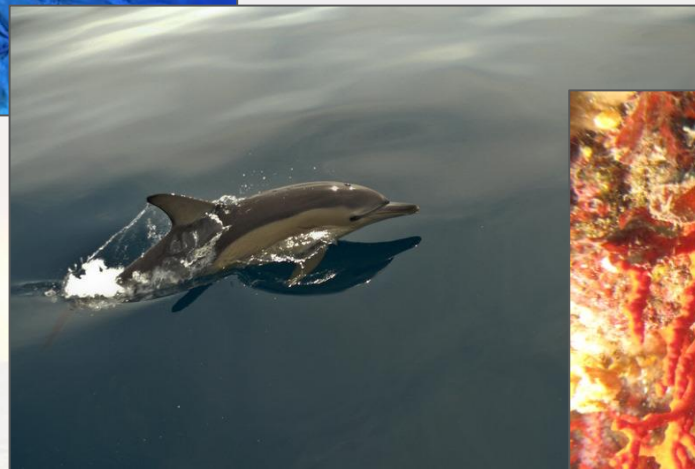
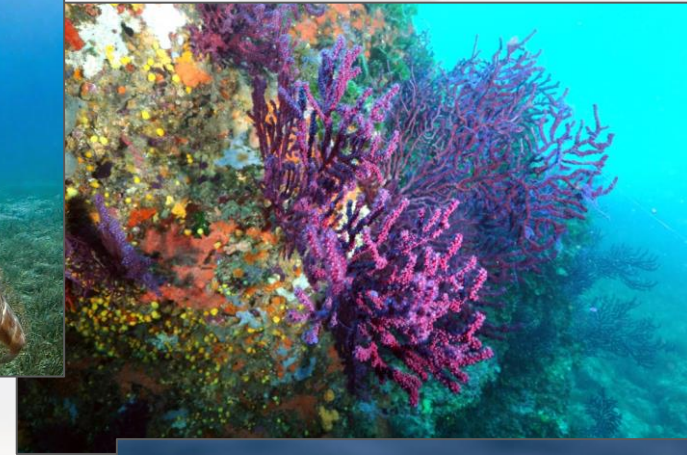


Ecological restoration of human impacted Mediterranean benthic marine ecosystems through active ecological restoration, the LIFE Ecorest project

Jordi Grinyó, Marina Biel, Sofia Faramelli, Cristina Martín, Maria Montseny, Andreu Santín, Andrea Gori, Cristina Linares, Jacopo Aguzzi, Damianos Chatzievangelou, Joan Navarro, Nathan J. Robinson, Nixon Bahamon, Toni Abad, Joan B. Company



Background



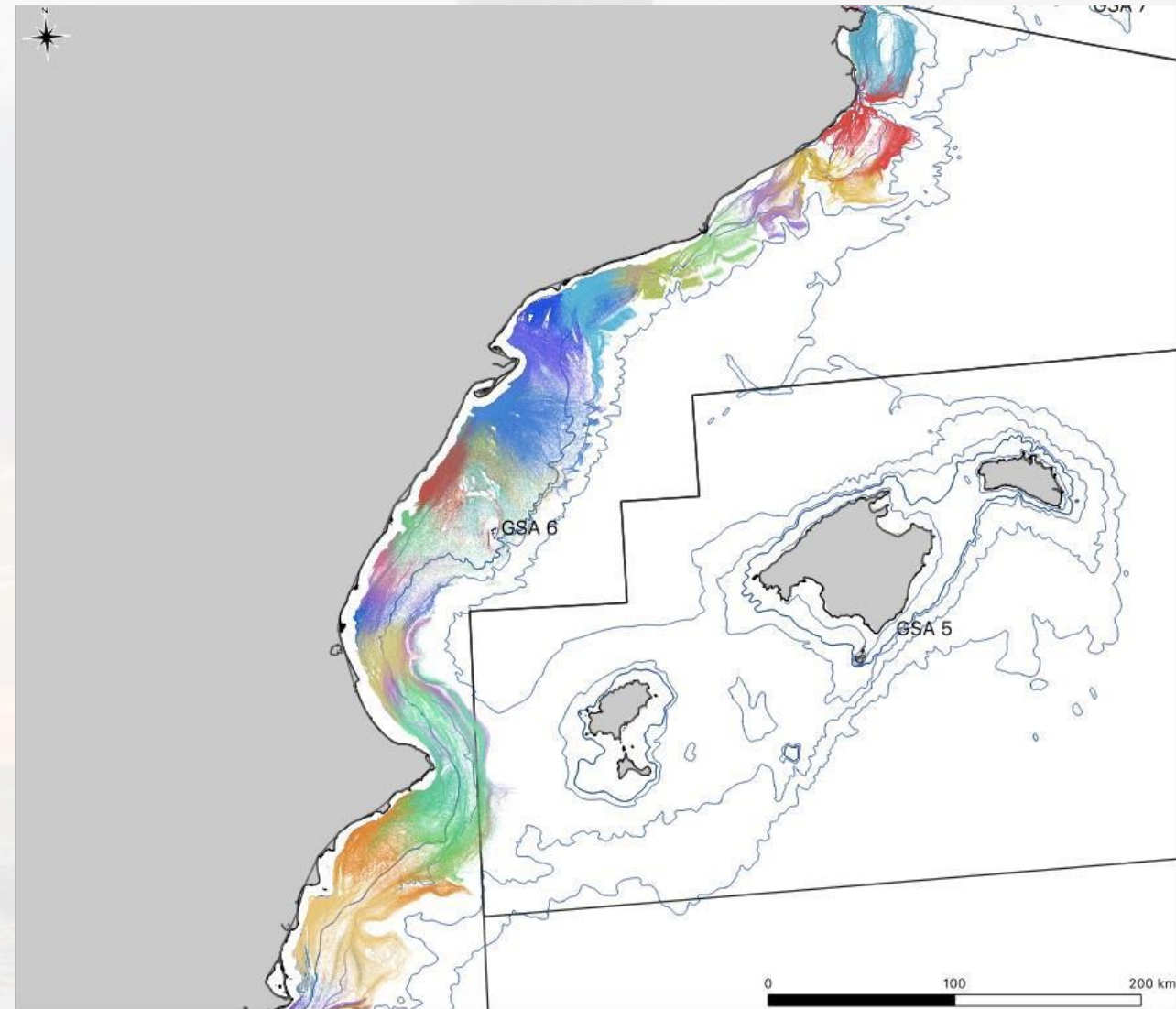
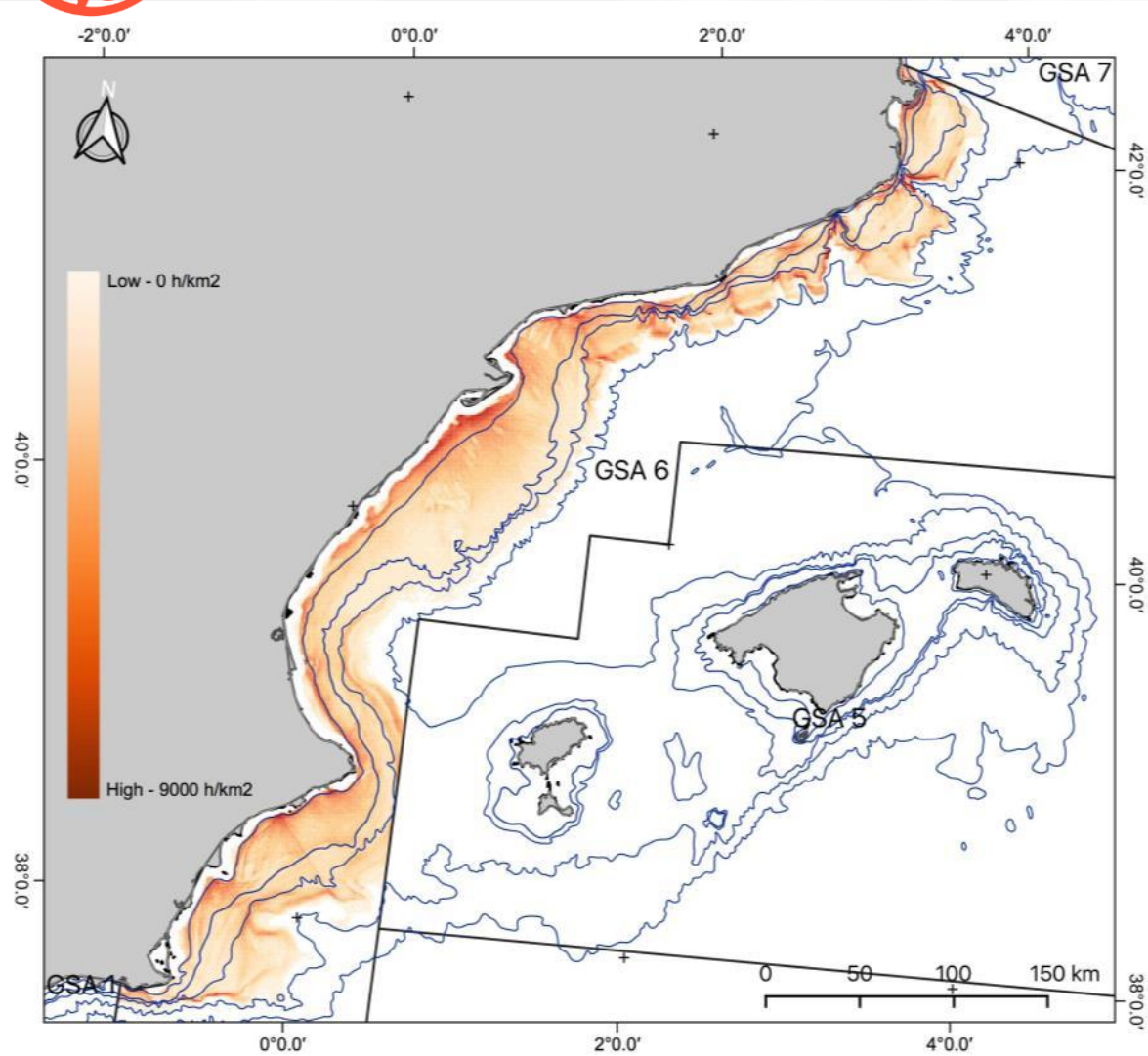


