SONORA

Filling the gap: Thresholds assessment and impact beyond acoustic pressure level linked to emerging blue-growth activities

Kick off meeting

Universitaire Stichting - Fondation Universitaire. Brussels

February 14th, 2023

JPI OCEANS

2021 2030 United Nations Decade of Ocean Science for Sustainable Development

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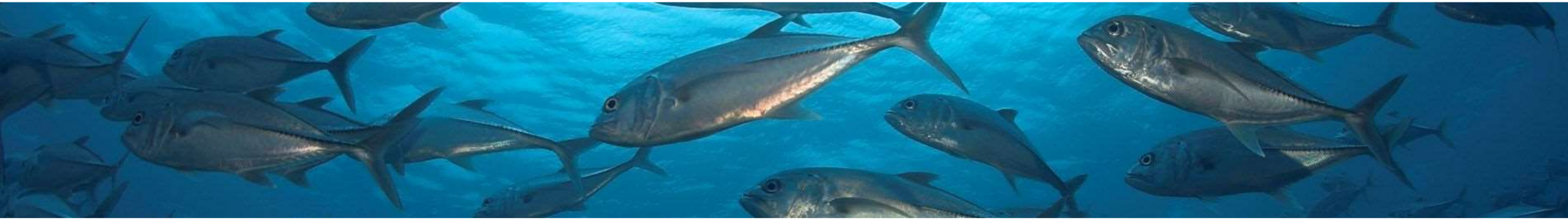


1. Consortium Overview

1. Consortium Overview

- SONORA Partners:

UNIVERSITÀ DEGLI STUDI DI TRIESTE

Modelling and Propagation, Underwater Acoustics, Bioacoustics

OGS Istituto Nazionale di Oceanografia e di Geofisica Sperimentale

Acoustics
Biology

Università degli Studi di Palermo

Biology

UNIVERSITAT POLITÈCNICA DE VALÈNCIA
CAMPUS DE GANDIA

Underwater Acoustics
Ecology
Signal Processing & Machine learning
Aquaculture

Universitat d'Alacant
Universidad de Alicante

Acoustics
Marine Sciences

- SONORA Subcontractors

Private Consultant

ELECTRÓNICA SUBMARINA SAES

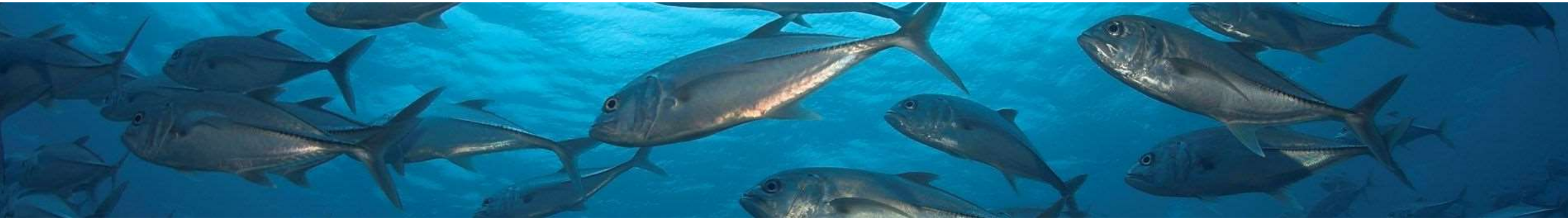
2. Project Objectives and Description

THEME 1: EFFECTS OF ANTHROPOGENIC NOISE POLLUTION ON MARINE ECOSYSTEMS

- Study of the usual **behaviour of fish** in and around commercial marine aquaculture cages
- Study of the **effect of noise produced on blue economy industries**: marine industrial aquaculture, seabed exploitation
- Study of the **effect of noise on commercially harvested species** considering different growth stages
- Study of the **effects of noise at behavioural and biochemical** (celular and molecular) **levels**

THEME 2: INNOVATIVE SEISMIC SOURCES AS AN OPTION FOR QUIETER AND MORE EFFECTIVE ALTERNATIVES TO CONVENTIONAL MARINE GEOPHYSICAL EXPLORATION

