8 Vies pour la planète

Projet ZoRRO
Etang de berre

2021-2030

ZoRRO Project

Reintroduction of eelgrass in the Berre pond

Autumn Report 2025
ZoRRO5 Activities

Association ***8 Vies pour la planète****

[*8 Lives for the Planet]

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A reminder of the implications and goals of the project

The project**ZoRRO (Zostères, the Rapid Return as Objective)**aims to help the eelgrass (*Zostera marina*) to recolonize the Berre pond.

This plant, once dominant over almost the entire shoreline of the pond, disappeared in the 1970s. From 2005 onwards, the physical and biological conditions gradually became favorable again, and the recolonization of the pond by dwarf eelgrass (*Zostera noltei*) was spontaneous. It is currently very rapid. On the other hand, no spontaneous return of eelgrass has been observed.

The promoters of the ZoRRO project hypothesized that humans could trigger this process. After a few successful activist trials, they convinced the authorities to authorize the project in early 2021. The ZoRRO project thus began in 2021. It was conceived as a ten-year project (2021-2030) and has just completed its fifth season (ZoRRO5).

Figure 1: Young eelgrass (with dwarf eelgrass around it) resulting from the swarming of a patch planted in 2019. It is part of the first swarming in the pond linked to the ZoRRO project. This swarming, discovered in July 2023, produced about twenty young shoots. About ten remain one year later, some of which have become patches (> 0.25 m).[2]).

From a biological point of view, a large seagrass meadow

- improves the physico-chemical stability of the water mass where it is located (oxygen production, low but regular consumption of inputs, proportional to the size of the seagrass bed);
- increases biodiversity, as many species depend on its presence (anemones, seahorses, cuttlefish…) or like to hide there (juvenile fish).

In terms of biodiversity, a seagrass meadow is better than

- a herbarium of dwarf eelgrass due to the narrowness of its leaves
- a herbarium of cymodocaceae, a plant that loses its leaves in winter and only regrows in June.

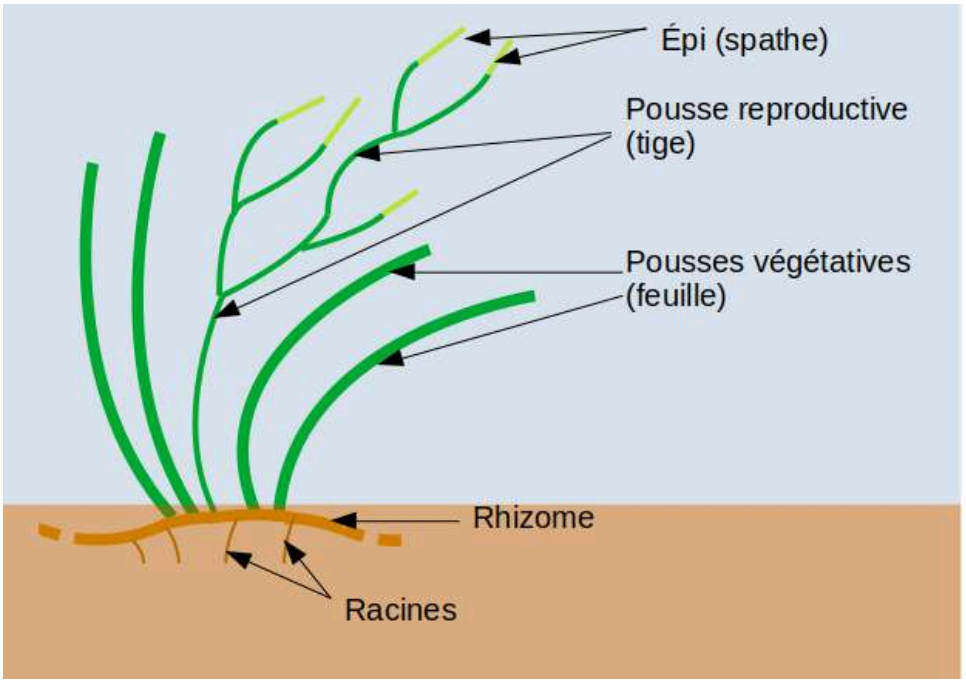


Figure 2: Main parts of a marine eelgrass

From a legal and administrative perspective, a sizable eelgrass bed is one of the objectives of the Water Framework Directive (WFD) for the Étang de Berre (criterion "macrophytes"). Failure to meet this objective would expose France to penalties.