Background: fishing communities



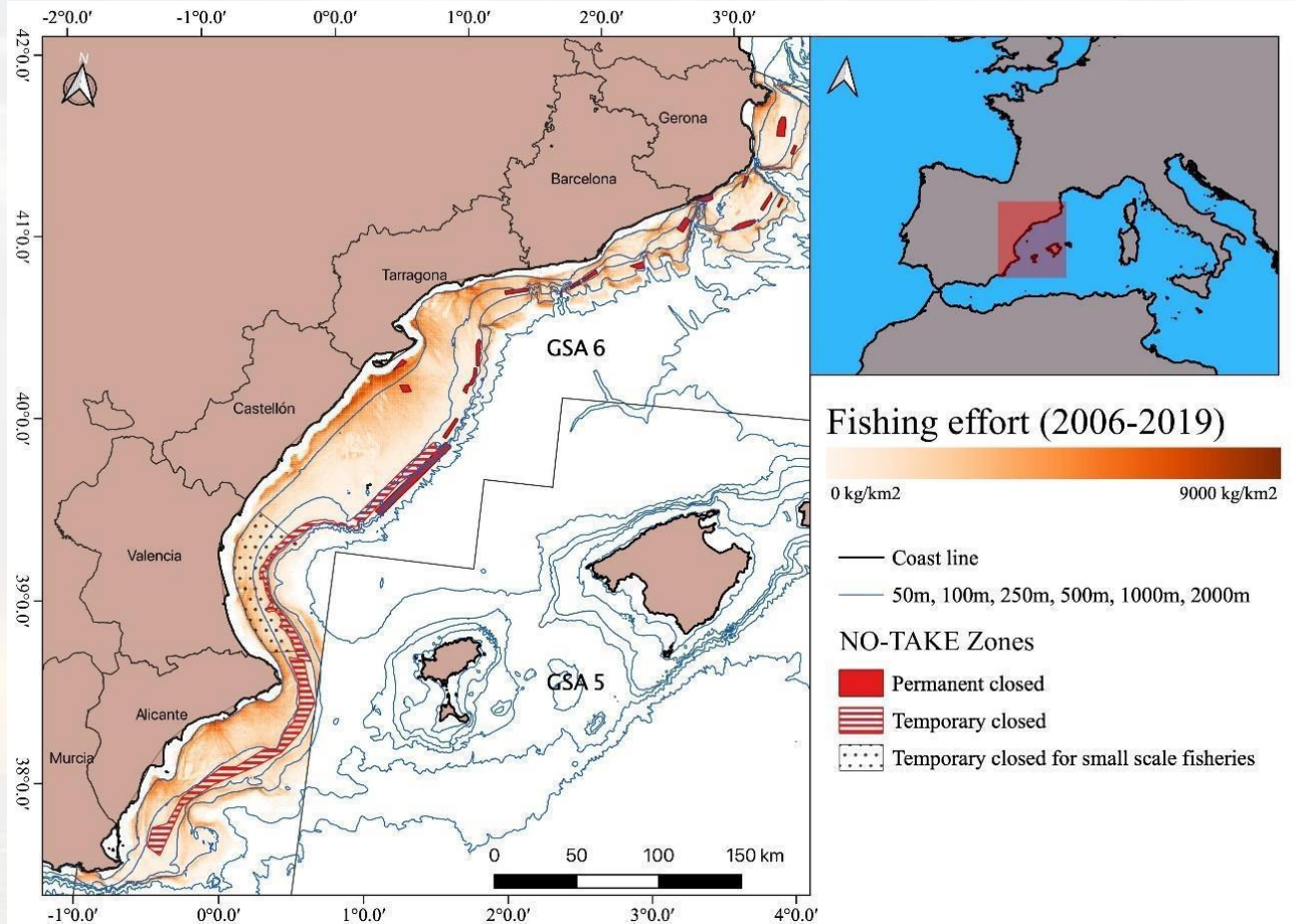


Background: trawling grounds

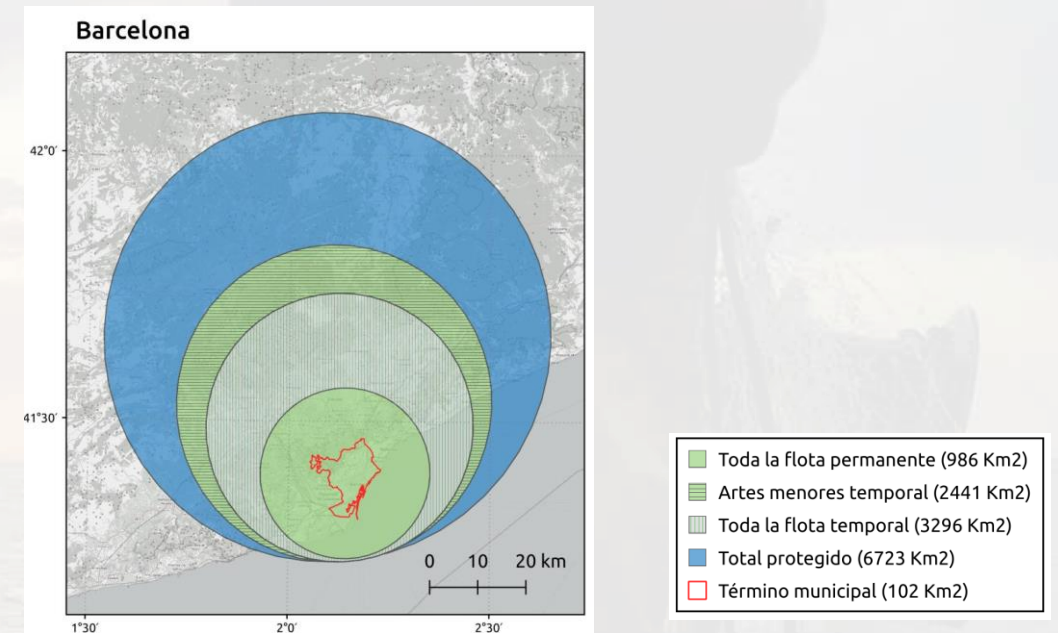




Background: establishment of deep MPAs



a) 20 new permanent closures areas:
Over 600 Km²
(Catalan coast/Northern GSA6)
Almost 5 % of total fishing ground surface
(enforced this last January 2022; published in the Spanish Official Gazette)





Background: recovery of commercial stocks

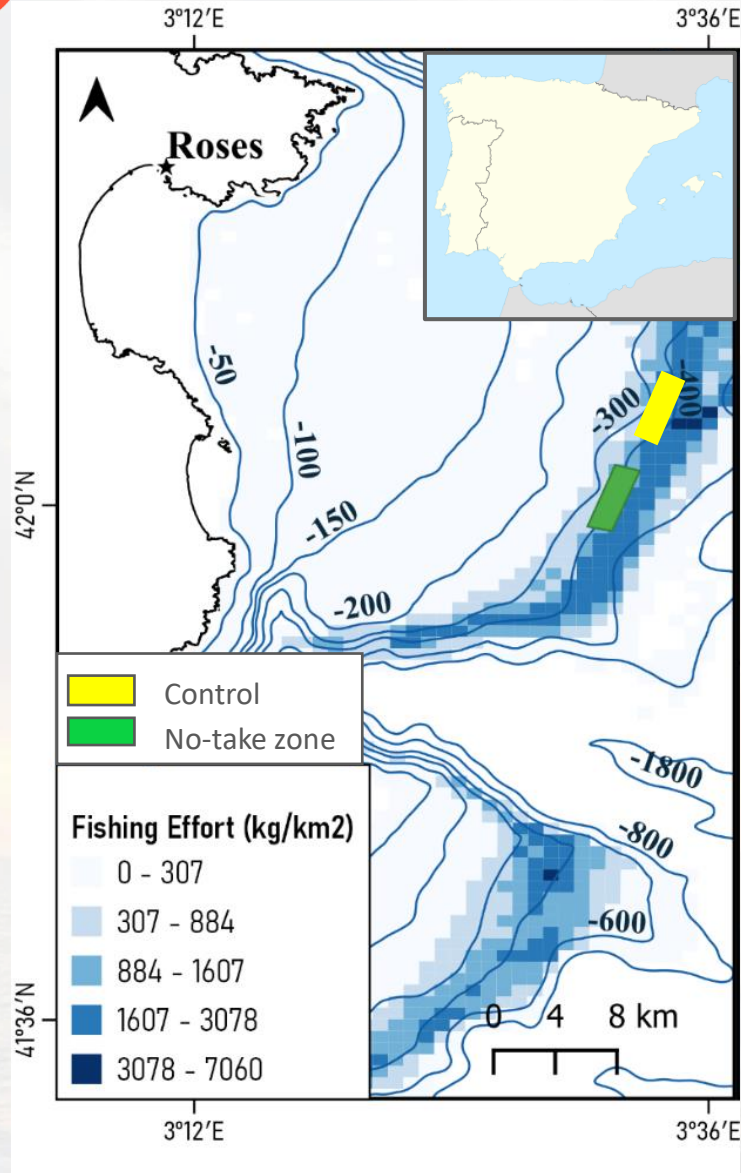
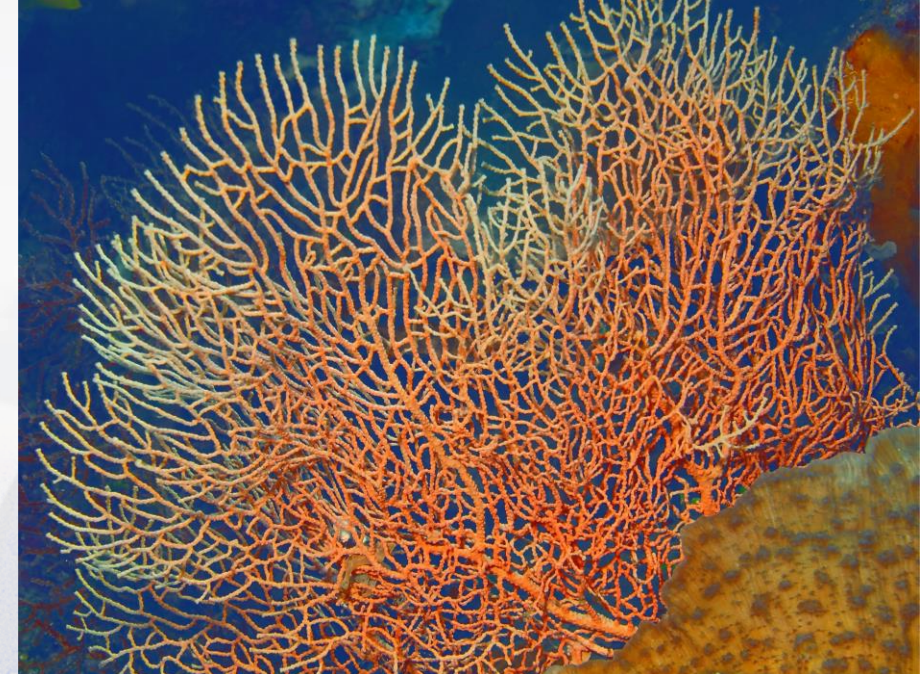