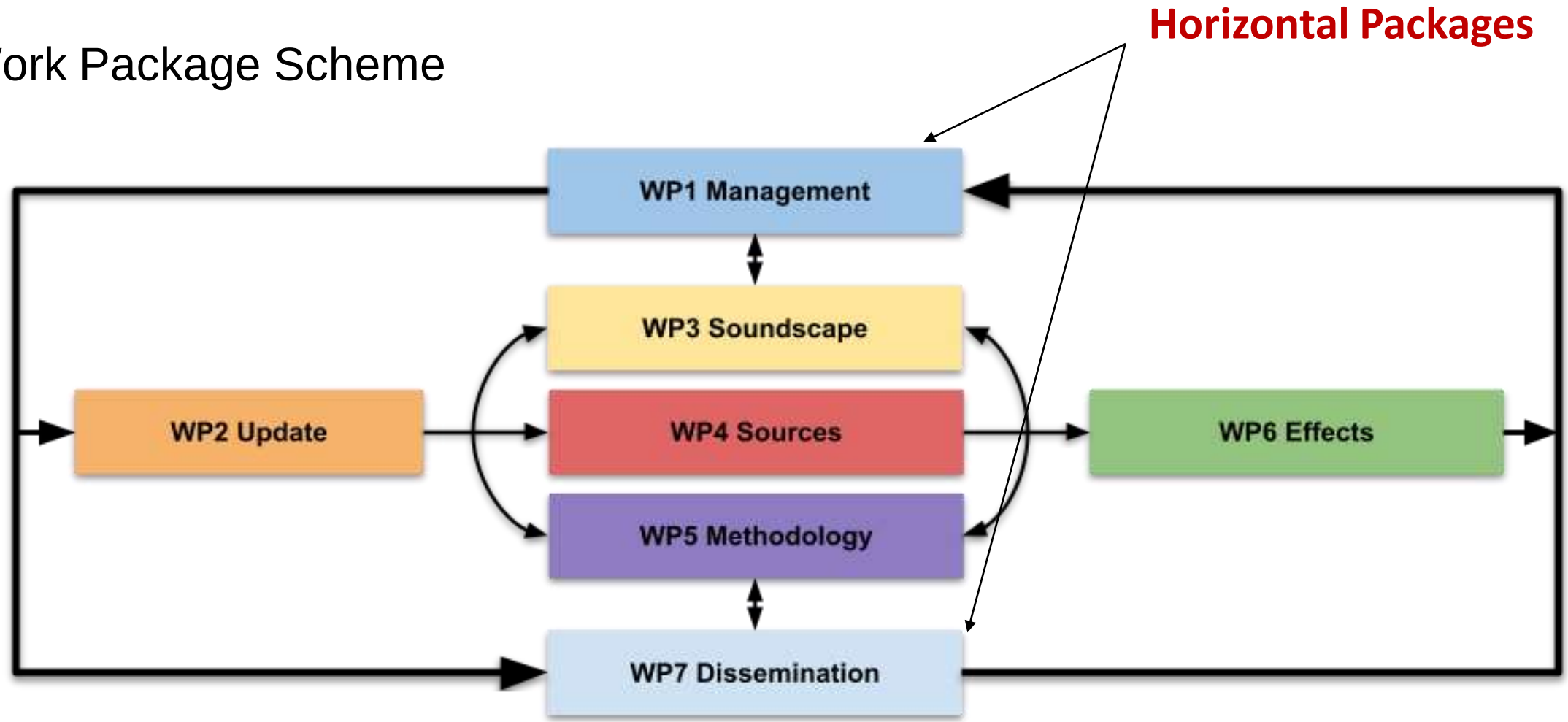
- **Measurement and characterisation** of underwater noise sources: continuous/Impulsive
- Implementation of **sound propagation models**
- Development of **predictive and monitoring systems** software tools
- Compilation of noise risk matrix to aid in the Development of **guidelines** for conducting marine geophysical prospecting activities



