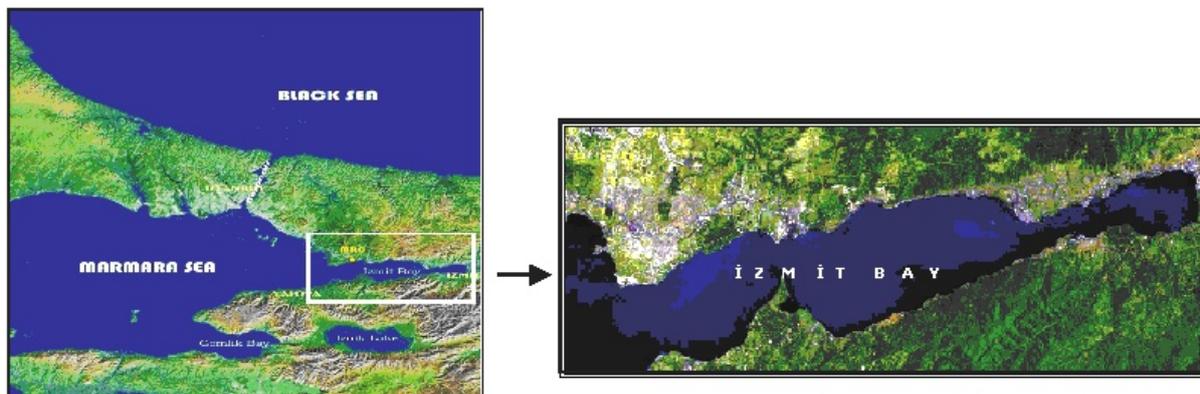


WT 7.17 IZMIT BAY

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2. Izmit Bay



3. Characteristics

<i>Marine System</i>	Izmit Bay, located in the southeastern part of the Marmara Sea has an area of 279 km ² . The bay consists of three parts, connected to each other by narrow openings. The bay has a two-layer water stratification and flow system with a halocline / thermocline which separates the lower water layer of Mediterranean origin (35-38 ‰) from the upper layer of Black Sea origin (22-28 ‰). The thicknesses of the layers change seasonally depending upon the current systems in the area. The major discharges are from the northern part of the Bay.
<i>Watershed</i>	Izmit watershed is a part of Marmara watershed. Although Dilderesi river and Eastern Channel are the main freshwater inputs to the Bay, both of them carry polluted waters from surrounding industries, settlements and agricultural area. Dilderesi is 12 km long and carries 70x10 ⁶ m ³ /year.
<i>Human Activities</i>	Urban wastes, industrial wastes (toxic) and, heavy ship traffic, atmospheric pollution, restricted water circulation, natural phenomenon like earthquake, pollution transport from the adjacent seas
<i>Impact Responses</i>	Oxygen deficiency in bottom waters, biochemical pollution, eutrophication, accumulation of pollutants in sediments and biota, sediment toxicity, habitat destruction, toxic algal blooms, bio-diversity loss.

4. Policy

<i>Policy issues</i>	<p>Water quality. Development of water quality models, identification of limiting nutrient and self-purification capacity, nutrient discharge regulations and control, setting up toxicity threshold levels</p> <p>Integrated waste management. Legal constraints, development of regional criteria for discharges and water quality, capacity building towards the public health and environmental welfare, risk assessment and minimization for hazardous and toxic wastes (accidents), development of contingency plans. Unification of the SMEs for pollution abatement and conservation of resources</p> <p>Promoting decentralized approach for the source control, reuse/recycle of the wastes, enhancement of public awareness, involvement of stakeholders in the decision making process.</p> <p>Rational integration of institutional bodies, cost control from a central budget allocation body and optimization of the efforts by cost-benefit analysis, improvement of existing NGOs in the region as well as promoting international well known NGOs to focus on the problems</p> <p>Land use options, changes, foreseen impacts and prioritization</p>
<i>Policy changes</i>	Land use policy has been drastically changed in favour of industrial establishments. The proximity of Izmit Bay to the metropolitan city of Istanbul enhanced this development.

	<p>Environmental policies. The large volumes of wastes from domestic and industrial sources were mostly discharged to the environment without any treatment and until 1980's, it was assumed that this activity was not deleterious. As a direct consequence of pollution the insufficient environmental policies towards resource management and abatement of pollution was affected and needed to be upgraded. Environmental laws and regulations was set up associated with water pollution control, solid waste control air pollution control etc. However, the levels of nutrient and organic matter in the Bay waters have increased despite the regulations and eutrophication problems persist in the bay. In recent years periodic red tide events have been observed and the Secchi depth has decreased. Furthermore, hazardous wastes and toxic substances in the industrial and complex wastewaters are still out of control.</p>
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5. Stakeholders and Institutional Governance

<i>Major organisations</i>	Ministry of Environment and Forestry, Kocaeli Metropolitan Municipality, Kocaeli Province Directorate of Environment and Forestry
<i>Other leading organisations</i>	Kocaeli University, Gebze High Technology Institute, Kocaeli Chamber of Industry, NGOs

6. Partner Collaboration

<i>SPICOSA Partner Collaborations.</i>	None
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7. Systems Studies

<i>Long time series</i>	<p><u>Physical parameters:</u> water column depth, sechi disk depth, temperature, salinity, conductivity, current (before earthquake), light penetration, total suspended solids (for years 1985, 1990, 1995, 2000). Meteorological data (daily since 1985). <u>Chemical parameters:</u> Dissolved Oxygen, pH, nutrients (total nitrogen, nitrate and nitrite nitrogen, total phosphorus, ortho-phosphate phosphorus, reactive silicate), total and dissolved organic carbon, total polycyclic aromatic hydrocarbons (years between 1999-2003), PCBs (years between 1999-2000) in different matrices (sediment and biota). <u>Biological parameters:</u> Chlorophyll-a, phytoplankton, (number and species), primary production, biomarkers. <u>Remote Sensing and Geographical Information Systems</u> (since 1998). NOAA and Landsat images. Digital data integrated GIS. <u>Point sources:</u> Domestic and industrial wastewater discharges (from nine main discharges of north-eastern region), pollutant loads (total nitrogen, total phosphorus, silicate, total organic carbon, biological oxygen demand), toxicity measurements on the sources. Atmospheric PAH deposition (four seasons in year 2002).</p>
<i>Research Projects</i>	<p>* Wastewater Treatment and Disposal Studies. 1988-1989. NATO TU-WATERS * The effects of industrial developments on the coastal waters and semi enclosed areas - Izmit Bay case study (two projects):1994 –1996, 1999-200. Focus was on eutrophication, water quality, pollution sources and marine biodiversity. In the second project water quality monitoring studies and toxicity of the wastewaters was investigated.</p> <p>* Determination of the Adverse Effects of the Industrial Wastewaters to the Coastal Water Quality of Yalova. 1997 -1998.</p> <p>* Determination Of The Pollution Level In Izmit Bay After The Earthquake. 2001-2002 * Effects of the Natural Phenomenon and Land Based Sources to the Coastal Waters: Case Study of Izmit Bay and Dilderesi River (2001 -2002). The aim was to determine the industrial and domestic pollutants arising from heavily industrialized northern part of Izmit Bay and their effects to the coastal waters of the Bay. * Carcinogenic Polycyclic Aromatic Hydrocarbons (PAHs) Entering Izmit Bay: Determination of Sources and Concentration Levels (2002-2003).</p>