The ZoRRO project, for its fifth year (2025):

- has once again been a project based primarily on volunteer work, still under construction participatory;
- always and exclusively used the herbarium of the Carteau cove (Port-Saint-Louis-du-Rhône) as a source site;
- still has two seed maturation sites (since 2023 - ZoRRO3)

Project summary to date (December 2025)

As we learn by doing, the project evolves year after year, based on our own ideas, external experiences we learn about, our human and financial resources, and our results.

We use two very different methods: seeds and cuttings.

Seed method(and natural swarming):

Year	Actions / New Products	Results
ZoRRO1 (2021)	Harvesting approximately 10,000 seeds by walking through the seagrass beds over 4 days (late May-early June 2021), collecting only the seed heads Shelling and sowing of these seeds on the same day always on the same site (Figuerolles beach).	no results herbarium source slightly touched
ZoRRO2 (2022)	Harvesting approximately 5,000 seeds by swimming, therefore without trampling, over 4 days, harvesting only the ears; Approximately 80% of these ears were placed in small jute bags and sown on the same day at 4 different sites; The remainder was placed in "dispersing buoys" at the same 4 sites.	no results undamaged herbarium specimen **Natural swarming detection on the rocky coast of Istres.**
ZoRRO3 (2023)	Development of two seed maturation sites, with a system for renewing seawater in settling tanks; Harvesting by swimming, always over 4 days, of approximately 40,000 seeds, harvesting the entire reproductive shoot; Transfer of the entire harvest into the ripening tanks (with oxygenation and water renewal of the pond); Separating the seeds from the remaining shoots after a few weeks, and storing the seeds in renewed water until November; Sowing of seeds collected in small jute bags, early November at two sites (Monteau in Istres and La Digue in Saint-Chamas)	**Around twenty departures were detected at the end of May on one of the sites (La Digue in St-Chamas), and were still alive in December 2024.** No results on the other plot (where we had sown the majority of the seeds). **Natural swarm detection at Figuerolles (8 departures)** no damage to the source herbarium

ZoRRO4 (2024)	Improvement of the two seed maturation sites, with automation of water renewal and fault reporting to operators via the Internet (which greatly reduced the workload of the operators). Fewer pickers and collection too late. A cold snap triggered unwanted germination of a large proportion of the seeds. 4,000 seeds counted in November. Sowing 4,000 seeds in jute bags with silt and stapled at the bottom at 5 sites.	No successes were observed related to ZoRRO4's work with the seeds.
ZORRO5 (2025)	The harvest began two weeks earlier than in previous years (early May), and probably too early: the seeds were barely ripe during the first two sessions. Every year is different… The harvest was smaller because canal dredging removed many patches of eelgrass from the source site. The harvest was estimated at 27 000seeds. The sowing was carried out using the DIS method (see below).	Coming in spring 2026!

<u>Cuttings method</u>

This method was used even before the official launch of ZoRRO, in ad hoc experiments. The method has not changed in the last 5 years because it has proven satisfactory.

- we only harvest**cuttings-wrecks**(on the same site as the seeds), which are more or less beautiful (more or less old) and with a more or less large part of the rhizome;
- we attach these cuttings to twisted rebar anchors;
- The anchors with fittings are placed on the bottom of the pond (partially buried if the bottom allows).

Year	**Actions / New Products**	**Results**
ZoRRO1 (2021)	We harvested the seeds at the same time and placed the anchors in 3 sites (Beaurivage, Le Ranquet and Figuerolles)	Some plants survived for a year, only one was still alive in 2023. Our observations led us to believe that we planted too close to patches of dwarf eelgrass and that the latter killed or ejected most of our young plants. A spot that had developed well died, killed by the red tides that were observed the following summer (2022) on this part of the pond (Figuerolles beach) and which killed three other spots that dated from 2019.