Photo: Joan B. Company (September 2th, 2021)

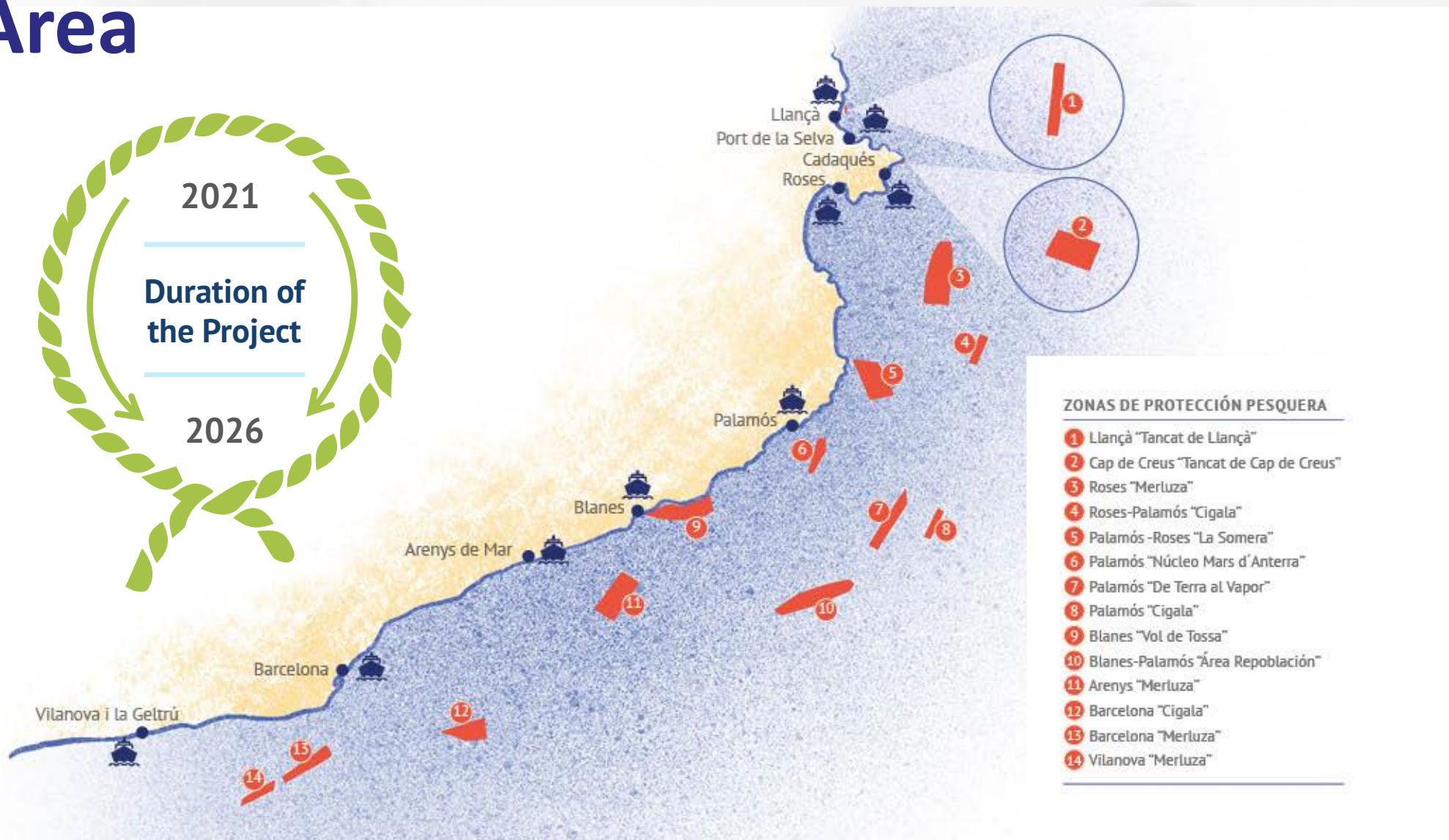


OBJECTIVE

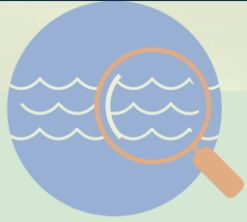
Actively restore aprox. **30.000** ha. of **Deep-Sea Benthic communities** in Catalonia, in an area with high ecologic value, with the conjoint participation of the fisher guilds and local stakeholders.



Area



Scope



Research

Yearly **oceanographic surveys** on each no-take area as well as surrounding active fishing areas to study the long term evolution of the restoration activities.

Allow for a follow the recovery of the restored and natural populations as well as their associated ecosystem services on the no-take areas by means of non-invasive imaging techniques and the establishment of **sentinel sites**.



Active Restoration

Keeping by-catch benthic organisms (gorgonians, sponges) on specially designed aquaria facilities in the fisher guilds.

Recovery and preparation for active restoration of the suitable species by means of the **badminton technique**, all in **collaboration** with the fishing sector.



Participation, Capacitation and Governance

Creation of participation and governance tools and joint ventures between all the actors in order to guarantee a mutual confidence by all stakeholders involved.

Creation of a working group with both local and international actors to identify priorities and incentivise capacitation activities.

<https://www.life-ecorest.es/>



Outreach, Education and Knowledge transfer

Start of an outreach and education program mainly aimed at the local population, fisher communities and schools, combined with other activities aimed at the general public, such as visits to the fisher guilds or citizen science initiatives on the frame of the project.

Replicating the active restoration activities and transferring the knowledge obtained during the project to additional protected areas, ideally both with **national** and **international collaborations**.



