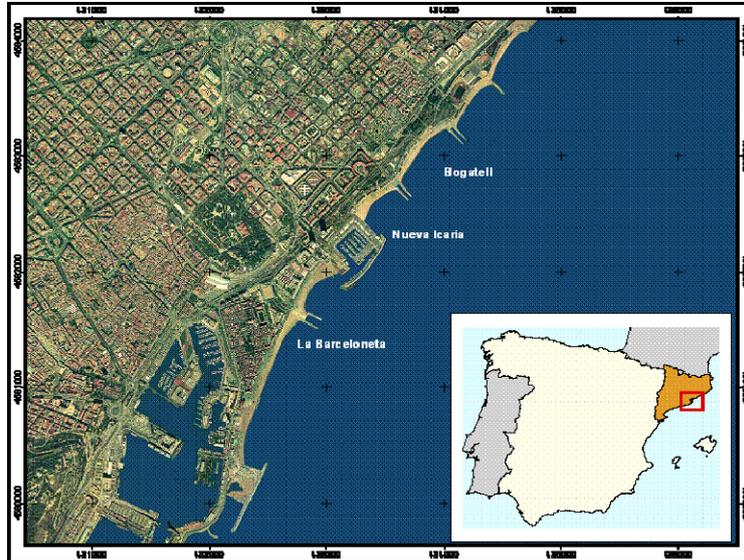


## WT 7.12. BARCELONA WATERFRONT, CATALUNYA, SPAIN

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### 2. Barcelona Waterfront, Northwestern Mediterranean, Catalunya, Spain



### 3. Characteristics

<i>Marine System</i>	30 Km of almost linear open Mediterranean coast broken by different coastal infrastructures such as harbours, protective barriers, etc. Tide generated currents are negligible and wave periods exceeding 7-8 s rare. The most persistent current direction is towards the SW, following the general circulation pattern of the peninsular shelf current of the North-western Mediterranean with an average velocity of 5 and 10 cm s <sup>-1</sup> . The land is mostly beaches and urban construction. The bottom is mud or sand of various grain sizes up to gravel. The water is oligotrophic marine waters, naturally enriched in nutrients by the deep Mediterranean waters through winter mixing, and sporadically by the freshwater land runoff.
<i>Watershed</i>	The coast receives discharges from the Besòs River, and the Llobregat River with a mean water discharge of 5 and 20 m <sup>3</sup> /s respectively. However the water discharge of both rivers is extremely variable (maximum values of more than 2000 m <sup>3</sup> /s in strong flood events). Both rivers traverse urban, industrial and rural settings and the watershed size is 5000 km <sup>2</sup> for Llobregat and 1000 km <sup>2</sup> for Besòs. The watershed near the coast is all urban. During rain events, the coast receives the impact of urban drainage storm collectors, besides that from the rivers.
<i>Human Activities</i>	Barcelona and surrounding cities reach about 4 million habitants. Along the coast there are tourism activities, recreational and commercial harbours, some fisheries, waste effluents and two waste water treatment plants. Near the coast human activities are mainly urban activities with some industries. In the rivers watersheds there are heavy industries and agriculture
<i>Impact Responses</i>	<b>Urbanisation.</b> Changes on the dynamics and diversity of the marine ecosystem: Toxic algal bloom, jellyfish blooms, disappearance of key commercial species (e.g. anchovy, sole, hake, shrimp shellfish) <b>Coast line and morphodynamic modification</b> resulting in beach erosion, changes in sediments dispersion and sediment accumulation sites and in modifying the benthic community. Changes in bottom sediment and bathymetry by Harbour dredging and dumping activities, harbour expansion, and new structures (submerged barriers, and so on). Artificial plumes from urban collectors during rain events. <b>Toxic pollution</b> by waste discharged from rivers, and urban collectors. Accumulation of contaminated bottom sediment for decades. Organism, water and sediment contamination by urban and industrial waste.

**4. Policy**

<i>Policy issues</i>	<ol style="list-style-type: none"> <li>1. Evaluation, monitoring and managing the effect of water and sediment runoff produced by sporadic rain and storms in seas like the Mediterranean, where those represent a major contribution of the land /ocean interaction: eutrophication, sediment transport and re-suspension, beach erosion, bacterial contamination, unexpected contaminants, beach water quality, etc.</li> <li>2. Urban development/eutrophication/ biodiversity: Waste water treatment plant and emissary:</li> <li>3. Exploring Possibilities (social, economical and ecological) of improving the highly degraded Barcelona littoral front for fisheries, and water sport activities.</li> <li>4. How to comply with the new EU Water Quality Regulation Policies</li> </ol>
<i>Policy changes</i>	<ol style="list-style-type: none"> <li>1. 2002 Construction of two new Waste Disposal Plants: primary treatment, and new waste water emissary: 3 Km from the coast and at 50 meter depth, before was 600 m off and at 20 m depth 2006 Implementation to a secondary treatment.</li> <li>2. Construction of a new recreational harbour, modernisation and amplification of the commercial harbour, construction of several protection dikes and underwater barriers.</li> <li>4. Opening new beach sites, developing new beaches.</li> </ol>

**5. Stakeholders and Institutional Governance**

<i>Major organisations</i>	Spanish Ministry of Environment. Conselleria de Medi Ambient of the Autonomous Catalan Government. Conselleria de Obras Publicas of the Autonomous Catalan Government. Barcelona City Hall
<i>Other leading organisations</i>	Agencia Catalana del Aigua. Autoritat Portuaria of Barcelona Harbour Fishermen organisations and recreational organisations. CLAPSA: Organization managing rain water discharge of Barcelona, through collectors.

**6. Partner Collaboration**

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

<i>Long time series</i>	<p>Data of many variables (hydrographic, plankton and fish biomass, sediment and contaminants, bacteria counts etc) have been taken several times since 1965.</p> <p>Long time data: Meteorological data from a station right on the site, and sociological data. Since 1995 monitoring data on temperature and chlorophyll satellite information, Bacterial counts, nutrients, river outflow, phytoplankton biomass and species, Water colour, Beach erosion, meteorological data,</p> <p>Since 2003 real time data on temperature, currents, beach erosion and water turbidity and colour.</p>
<i>Research Projects</i>	<ol style="list-style-type: none"> <li>1. Morfodinámica de playas urbanizadas: integración de datos experimentales y modelos teóricos. Parte experimental 01/01/2004 - 01/12/2007, (PUDEM), Spanish Government.</li> <li>2. Aproximación multiescala a la variabilidad de la turbulencia y su efecto sobre la estructura y la dinámica del ecosistema costero en el Mediterráneo noroccidental (VARITEC) 01/01/2003 - 01/12/2004. Spanish Government.</li> <li>3. Pla de vigilància de fitoplàncton nociu i tòxic a la costa catalana. 2004-2007. Funding agency: Agència Catalana del Aigua (ACA), Catalan Government.</li> <li>4. Programa de vigilància i control de la qualitat ambiental de les aigües litorals a Catalunya durant els anys 2003 a 2007. 2003-2007. Catalan Government</li> </ol>
<i>Socio-economic studies</i>	<ol style="list-style-type: none"> <li>1. Integrated program to study the effect of the mud submarine deposit of the area of the Besòs prodelta on the Barcelona Coastal area. (SPIO): Corporación Metropolitana de Barcelona y Ministerio de Obras Públicas. 1987-1989</li> <li>2. PORT (2002 -2004): Estimación de las obras del plan director sobre los recursos pesqueros que explota la flota pesquera de la cofradía de Barcelona. Autoritat Portuaria de Barcelona (APB).</li> </ol>