ZoRRO2 (2022)	We started again, but harvesting for a longer period throughout the year and planting on several sites.	The cuttings produced no results except at one site (an area of the rocky coast of Istres) where 11 patches are currently growing:**A first success for the project.**
ZoRRO3 (2023)	We planted our cuttings mainly on rocky coasts, like the rocky coast of Istres.	Two success stories were thus added: - **Monteau (4 spots)** **- another site on the rocky coast of Istres** We estimate the survival rate at 10% (by anchoring, not by cutting)
ZoRRO4 (2024)	We tried to do it year-round (starting in January), but volunteers are scarce in winter (and sometimes there are cuttings to collect too). There have been busy days and less busy ones.	2 new spots in Figuerolles-sud
ZORRO5 (2025)	We did not resume harvesting during the winter. The harvest was much smaller than in previous years, clearly due to the dredging of the small canal (the Mazet canal).	Coming in spring 2026!

Despite ZoRRO4's poor results, the project continues to be considered a success by the team for two main reasons:

- the enlargement of a good portion of the pre-existing spots, and the survival of the others (no disappearance noted)
- The resistance of eelgrass to the summer heatwave (the water reached 30°C in the center of the pond) was remarkable, contrary to what the literature seemed to predict (our "official" monitoring takes place between April and June, but we tracked the development of the patches throughout the summer). Mediterranean eelgrass appears to be more resistant than others in this respect. Let's hope it lasts!

Administrative authorization and reports

Seagrass is a protected plant; its harvesting and transport require a derogation request from the relevant prefectural service (DDTM), which seeks the opinion of the CSRPN (Higher Council for Nature Protection).regionalyou onatrium naturel).

We requested and obtained this exemption for the 5th[and]consecutive year and the administrative authorization for ZoRRO5 was signed on**10 mars 2025**.

It was given:

- **for the seed method**, a method which, to our knowledge, has never been applied in France, limited to 50,000 seeds (approx. 5,000 spathes + 2,000 reproductive stems)
- And **for the rhizome method**We must limit ourselves to naturally uprooted rhizomes found on site, up to a limit of 1,000 rhizomes.

The prefecture's exemption was granted with the instruction to issue reports.

For ZoRRO1 and ZoRRO2, we had issued:

- a report following the seed collection, around July of the year (“post-campaign report”)
- a report the following spring focused on the post-winter follow-up ("spring follow-up report")

Since ZoRRO3, we have evolved the pace of our reports with:

- a report in December of the current year following the sowing of the seeds,the**" report activities »**.
- a report in June/July of the following year focusing on the follow-up the following spring, the**"follow-up report"**.

This report is the activity report of ZoRRO5.

2025 Campaign Details

There were 4 days of "seed" action: Sundays May 11, 18 and 25, and January 1isJune 2025.

The other days listed in the table below are "rhizome" action days only.

The collection point is located at GPS point N 43° 22’ 36.67’’ E 04° 51’ 07.79’’ (at the end of the “Carteau huts”). We mainly collected in the small canal where the most beautiful seagrass bed is located.

Due to the dredging of the small canal where we used to collect most of our seeds,

• we collected mostly in the large canal, on either side of the exit of the "small canal" where we entered the water;

• There were far fewer drift rhizomes found.

	April 6	May 11	May 18	May 25	June 1	4 sept	5 oct
Number of collectors	4	5	1	7 adults 5 children	7	1	7

Number of reproductive stems	0	150	40	350	4 sacs 175 stems	0	0
Place of maturation		Beaurivage then Fablab	Beaurivage then Fablab	Beaurivage then Fablab	Beaurivage then Fablab		
Number of anchors bearing rhizomes **+ drop-off location**	2 Istres rocky coast	0	0	0	4 Istres Ranquet nord	3 Istres small port	5 Istres Romaniquette South

Figure 3: Map of ZoRRO5 plantations - cuttings in white and seeds in yellow

Rhizome-Wreck Method

Collection

The collection dates can be found in the table.p9.

The meeting point is located south of the large navigation channel (the Saint-Antoine canal, the one which connects the Carteau cove to the port Napoléon) on the edge of the small channel (the Mazet canal) which leads to the "Carteau huts".