Oceanographic surveys



Monitoring approaches

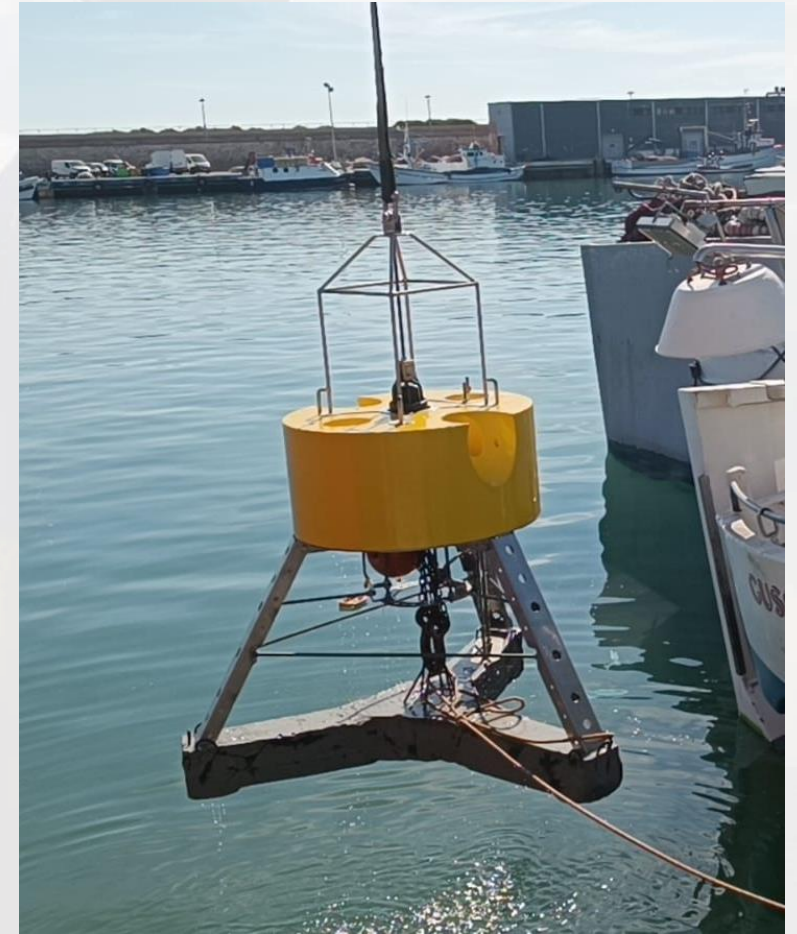
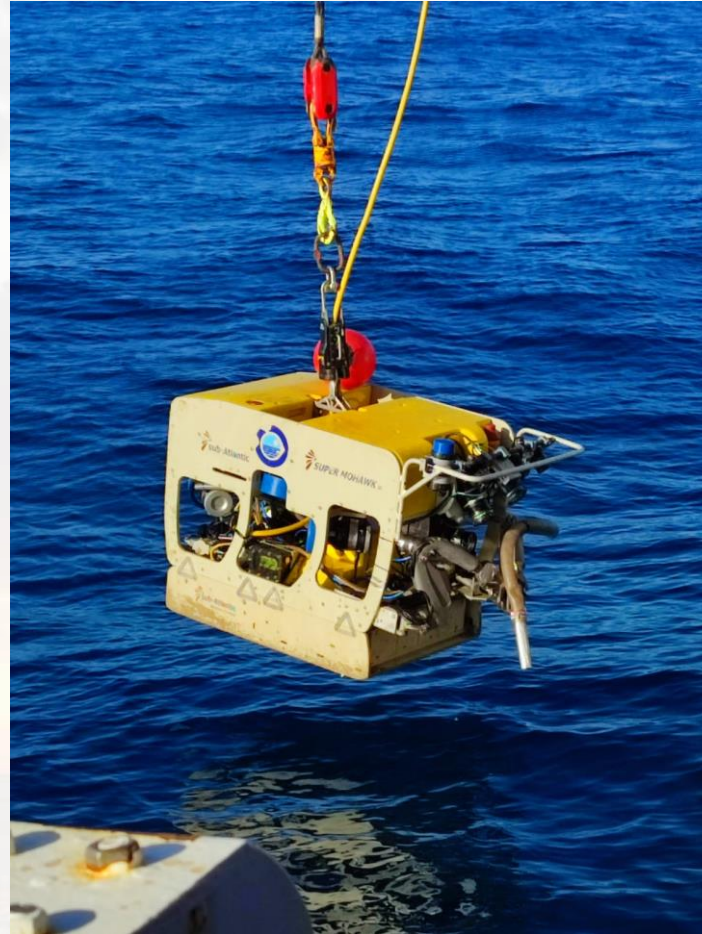
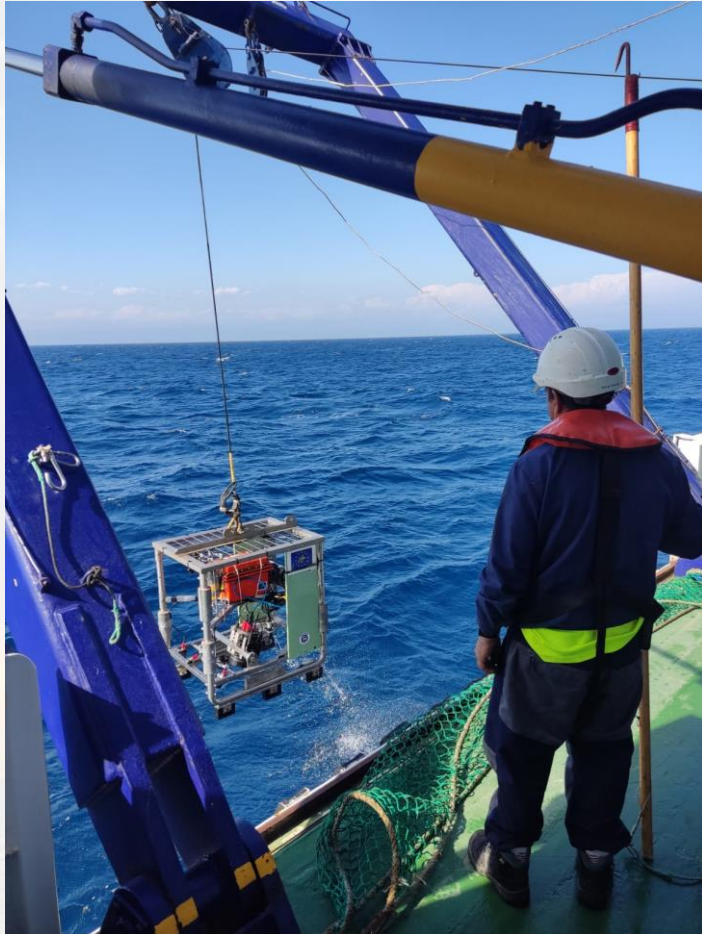
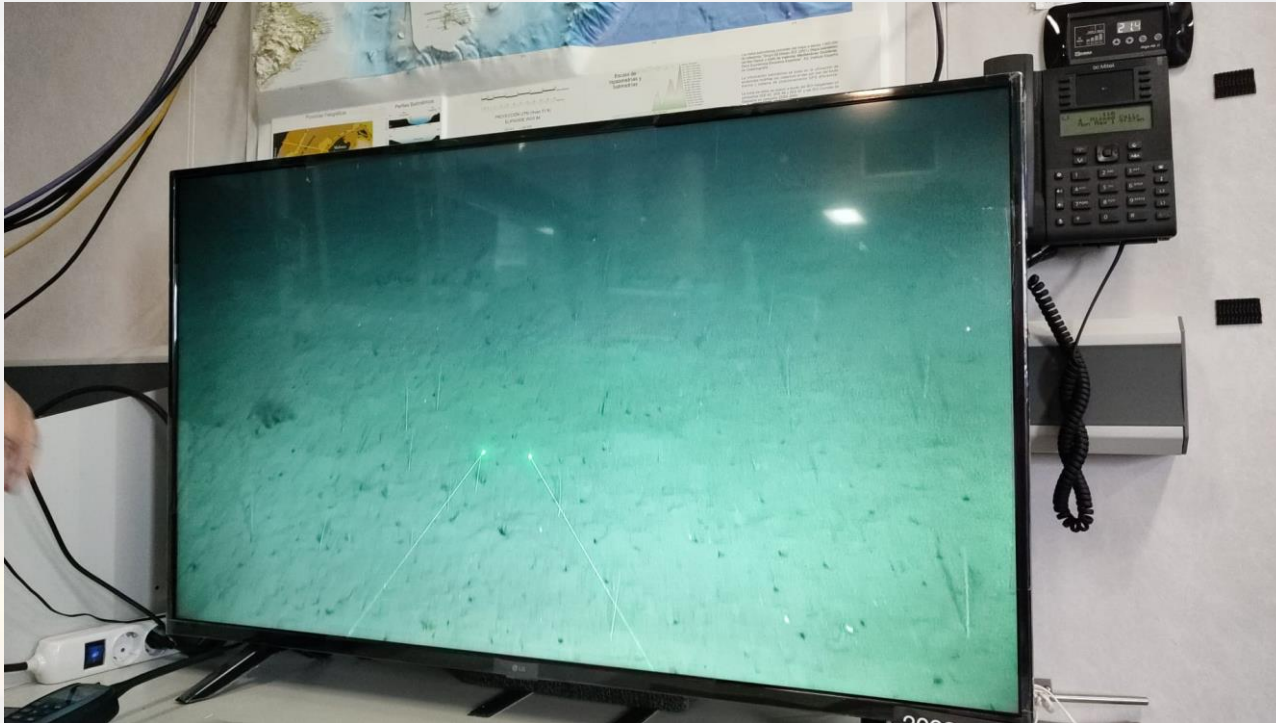
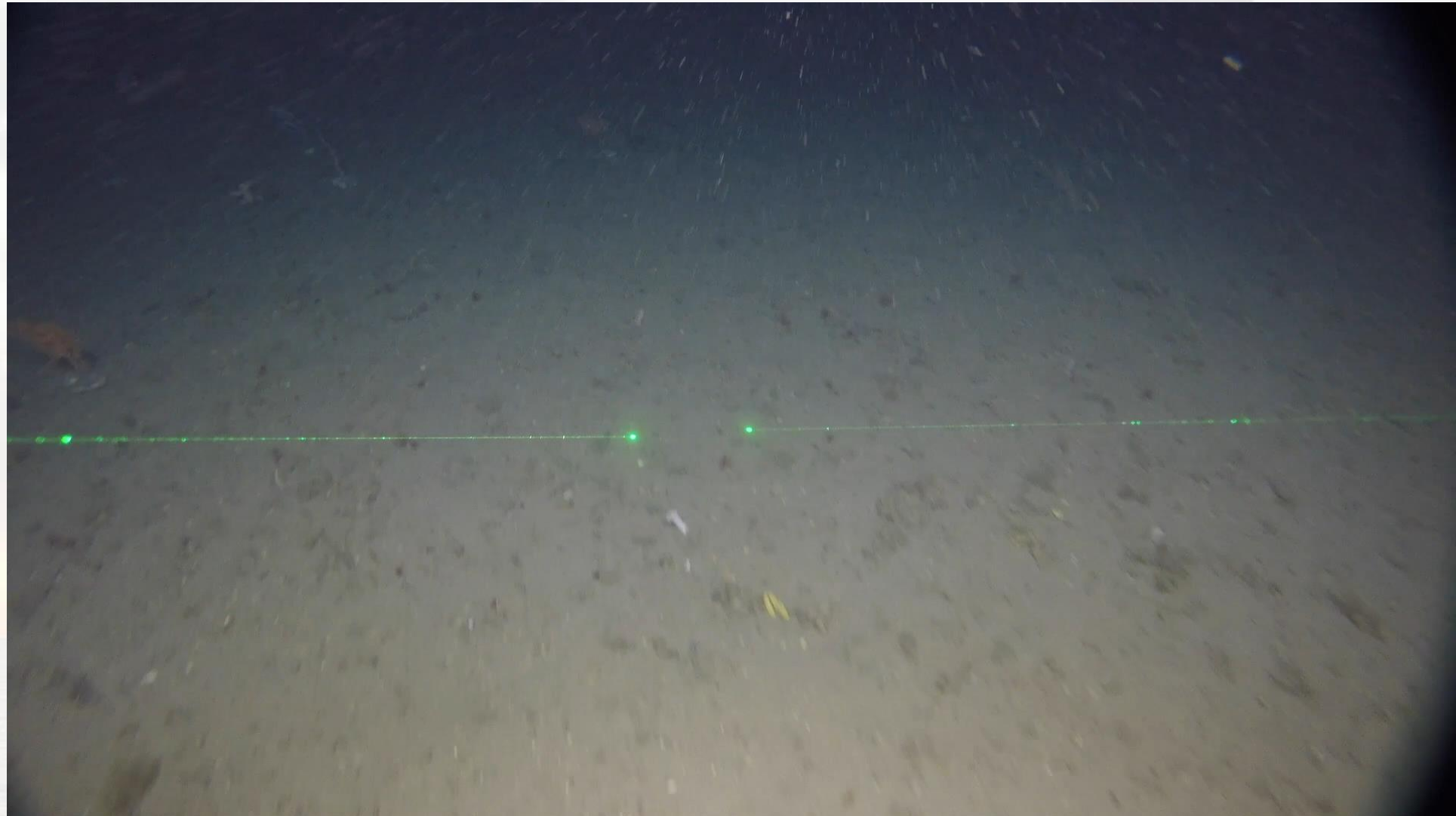


