g., eel, sea trout), and marine (e.g. herring) species. Most species of commercial importance (e.g. pikeperch, perch, roach, whitefish) form populations migrating between the lagoon and coastal Baltic Sea, eel and herring migrate even further.

Management: The Odra discharge largely controls the nutrient dynamics in the Szczecin Lagoon. Nutrient loads in the Odra were increasing until the late 1980s, declined steeply during the early 1990s and slightly increased afterwards. This pattern was reflected in nitrogen and phosphorus concentrations in the Lagoon (130 μmol N l⁻¹; 6 μmol P l⁻¹ in the late 1990’s). In wet years, the P and N load by the Odra can be up to twice as high as in dry years. The reduction in nutrient contents observed in the early 1990s was largely an effect of the warm, dry years and cannot be attributed to anthropogenic nutrient load reductions. Internal eutrophication, the release of P from the sediment under anoxic conditions plays an important role. The lagoon is a natural eutrophic system and nutrient load reductions have only a minor impact on water quality.

References: For details and further references see Radziejewska & Schernewski: The Szczecin (Oder-) Lagoon. In: Schiewer (ed.): Ecology of Baltic Coastal waters; Ecological Studies, Springer.

Regional Information System Oder Estuary Region, ICZM-Oder: www.ikzm-oder.de/en/

Contact: schernewski@eucc-d.de