3. Project Work Plan

3. Project Work Plan

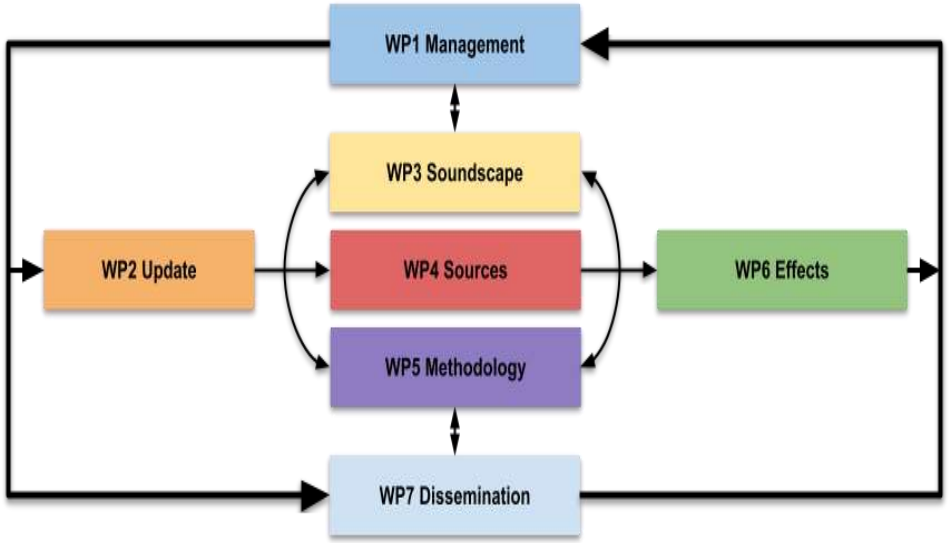
- Work Package Scheme



3. Project Work Plan

WP1. Project coordination, management and quality assurance

- Management Structure
- Technical and Financial Management and Reporting
- Data Management
- Quality Assurance and Risk Management



3. Project Work Plan

WP2. Update in anthropogenic underwater sounds and their effect on the welfare of marine vertebrates

- Objective:To get a better understanding of underwater noise sources and their effect
- Tasks:
  - **Update of the state-of-the-art**. It is important to establish in a more detailed way the current state of the science regarding not only the behaviour of fish in relation to noise, but also the existing noise sources and their most important characteristics.
  - **Noise source catalogue**. A source catalogue and their possible impact on marine environment will be defined.

3. Project Work Plan

WP3. Soundscape around offshore fish farms

- Objective: To monitor noise sources in fish farm environment. Noise maps
- Tasks:
  - **Noise monitoring in the fish farm environment**.

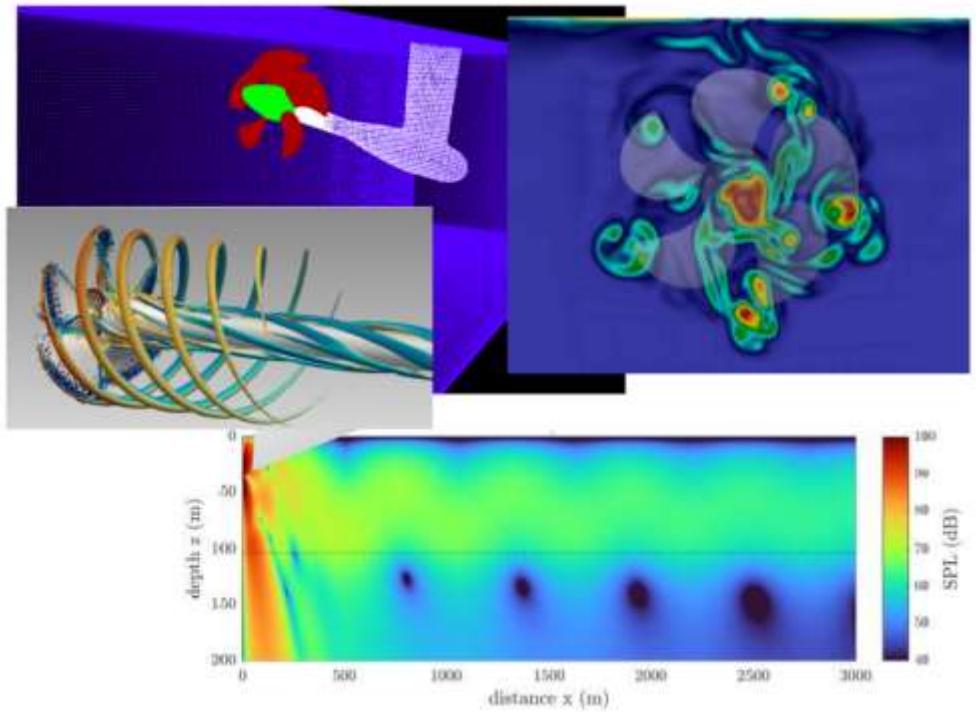
    Determine Sound Pressure Levels (SPL) using passive monitoring system, SAMARUC,(and others) installed in fish farm cages.
  - **Noise map around the facilities**.