Image analyses





Monitoring of restored populations





Scope



Research

Yearly **oceanographic surveys** on each no-take area as well as surrounding active fishing areas to study the long term evolution of the restoration activities.

Allow for a follow the recovery of the restored and natural populations as well as their associated ecosystem services on the no-take areas by means of non-invasive imaging techniques and the establishment of **sentinel sites**.



Active Restoration

Keeping by-catch benthic organisms (gorgonians, sponges) on specially designed aquaria facilities in the fisher guilds.

Recovery and preparation for active restoration of the suitable species by means of the **badminton technique**, all in **collaboration** with the fishing sector.



Participation, Capacitation and Governance

Creation of participation and governance tools and joint ventures between all the actors in order to guarantee a mutual confidence by all stakeholders involved.

Creation of a working group with both local and international actors to identify priorities and incentivise capacitation activities.

<https://www.life-ecorest.es/>

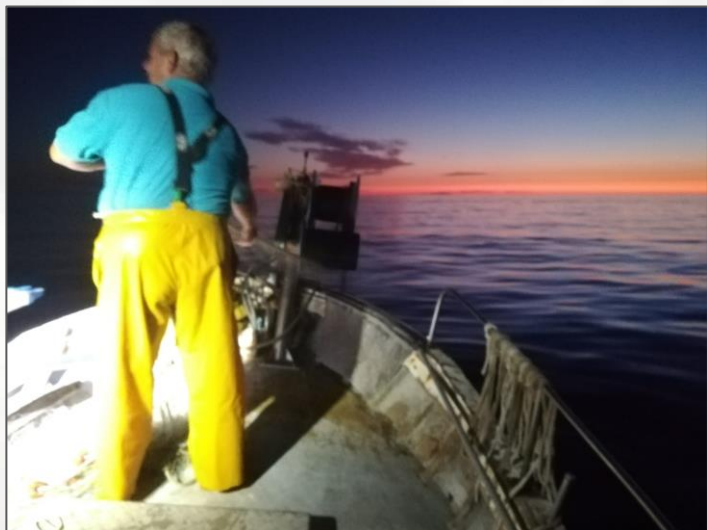


Outreach, Education and Knowledge transfer

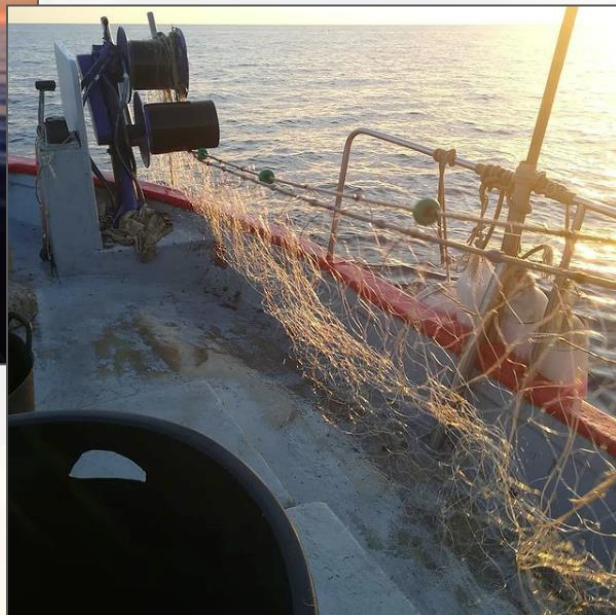
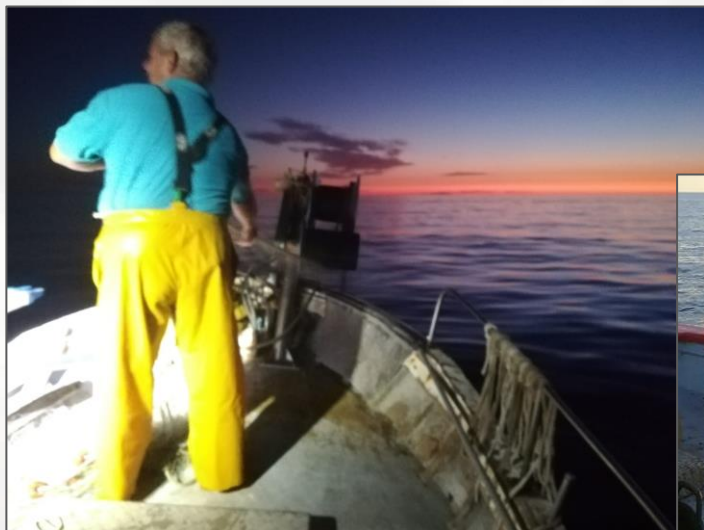
Start of an outreach and education program mainly aimed at the local population, fisher communities and schools, combined with other activities aimed at the general public, such as visits to the fisher guilds or citizen science initiatives on the frame of the project.

Replicating the active restoration activities and transferring the knowledge obtained during the project to additional protected areas, ideally both with **national** and **international collaborations**.

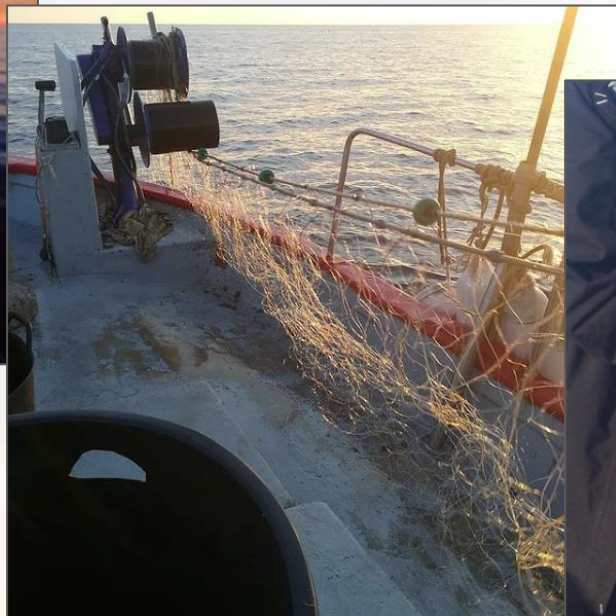
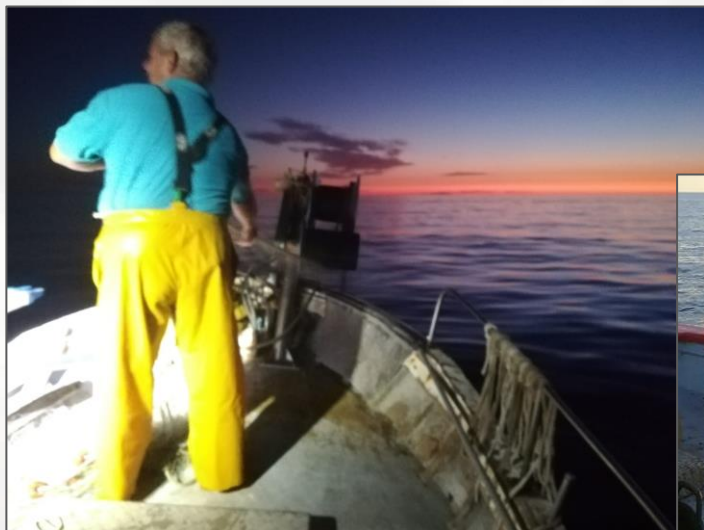
Organism recovery