The collection of**cuttings-wrecks**is done mainly by kayak on both sides of the Saint-Antoine canal.

Figure 6: Nathalie collecting rhizomes in a canoe - Mazet canal (August 2024)

Figure 7: Rhizomes-debris collected (and before collection) - Mazet canal (2022)

Transport

The rhizomes are transported in a bucket filled with seawater.

Attaching the cuttings to the anchors

As in 2024, we favoured rocky coasts for propagation.

The rhizomes of the cuttings were attached to pieces of rebar bent into a "flat zig-zag" shape. Four to ten cuttings can be attached to one anchor point, depending on the size of the rhizome pieces and the number of cuttings and anchor points available that day.

As stated in the exemption request document, the cuttings are attached to the rebar with plastic string. The biodegradable string used before 2022 degraded too quickly, before the cuttings had time to take root.

Figure 8: Carole with eelgrass rhizomes attached to a piece of rebar (February 2024)

Seed method

Harvest

The harvest is carried out by divers equipped with fins, mask, and snorkel at the Carteau site. The spathes are bundled into bunches of 25 strands and placed in nets. This allows for easier counting of the harvested spathes.

The collection of**seeds**took place over 4 Sundays: May 11, 18 and 25 and 1^{is} June.

Each time, the procedure was as follows:

- 10:00 – 10:30: Welcome coffee and croissants, followed by training and briefing
- 10:30 am – 11:30 am: Collection by snorkeling (seeds) or kayak/on foot (cuttings)

- 11:30 – 12:00 PM: debriefing

For each of the 4 days, the collectors were diving (fins-mask-snorkel).

Since 2022, seed harvesters have been collecting reproductive shoots, cutting them by hand shortly after they emerge from the rhizome (leaving one or two spathes attached). This practice was suggested by Mr. Orth of VIMS (Virginian Institute for Marine Science). Reproductive shoots can bear five or six spathes (but on average, two or three).

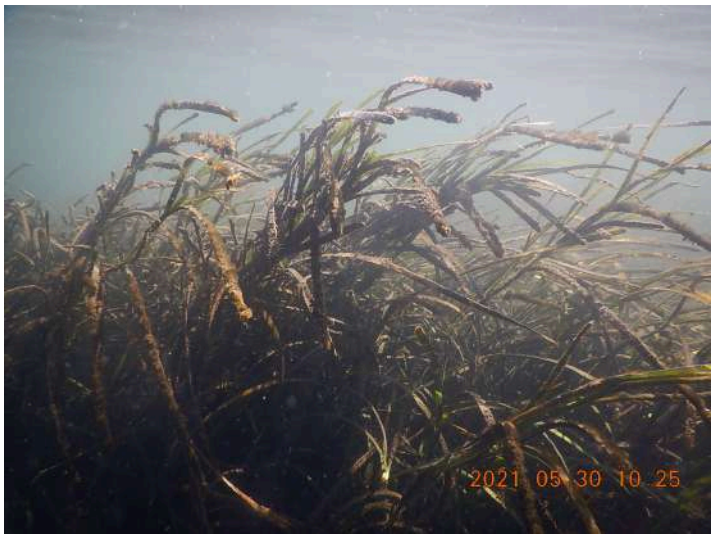


Figure 4: Underwater photograph of eelgrass with reproductive shoots, the spathes: those containing the fruits/seeds tend to float, and the most mature ones are often covered with epiphytes. If the reproductive stem lies on the seabed, it means the seeds have already emerged (photo from 2021).