    Responsible for obtaining, **using Ray Tracing techniques**, a noise map in the vicinity of the facilities.

3. Project Work Plan

WP4. Seismic and opportunistic noise sources. Characterisation and modelling

- Objective:To characterize anthropogenic noise sources; Numerical modelling and propagation; Noise risk matrix
- Tasks:
  - **Numerical Modelling of impulsive sources**: modelling of seismic sources by studying the noise produced by airguns **comparing various software**.
  - **Numerical Modelling of continuous sources**: characterisation and propagation of ship propeller noise using high-fidelity numerical simulation.
  - **Comparison with experimental data**
  - **Noise risk matrix**: Compile into a noise risk matrix - sources vs. biological recipients

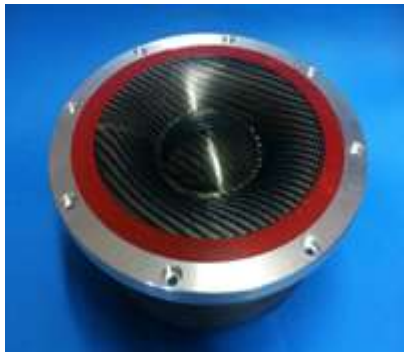


3. Project Work Plan

WP5. Experimental equipment and methodologies for underwater noise impact studies

Objective: To implement an experimental set-up for analysing physiological and behavioural response of fish to noise in different scenarios.

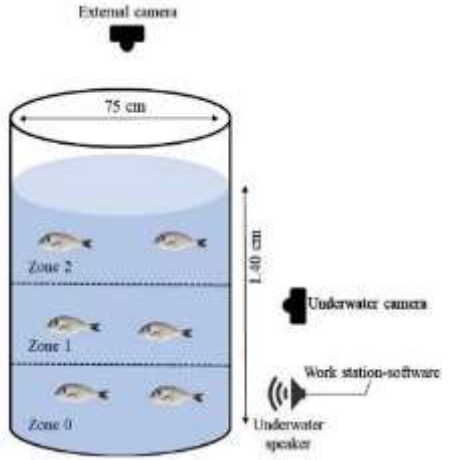
- Tasks:
  - **Power controlled underwater sound source design and characterization**
  - **Design and characterisation of receiver transducers (SPL and Particle Motion sensors**
  - **Experimental setup and methodology in tanks**
  - **Experimental setup and methodology in cages**



3. Project Work Plan

WP6. Effects of anthropogenic noise on fish

- Objective: To study the effects of noise on commercial fish species in tanks, cages and around aquaculture facilities (including early development stages).
- Tasks:
  - **Behavioural and physiological impact on fish in early development larval and other growth stages in tanks**
  - **Behavioural and physiological impact on fish in adult stages in cages**
  - **Effects of anthropogenic noise on wild fish assemblage around offshore fish farms**



3. Project Work Plan

WP7. Communication, Dissemination and Networking

Dissemination plan scheme

Visual identity and online communication channels

- *Logo*
- *Basic promotional materials (leaflet, templates)*
- *Dissemination strategy*
- *Social media tools (website, social network)*

Scientific dissemination

- *Conferences/meetings*
- *Reports, deliverables*
- *Journals publication*
- *Contributions to scientific conferences*

Integration/Training activities

Young scientists or students

- *Integration with training and research activities of the partners*
- *Scientific fairs*

Stakeholders

- *Online seminars*
- *Panel discussions*
- *Webinars*

3. Project Work Plan

WP7. Communication, Dissemination and Networking

Visual Identity and online communication channels

- Visual identity guidelines: logo, basic promotional materials, templates

- Identification of the main fora, involving:
- Media, Social networks and website

3. Project Work Plan

WP7. Communication, Dissemination and Networking

Scientific dissemination

- Reports and meetings (**mid-term and final conferences**)
- **Website (project description, objectives and consortium members**).
- **Active participation in social media** (Twitter, Facebook, Instagram or LinkedIn)
- **Published in high-impact factor peer-review journals**.
- Contributions to **scientific conferences**.
- Publications will be in **open access** format to the possible extent.