Organism recovery



Organism recovery

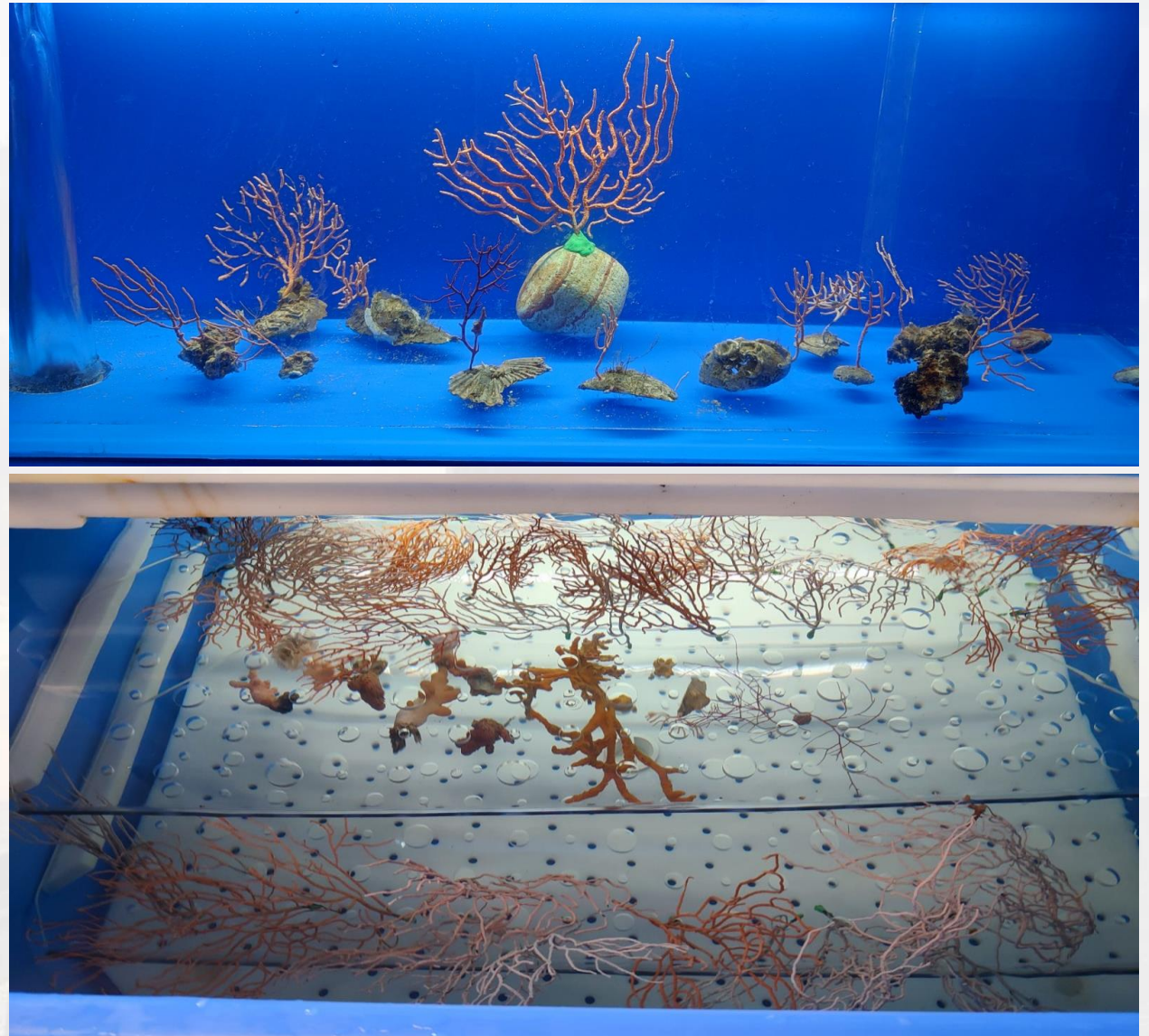


Matenances aquariums





Maintenance aquarium



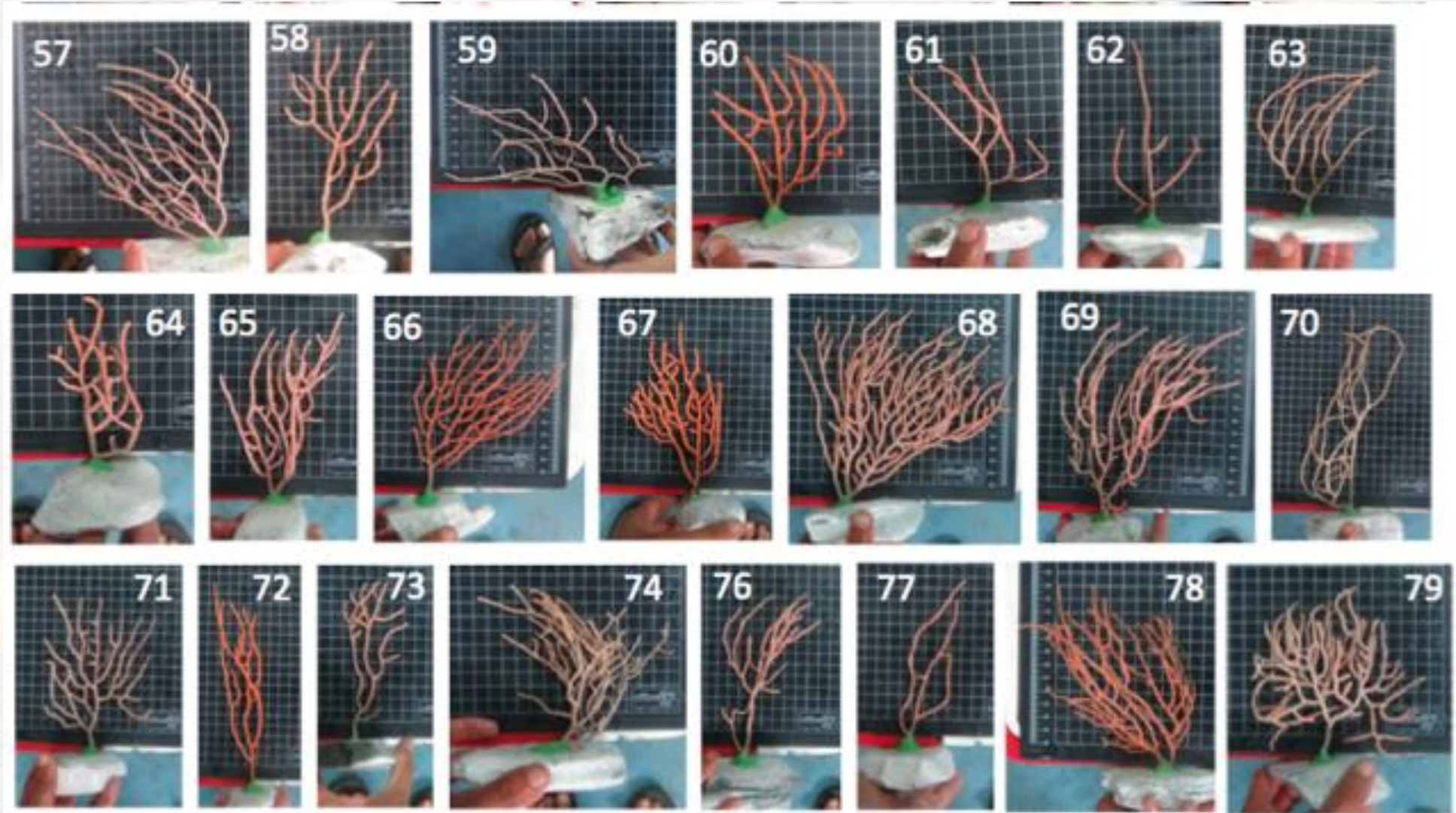


Maintenance aquarium

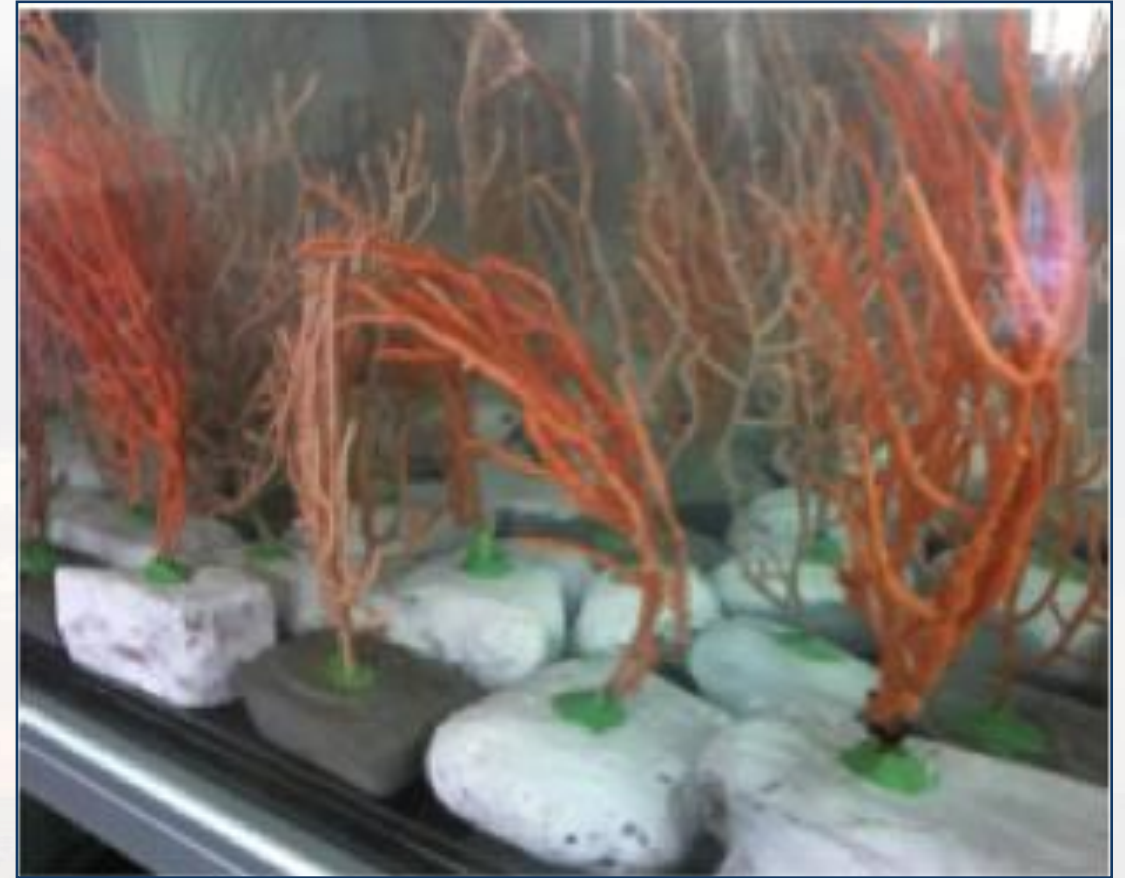




Register of organisms



Badminton Method

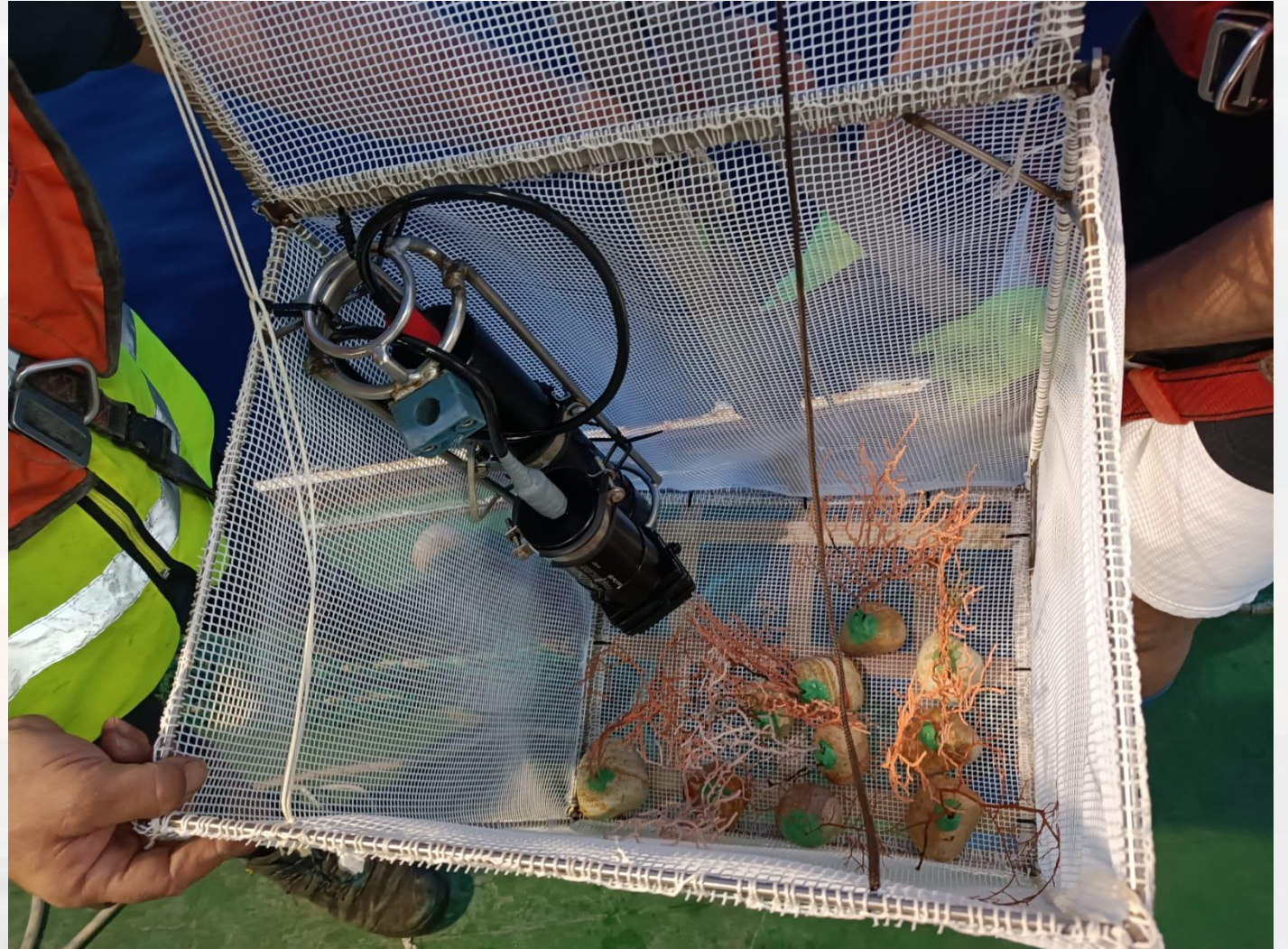


Badminton Method



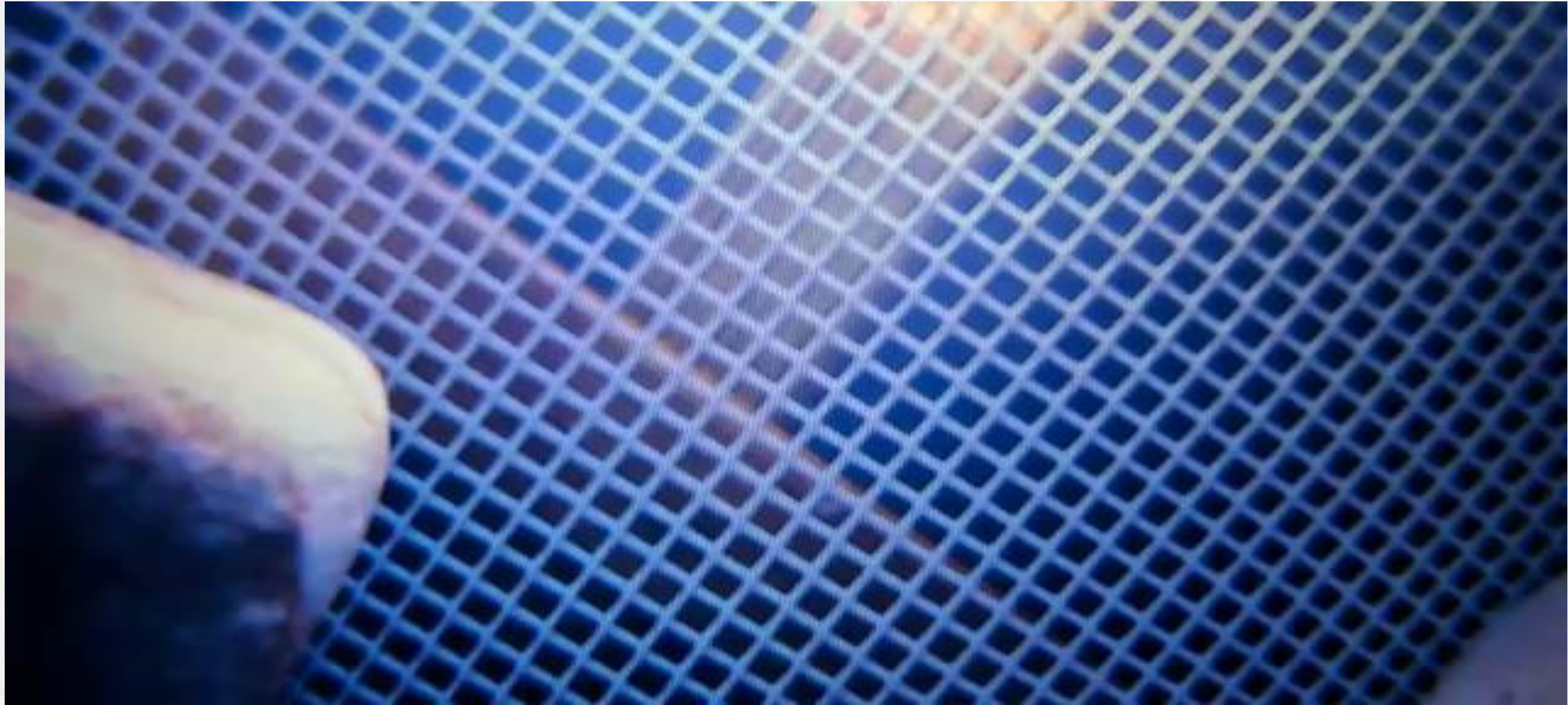


Restoration beyond >100 m depth





Restoration beyond >100 m depth

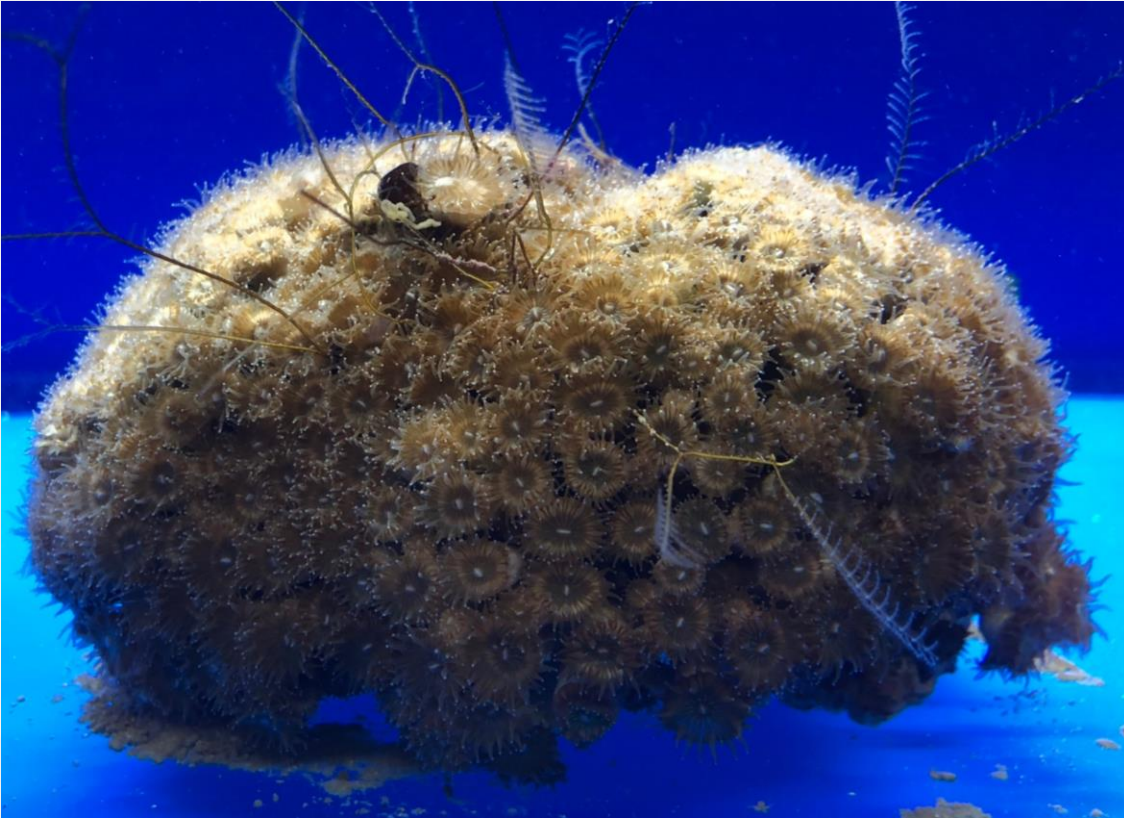




Restoration beyond >100 m depth



New challenges: Restoration of reef building corals



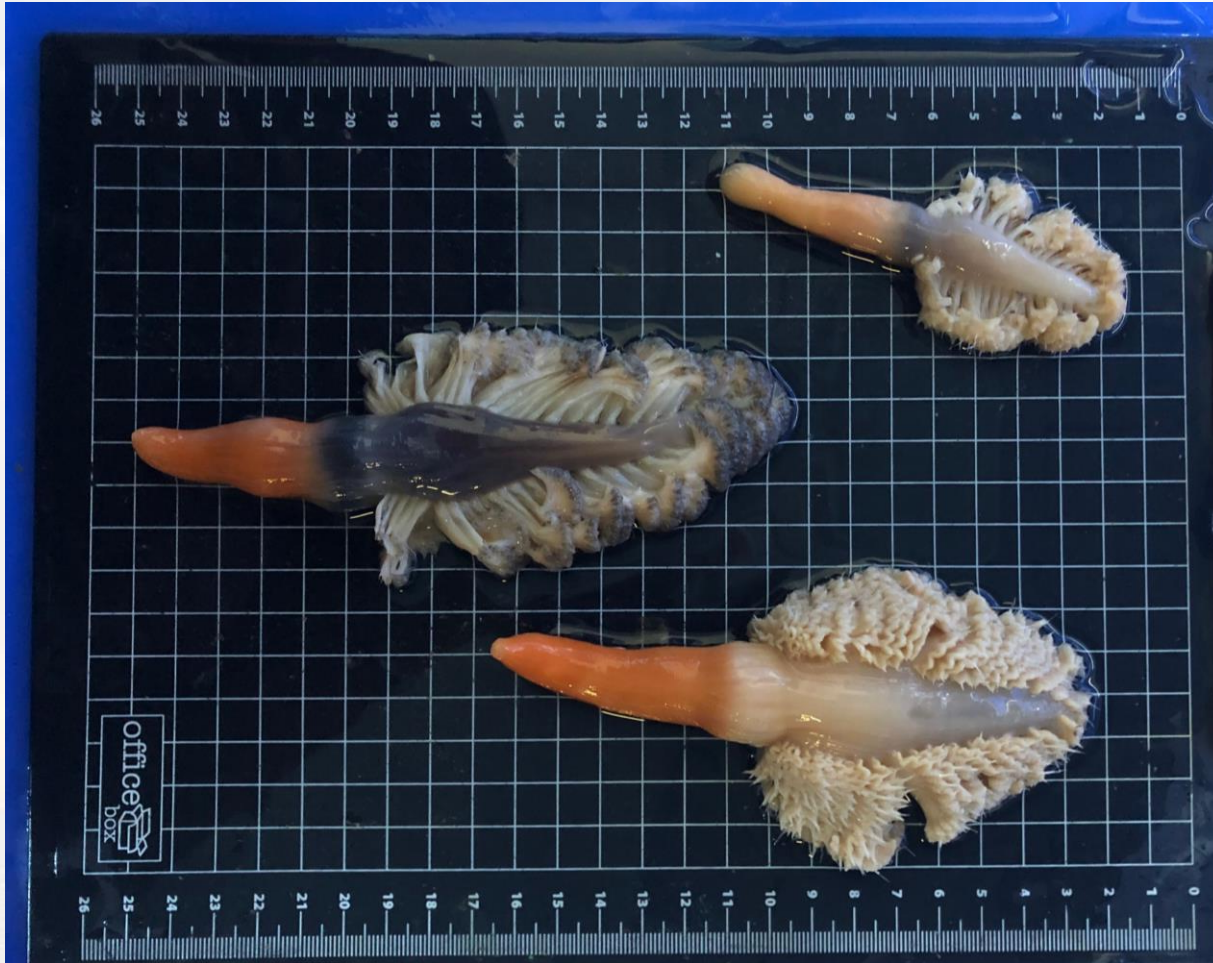
Shallow species: *Cladocora caespitosa*



Deep-sea species: *Madrepora oculata*



New challenges: Restoration of soft-dwelling species



Sea-pens: *Pteroides spinosum*



Sea-squirts: *Phallusia mammillata*



Restoration of hard substrates



Boulders recovered in trammel nets

- Decades of chronic trawling have depleted benthic habitats of hard substrates

- Based on historical knowledge (fishing cards) we intent to restore boulder beds within no-take zones.

- Boulders will be obtained from fishing by-catch and local quarries



Scope



Research

Yearly **oceanographic surveys** on each no-take area as well as surrounding active fishing areas to study the long term evolution of the restoration activities.

Allow for a follow the recovery of the restored and natural populations as well as their associated ecosystem services on the no-take areas by means of non-invasive imaging techniques and the establishment of **sentinel sites**.