Figure 5: Reproductive shoot sacs waiting in the small channel (and eelgrass behind) – photo from 2022

summary table of seed harvests

Harvest date	*number of ears harvested*	*maturation tray*	*measured seed volume [ml] (21/07/25)*	*number of seeds*	*yield (seeds/ears)*
11/05/25	*150*	*1*	*85*	*8947*	*59*
18/05/25	*40*	*2**	*10*	*1052*	*26*
25/05/25	*350*	*3*	*133*	*14000*	*40*
01/06/25	*175*	*4***	*32*	*3368*	*19*
total	***800***		***260 ml***	***27368***	

** Tray 2 suffered a bubble failure followed by severe seed deterioration around June 15th.*

*** Tank 4 has dried out due to a forgotten siphon*

Transport

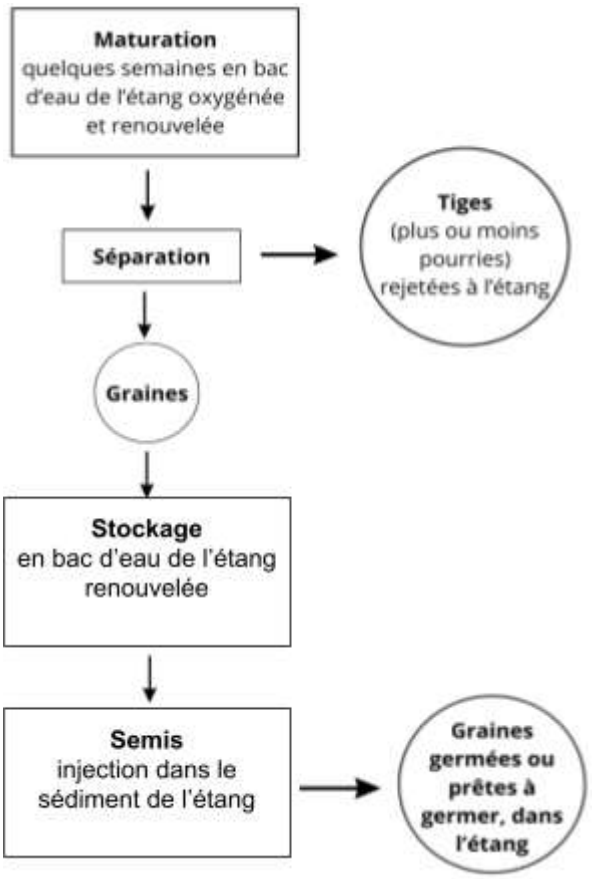
The reproductive stems are transported in a bucket filled with seawater, away from heat. The lid is kept closed for a maximum of 2 hours.

Maturation

The spathes are placed in maturation trays. In 2025, we used a different tray for each harvest in order to assess the maturity of the spathes.

Since ZoRRO3, we have two sites to store the seeds (in their spathes), before isolating them from the stem remains and sowing them in the autumn.

The basic diagram of the process is as follows:



The two premises (the same as in 2023) have been improved.

Our first premises is a 1966 caravan converted into a laboratory, which the town hall of Saint-Chamas has allowed us to place in the marina parking lot, right by the water, from June to October. It now has a name: the Nautile.

Figure 9: The newly repainted "Nautilus" laboratory caravan with the sign explaining the project to the public (June 2024)

Figure 10: 100 L container in room no. 1 (the Nautile caravan). It shows reproductive stems (grouped in sets of 25) and the water level markers. The stems have just been introduced.

Our premises no. 2 is one of the rooms in a disused building in the port of Beaurivage (Saint-Chamas) and located 30 m from the edge of the pond.

Figure 11 : local de Beaurivage

After a few weeks, the stems release their seeds and can be easily removed. At the bottom of the container, there is a mixture of seeds and decomposing leaf fragments that are not easy to separate.

Figure 12: Seed maturation tray in room no. 2 (Beaurivage):

IBC of 1 m³ cut in 2. Usable volume approx. 300 L.

