

**WP 7. 14 MAR PICCOLO**

**1. Institution:** Istituto Marino Costiero, IAMC-CNR, Taranto (Italy).

**Contact:** Carmela Caroppo



2. The Mar Piccolo of Taranto is located North of the town of Taranto-Apulia-IT. The Mar Piccolo is connected with the Mar Grande basin through two channels, only one of which is important for water exchange.

**3. Characteristics**

<i>Marine System</i>	The Mar Piccolo of Taranto is located North of the town of Taranto and has a surface area of 20.72 km <sup>2</sup> . It is an inner, semi-enclosed sea with estuarine features divided by two promontories of land into two smaller inlets, called First and Second Inlet which have a maximum depth of 13 and 10 m, respectively. Tidal range does not exceed 30-40 cm The volume of water exchanged per hour through the connecting channels is: Inlet: 500000 m <sup>3</sup> h <sup>-1</sup> ; 24 cm s <sup>-1</sup> . Outlet: 380000 m <sup>3</sup> h <sup>-1</sup> ; 18 cm s <sup>-1</sup> .
<i>Watershed</i>	Besides Taranto (300 000 inhabitants), some small inland cities sum-up the residential population to over 500 000 inhabitants, with a rise of 20-30% during summer. A navy base (the most important in Italy), a commercial port, mussel-culture and a fishing fleet directly or indirectly influence the water quality. The presence of 34 submarine freshwater springs (locally called "Citri") and the outfalls of small tributary rivers influence the salinity and carry agricultural chemicals (the latter). The scarce hydro-dynamism and the reduced water exchange with Mar Grande determine, mainly in summer, a high water-stratification.
<i>Human Activities</i>	Urbanization, Heavy industry, Aquaculture, Tourism, Transports and Agriculture are driving forces. Mussel-culture, Navy docks and the fishing fleet are internal pressures.
<i>Unsustainable Forcings</i>	Unresolved use conflicts; Urbanization and emissions; Heavy industry (stainless steel, cement, oil refinery) and relevant emission; Intensive Aquaculture; Intensive Agriculture and Drainage; Navy docks; Shipping.
<i>Impact Responses</i>	Bio-chemical Pollution; Diversity loss; Eutrophication (Algal blooms, microbial pollution); Habitat Destruction; Sediment and Turbidity (metals, IPA, PCB in marine sediments); City devitalization; Social problems; Economy loss; Geomorphic changes.

**4. Policy**

<i>Policy issues</i>	The heavy industry and navy docks are two of the main employers in the area. The steel industry, not only through the emissions but also through the water-scooping machines, strongly influences the biodiversity and environmental quality of water and sediments. The presence of such industrial activities is also in conflict with other productive instalments such as the mussel farms and related activities. The drainage of agricultural soils and the sewage inputs are also important factors that influence the water and sediment quality. The Mar Piccolo is one of the Sites of National Interest for the high level of pollution and a special Programme has just been started in order to plan an intervention for cleaning sediments and reducing pollution. Regional Programmes also include interventions for the characterization and recovery of surrounding sites that may indirectly influence the quality of the basin.
<i>Policy changes</i>	The heavy industry (stainless-steel, oil refinery, cement manufacture) started to be establish in Taranto some fifty years ago (second half of the 1950s) completely changing the economy of the city and Province that were essentially based on agriculture, aquaculture, navy docks and handicrafts. Such change has caused a large increase of the population of Taranto grown to over 280 000 inhabitants from 150 000. Consequently, severe social problems exploded, especially when the steel industry, grown to hire over 22 000 employees, started to reduce the activity and to fire people (now there are less than 8 000 employed staff). These problems have strongly influenced the quality of life and safety in the city.

## 5. Stakeholders and Institutional Governance

<i>Major organisations</i>	All local and regional authorities (Province of Taranto, Municipality of Taranto), Ministry of the Environment, Ministry of Industry, Navy, Aquaculture enterprises, Recreational bodies and Tourism organizations.
<i>Participatory organisations SSA</i>	Aquaculture and fishing enterprises; tourism enterprises.

## 6. Partner Collaboration

<i>SPICOSA Partner Collaborations</i>	Partners : <b>SZN</b> Stazione Zoologica Anthon Dorn
---------------------------------------	--

## 7. Systems Studies

<i>Long time series</i>	<ul style="list-style-type: none"> <li>• Chemico-physical data for seawater and biochemical components of suspended matter: 1970 until today;</li> <li>• Floristic lists of macroalgal species: 1920-1925; 1987 until today.</li> <li>• Floristic lists of microalgal species and cystes: 1991-1994; 1996-1997; 2001-2003.</li> <li>• Metals (Hg, Pb, Cd, Cu, Zn, Ni and V) and HPAs and PCBs: 1986 until today</li> <li>• Quantitative data of fecal indicators : 1981 until today; Bacterial diversity: 1999 until today</li> <li>• Cystes in the sediments</li> </ul>
<i>Research Projects</i>	<ul style="list-style-type: none"> <li>• “Study of the ecosystem Mar Piccolo of Taranto: biocenoses with particular attention to phytocenoses”;</li> <li>• “Individuation and monitoring of non-indigenous species in the Taranto seas”;</li> <li>• “Chemico-physical and biochemical conditions in Mar Piccolo of Taranto”;</li> <li>• “Pilot study for the environment characterisation of marine areas subject to pollution”;</li> <li>• “Study for recovery and exploitation of shoreline in Mar Piccolo”;</li> <li>• “Preliminary study of ILVA water-scooping machine environmental impact the on Mar Piccolo ecosystem and on mussel-culture activities”;</li> <li>• “Monitoring and reclassification of costal zone for mussels production, stabulation, commercialisation and sale (D.L. 192/77 and D.L. 30/12/92, n. 530)”;</li> <li>• “Anthropogenic impact on the biodiversity of marine ecosystems”;</li> <li>• “Risk analysis and evaluation of the environmental quality index of coastal zones at high environmental impact: new classes of persistent pollutants”;</li> <li>• “Anthropic impact on biogeochemical cycles: ecological aspects”;</li> <li>• “Mussel culture: environmental studies at the production sites: bioaccumulation, epibionthic fauna and infauna on the harvesting collectors”;</li> <li>• “Innovative technologies including: Bioremediation, utilization of bacteria, and antibacterial activity of extracted products”;</li> <li>• “Technologies for CO<sub>2</sub> storage and reuse, including enhanced fixation in macroalgae for biofuel production”;</li> <li>• “Technological innovation and Policulture activities for mussel culture”;</li> <li>• “Integrated procedures for the investigation of marine trophic processes and for the management of platforms for the continuous monitoring of the marine environment”;</li> <li>• “Characterization of waste water from the Taranto industrial area”;</li> <li>• “Study on the environmental impact of the water up-take plants from the ILVA factory on the Mar Piccolo ecosystems and mussel farming”.</li> </ul>
<i>Socio-economic study</i>	<p>Study from an environmental, social and economical point of view of some areas near Taranto not or little subject to integrated policy: “Programma Terra Progetto Posidonia”; <a href="http://www.comune.taranto.it/Posidonia/INDEX.HTML">http://www.comune.taranto.it/Posidonia/INDEX.HTML</a></p>