



ECOTOXICOLOGICAL INVESTIGATIONS TO DETERMINE NEW REFERENCE VALUES FOR THE ORBETELLO LAGOON AREA, WITH THE AIM OF A POSSIBLE REDEFINITION OF THE NATIONAL INTEREST SITE

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Introduction: in the last century, several Italian territories have been subjected to strong impact due to industrial, mining and agricultural activities, leading to environmental decay. Consequently, the Italian Government adopted a national program (D.M. 471/99) to protect both human health and terrestrial or marine systems from hazardous substance release in the impacted areas. This program, based on several environmental criteria (site characteristics, amount and hazard of pollutants), identified several contaminated areas (D.Lgs. 22/97; D.Lgs. 152/2006) requiring clean-up actions and defined as National Interest Sites (SINs) (1). In particular, the present project will concern the National Interest Site of “Orbetello - Ex Sitoco area”.

Aim: the aim of this project is to evaluate/quantify the contamination in the Orbetello area in order to hypothesize specific intervention actions and/or redefine the SIN area perimeter according to the site-specific threshold values of a series of chemical contaminants, responsible of toxic effects.

Methods: a chemical–physical and ecotoxicological approach was identified as the most appropriate and objective criterion for assessing the values (1). Physical, chemical analyses, bioaccumulation and ecotoxicological tests will be carried out. In particular, a battery of ecotoxicological tests will be utilized to evaluate toxicity and bioavailability of the tested contaminants: at least four species will be tested, belonging to different taxonomic groups, the marine bacterium *Vibrio fischeri* (2), the unicellular alga *Phaeodactylum tricornutum* (3), the copepod crustacean *Tigriopus fulvus* (4), the cladocerus crustacean *Daphnia magna* (5), respectively representatives of decomposers, primary producers and consumers in the trophic net.

Conclusion: the results will help to redefine the perimeter the Orbetello National Interest Site and to undertake, if necessary, specific intervention actions.



References:

- (1) Ausili A., Bergamin L. and Romano E. (2020) Environmental Status of Italian Coastal Marine Areas Affected by Long History of Contamination. *Frontiers in Environmental Science*. Volume 8 | Article 34
- (2) Procedura operativa per il saggio in fase solida mediante *Aliivibrio fischeri*. ISPRA Quaderni di Ricerca Marina 04/2021
- (3) ISO 10253:2016: Water quality — Marine algal growth inhibition test with *Skeletonema sp.* and *Phaeodactylum tricornutum*
- (4) UNICHIM 2396:14 – Qualità dell'acqua - Determinazione della tossicità letale a 24h, 48h e 96h di esposizione con naupli di *Tigriopus fulvus* (Fischer, 1860)
- (5) UNI EN ISO 6341:2013 - Water quality - Determination of the inhibition of the mobility of *Daphnia magna* Straus (Cladocera, Crustacea) - Acute toxicity test