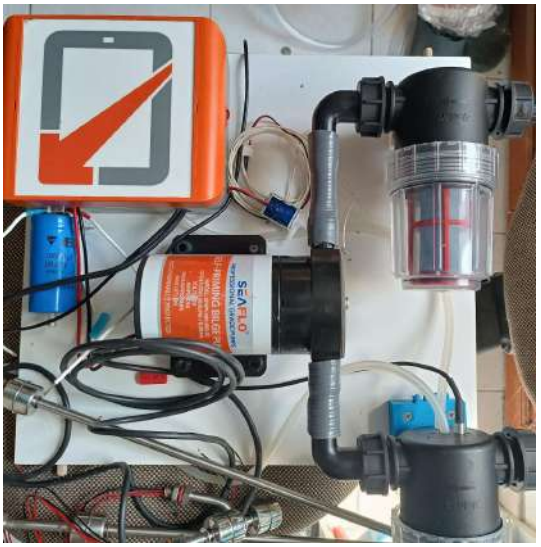
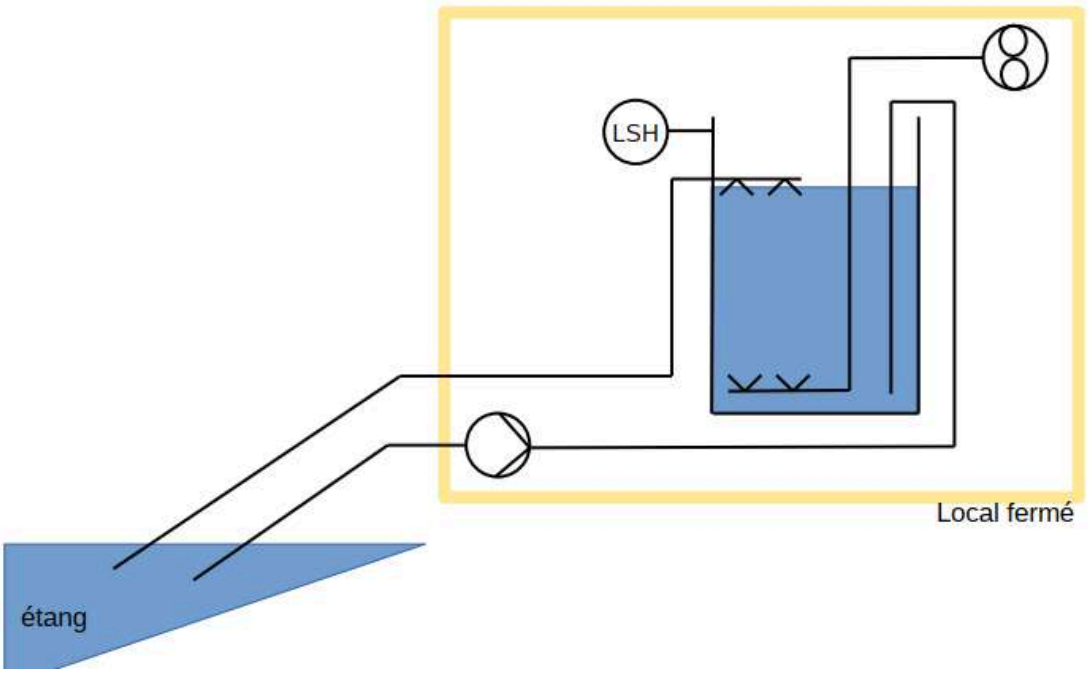


Figure 13: Water renewal system for the tanks

For the tanks in both rooms, the chosen process scheme is as follows:

1. The container is filled with water from the pond up to an overflow with holes smaller than the seeds (the container also contains the reproductive stems bearing the seeds, not shown in the diagram).
2. A pump draws water from the pond and introduces it to the bottom of the tank.
3. The new water raises the level and forces older water out through the overflow.
4. A safety mechanism stops the pump if the overflow is blocked.
5. A compressor (also operating on a timer) bubbles air to oxygenate the water.



Seed sorting

To separate the seeds from the organic waste, we use two stacked sieves. A 2 mm mesh sieve separates the macro-waste, leaf and stem remnants, gastropods…

A 1 mm mesh sieve retains the seeds and separates the sand and silt.

The sorting was carried out on 21/07/2025.

Counting and precision

To estimate the total number of seeds available, we count 100 seeds and measure their total volume with a graduated cylindrical container with a diameter of 12 mm.

We obtain 0.95 ml per 100 seeds. Allowing for a dispersion error of approximately +/- 5%, we consider that one milliliter contains a minimum of 100 seeds.

