

**WT 7.11 GUADIANA ESTUARY, PORTUGAL**

**1. Host Institution:** CIMA – Centre of Marine and Environmental Research, Universidade do Algarve  
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QuickTime™ and a Photo - JPEG decompressor are needed to see this picture.

**2. Guadiana River Estuary is located in the southeast of Portugal and makes a border between Portugal and Spain. The geographical coordinates of the south most point on the Portuguese margin are 37°10' N and 7°24' E**

**3. Characteristics**

<i>Marine System</i>	The Guadiana Estuary is a mesotidal, narrow funnel-shaped body, well mixed for low, summer (XX m <sup>3</sup> /sec) discharges, but vertically stratified in winter. The mixing zone is within the first 10 km from the mouth but brackish conditions may extend 40 km inland. Winter discharges delivers vital nutrients to the shelf sea. Since 2002, damming of the river reduced drastically this flux. Aquaculture and fisheries are important activities in this area. The wave regime is predominantly SW, associated mainly with swell from Atlantic Ocean. The strong long-shore current is west-to-east and transports ca 200 000m <sup>3</sup> /year of sand partially retained by groin. Domestic sewage discharge at present is important due to the legal halt of water treatment plant.
<i>Watershed</i>	Guadiana is the one of most important rivers on Iberian Peninsula whose total length is 730 km, of which the last 200 make a natural border between Portugal and Spain. Geologically the drainage basin of 67 000km <sup>2</sup> is much diversified. More than 40 dams store water mostly for irrigation purposes (mostly in Spain) and decrease severely the water flow, causing eutrophication and sediment starvation along the coast. Forestry and agriculture are the principal activities in the Portuguese part of drainage basin. Industrial pollution is not important.
<i>Human Activities</i>	The Human activities on the two margins (East – Spanish, West – Portuguese) of the estuary are at present distributed in an asymmetric way. The most important activities are indicated together with impacts: Agriculture - eutrophication, Aquaculture - effluents, Tourism and recreation – habitat destruction, fisheries – border conflicts, salt production.
<i>Impact Responses</i>	<b>River discharge reduction</b> (recently-2002 closed Portuguese Alqueva dam) caused nutrient enhancement and contributes to the toxic algae blooms. Coastal erosion will become more severe. <b>Tourism development and urbanization</b> have invaded natural habitats and added untreated sewage discharge.

**4. Policy**

<i>Policy issues</i>	The damming of Guadiana River eliminated from coastal waters the turbid plumes, which support the plankton blooms and the planktivorous fish stocks. It aggravated the eutrophication impacts. The so called « minimal ecological discharge » is negotiated with water managing authorities in order to keep these issues controllable.
<i>Policy changes</i>	On the Portuguese side of the estuary, the Natura 2000 zone was declared and effectively stopped the urban/tourism development. However the adjacent zone is under strong pressure from tourism on coastal fringe and golf fields inland. The latter are menacing the Natural sanctuary area (Castro Marim salt marsh natural reserve of 2400ha, RAMSAR site). On the Spanish side, the construction of a tourist-urban development for ca 30,000 people under completion changed dramatically the land use policy, invaded the agriculture dominated land and salt marshes which were covered by imported earth and transformed into the golf fields.

**5. Stakeholders and Institutional Governance**

<i>Major organisations</i>	Ria Formosa Natural Park - Castro Marim Natural Reserve, Municipality of Castro Marim (Portugal), Municipality of Vila Real de Santo António, (Portugal) Municipality of Ayamonte (Spain), Regional Port Authority
<i>Other leading organisations</i>	The association of solar pond salt producers, Confederação Portuguesa das Associações de Defesa do Ambiente.

**6. Partner Collaboration**

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

<i>Long time series</i>	Sediment infilling of the estuary/postglacial sea level rise – last 10000 years. Tides – 5 years. Fish discharged (tone) in local port – 30 years. Fluvial discharge of Guadiana – 50 years. Rainfall data -120 years
<i>Research Projects</i>	Monitoring and environmental management of Guadiana Estuary – development of a tool - MEGASIG (2004 -2006), EU-INTERREG IIIA program. Objective: create a versatile management and educational tools for the stakeholders. Multidisciplinary study of Guadiana River Estuary: Estuarine Dynamics – Present Situation, Anthropogenic Influences and the Perspective for the future – EMERGE. (1999 -2002). EU-INTERREG II program. Objective: define the principal environmental forcing factors acting upon estuarine system.
<i>Socio-economic study</i>	To be undertaken within the framework of recently approved Asia Link “Coastal-Profes” project.