3. Project Work Plan

WP7. Communication, Dissemination and Networking

Training activities for young scientists or students

- **Noise source modelling and propagation in marine ecosystem (UNITS)**
- **Sound source characterization (UA, UPV)**
- **Biochemical indicators of animal welfare (UNIPA)**
- **Noise effects on fish (UPV). To be included in the Underwater Acoustics course of the Master's Degree in Acoustics Engineering and of the Master's Degree in Assessment and Environmental Monitoring of Marine and Coastal Ecosystems.**

Others:

- Doctoral thesis and other initiatives (European see days, European research night, open workshop initiatives, …)

3. Project Work Plan

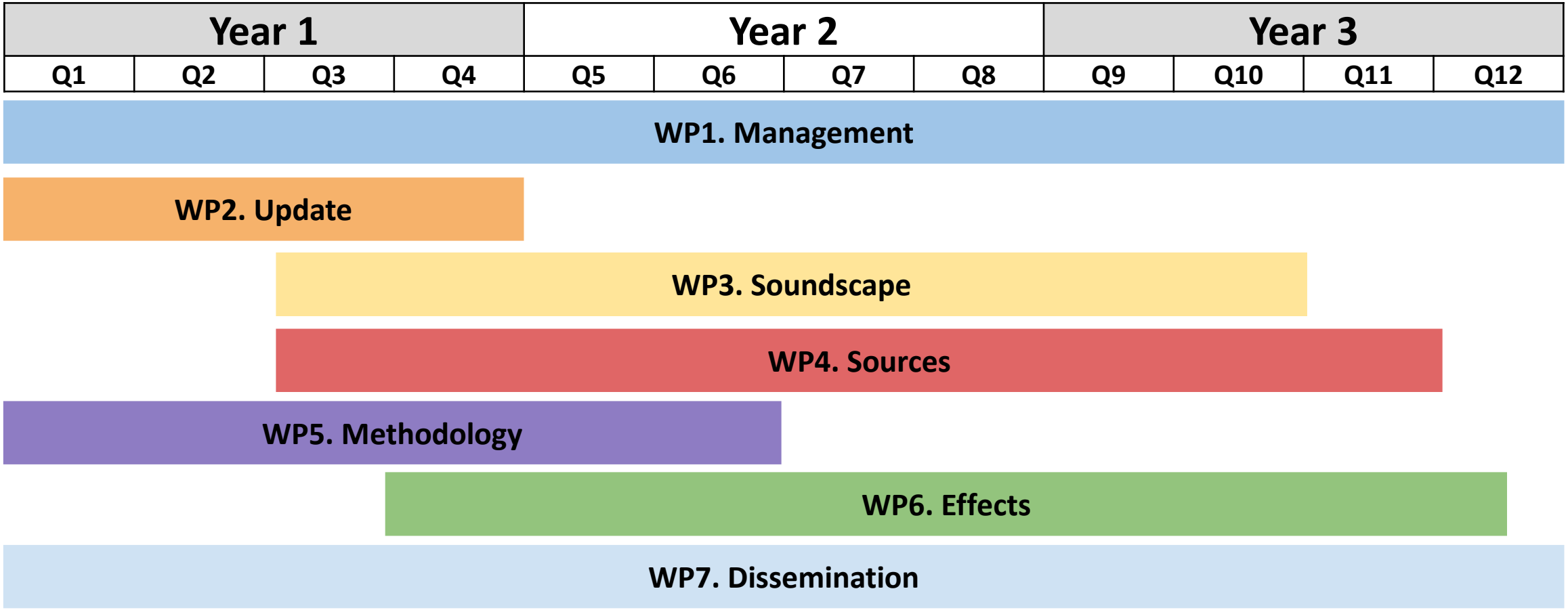
WP7. Communication, Dissemination and Networking

Integration of stakeholders or activities for stakeholders

- **Online seminars and panel discussions**:
  - Webinar/conference conducted by **UNITS** related to modelling and propagation of acoustic sources in the marine environment.
  - Webinar/conference conducted by **UA** related to anthropogenic sound sources and noise maps.
  - Webinar/conference conducted by **UNIPA** related to the influence of anthropogenic noise in fish welfare.
- **Scientific breakfasts and/or seminars** (online or face-to-face)

