



### PROJECT PARTNERS



- Lead partner: INSTITUTE OF OCEANOGRAPHY AND FISHERIES (IOF)
- NATIONAL RESEARCH COUNCIL (CNR)
- BLUE WORLD INSTITUTE OF MARINE RESEARCH AND CONSERVATION (BWI)
- ENVIRONMENTAL PROTECTION AGENCY OFFRIULI VENEZIA GIULIA (ARPA FVG)
- CETACEA FOUNDATION (CF)
- MARCHE REGION (REM)
- MINISTRY OF ENVIRONMENT AND ENERGY (MEE)
- TEACHING INSTITUTE FOR PUBLIC HEALTH, PRIMORJE-GORSKI KOTAR COUNTY (TIPH)

[www.italy-croatia.eu/soundscape](http://www.italy-croatia.eu/soundscape)  
EUROPEAN REGIONAL DEVELOPMENT FUND

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# SOUND SCAPE

SOUNDSCAPES IN THE NORTH ADRIATIC SEA AND THEIR IMPACT ON MARINE BIOLOGICAL RESOURCES

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EUROPEAN REGIONAL DEVELOPMENT FUND



Pollution of the sea has many forms, not always perceivable with our senses: pollution from spills of toxic substances, pollution from solid waste, but also thermal pollution and noise pollution. The latter, for example, although not perceptible underwater by the human ear, deserves to be studied for its consequences on marine fauna: the water in fact allows a faster propagation of about 1500 meters per second, about 4 times more than in the atmosphere.

Many studies attribute to excessive underwater noise the responsibility of deaths and beaching of different marine creatures, especially cetaceans. The main sources of this form of pollution have been identified in navigation, in the activity of exploration and extraction of gas and oil from the seabed, in the use of active sonar by military and commercial vessels, in professional fishing activities.

The quantity of underwater sounds has increased significantly during the last century, so much that it has almost completely covered the natural underwater noises.

**SOUNDSCAPE is a cross-border project that aims to map underwater noise in the Northern Adriatic Sea.** The data will be used to study underwater noise pollution and its impact on wildlife, with the aim of developing a plan for the sustainable use of the sea and resources.

## CAUSES OF UNDERWATER NOISE POLLUTION:



SEISMIC SURVEYS



COASTAL AND OFFSHORE WORK



MILITARY ACTIVITIES



MARITIME TRAFFIC



FISHING ACTIVITIES



YACHTING AND  
RECREATIONAL BOATS

## EFFECTS ON BIOLOGICAL ORGANISMS

Marine invertebrates, fish,  
mammals and marine reptiles:



PHYSIOLOGICAL EFFECTS: PHYSIOLOGICAL CHANGES THAT RESULT FROM EXPOSURE TO NOISE



HEARING LOSS AND AUDITORY MASKING: INCLUDES PERMANENT OR TEMPORARY DAMAGES TO HEARING SYSTEMS OF MARINE ANIMALS AS A RESULT OF NOISE EXPOSURE, AND INTERFERENCE OF NOISE WITH BIOLOGICALLY IMPORTANT SOUNDS



BEHAVIOURAL AND ACOUSTIC RESPONSES: CHANGES IN BEHAVIOUR AND VOCALIZATION PARAMETERS OF EXPOSED ANIMALS

## FROM SHARED RESOURCES TO JOINT SOLUTIONS



PROJECT DURATION 01/2019-05/2021



ERDF 1.824.134,41



TOTAL BUDGET 2.146.040,50

## PROJECT GOALS

The general **purpose** of **SOUNDSCAPE** project **is the evaluation of the impact of underwater noise on marine fauna** and in general on the ecosystem of the Northern Adriatic Sea. **Moreover it aims to the creation of a cross-border monitoring network to ensure effective protection of marine biodiversity and develop sustainable use of marine resources, ecosystems and coastal resources.**

To achieve this target:



CREATION OF A NOISE MONITORING SHARED NETWORK



ASSESSMENT OF THE INFLUENCE OF NOISE ON BIODIVERSITY



DEVELOPMENT OF MITIGATION MEASURES

## ACTIONS

**Communication activities:** the project will be promoted through public events in Italy and Croatia and through the use of digital media. At the end of the project the results will be published in a brochure and promoted to the European Commission.

**Assessment of noise pollution:** by positioning hydrophones in the Northern Adriatic, underwater noise caused by human activities will be recorded.

**Sensitivity of the objectives:** the consequences of the impact of the underwater noise pollution on biodiversity will be evaluated, investigating in particular the effects on two target species (the dolphin *Tursiops truncatus* and the turtle *Caretta caretta*).

**Creation of a model on underwater noise pollution and planning of Mitigation measures:** a map of the sound landscape of the Northern Adriatic Sea will be created and integrated into the ADRIPLAN portal ([data.adriplan.eu](http://data.adriplan.eu)) developed as part of the DG MARE ADRIPLAN Project. The mitigation measures to reduce underwater noise will be proposed at european level.