Active Restoration

Keeping by-catch benthic organisms (gorgonians, sponges) on specially designed aquaria facilities in the fisher guilds.

Recovery and preparation for active restoration of the suitable species by means of the **badminton technique**, all in **collaboration** with the fishing sector.



Participation, Capacitation and Governance

Creation of participation and governance tools and joint ventures between all the actors in order to guarantee a mutual confidence by all stakeholders involved.

Creation of a working group with both local and international actors to identify priorities and incentivise capacitation activities.

<https://www.life-ecorest.es/>



Outreach, Education and Knowledge transfer

Start of an outreach and education program mainly aimed at the local population, fisher communities and schools, combined with other activities aimed at the general public, such as visits to the fisher guilds or citizen science initiatives on the frame of the project.

Replicating the active restoration activities and transferring the knowledge obtained during the project to additional protected areas, ideally both with **national** and **international collaborations**.



Capacitacion and Governance





Scope



Research

Yearly **oceanographic surveys** on each no-take area as well as surrounding active fishing areas to study the long term evolution of the restoration activities.

Allow for a follow the recovery of the restored and natural populations as well as their associated ecosystem services on the no-take areas by means of non-invasive imaging techniques and the establishment of **sentinel sites**.



Active Restoration

Keeping by-catch benthic organisms (gorgonians, sponges) on specially designed aquaria facilities in the fisher guilds.

Recovery and preparation for active restoration of the suitable species by means of the **badminton technique**, all in **collaboration** with the fishing sector.



Participation, Capacitation and Governance

Creation of participation and governance tools and joint ventures between all the actors in order to guarantee a mutual confidence by all stakeholders involved.

Creation of a working group with both local and international actors to identify priorities and incentivise capacitation activities.

<https://www.life-ecorest.es/>



Outreach, Education and Knowledge transfer

Start of an outreach and education program mainly aimed at the local population, fisher communities and schools, combined with other activities aimed at the general public, such as visits to the fisher guilds or citizen science initiatives on the frame of the project.

Replicating the active restoration activities and transferring the knowledge obtained during the project to additional protected areas, ideally both with **national** and **international collaborations**.

Outreach



Outreach activities



Merci - Mercès