3. Project Work Plan

- Time Schedule



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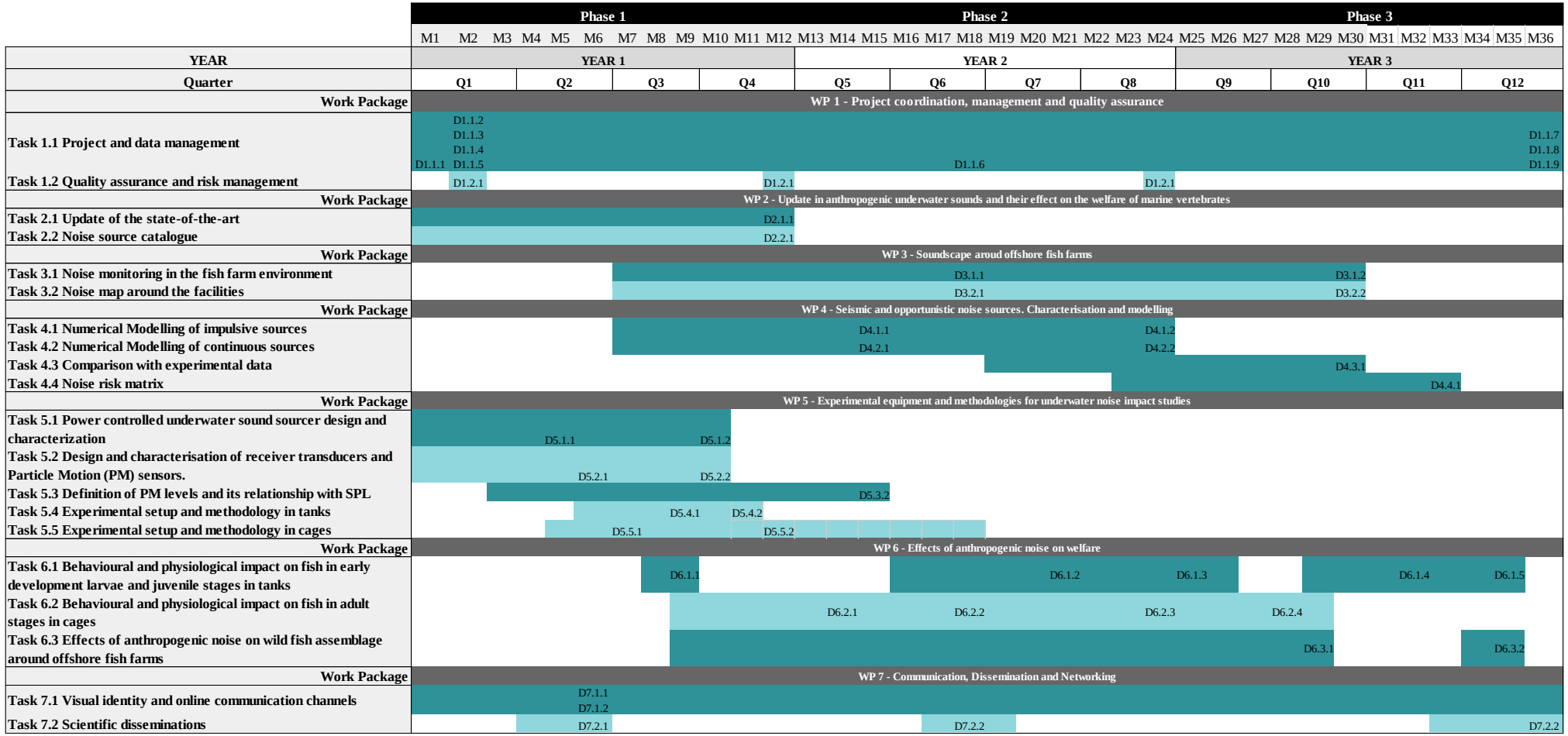

4. Next Meeting

- **Sonora Meeting at Gandia, 19-23th June and participation in Summer School of MASTER WAVES**

- **During our kick-off meeting in Elche (Alicante)**, proposed by the UPV group, we agreed that the **Summer School of Erasmus Mundus Master** on Acoustical Engineering "**WAVES**" **was a nice oportunity to diseminatte the progress of the project.**

3. Next Meeting

- **Sonora Meeting at Gandia, 19-23th June and participation in Summer School of MASTER WAVES**

- We have programmed a 4 days school and a last day for an excursion to the floating cages of bluefin tuna of *Balfegó* at *l'Ametlla de Mar.*
- Researchers of SONORA **will participate as teachers giving a talk of your perspective of the problems addressed in the project** to the students
- The rest of school days are devoted to acoustic techniques for biomass estimation in fisheries (with a particular flavour of tuna)

OPEN!!!

jramis@ua.es

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