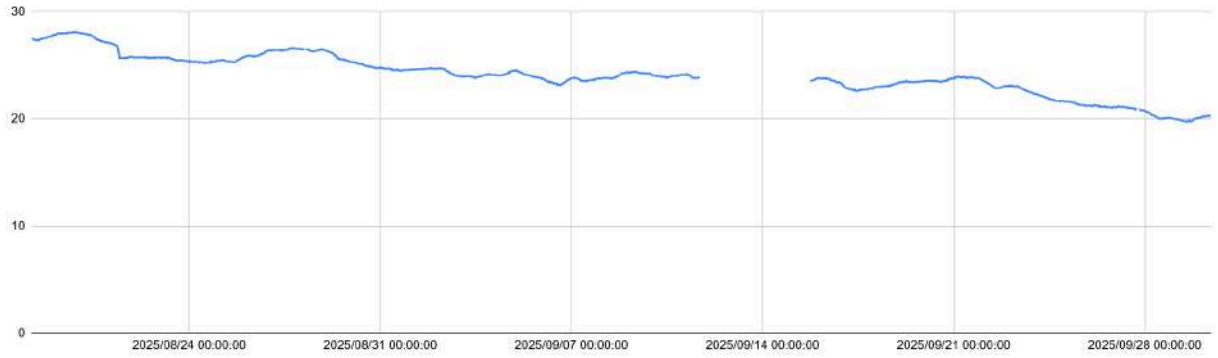
For the next part of the process, we use a 60 ml syringe to count the seeds.

Seed storage

The seeds were stored indoors at room temperature. The water is changed approximately daily. Forced aeration of the containers is performed for 30 minutes per hour.

The storage temperature of the seeds was recorded every hour. It was between 28°C (August) and 20°C (end of September).

Germination was observed from September onwards despite a temperature above 20°C.



date	volume of seeds [ml]	number of seeds measured
21/07/2025	260	27 368
27/10/2025	155	16 316

We recorded a 40% loss of seeds during storage between July 21st and October 27th. This loss is due to natural seed germination and mortality. Floating seeds are regularly removed.

Note that we kept approximately 3,800 seeds in order to test various seed preservation methods.

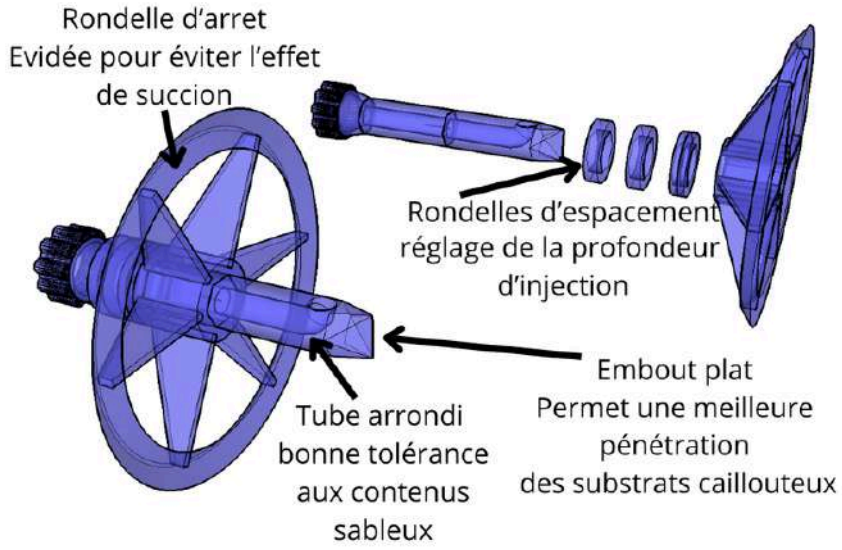
Sowing the seeds

The new feature of ZoRRO5 is the use of the**DIS method (**Dispenser Injection Seeding (seedling by injection using a dispenser), developed in the Netherlands, jointly by the University of Groningen (which coordinates the Seagrass Consortium of which GIPREB is a part) and the Dutch company The Fieldwork Company.

It is injected using a "sealant gun".A mixture of silt and seeds (300 ml cartridge containing 1,500 seeds) was injected into the sediment at the bottom of the pond at a depth of 4 cm. The injections (between 100 and 200 per cartridge) were carried out over areas and along a line (GPS points recorded).

Technical improvements have been made to the gun:

– installation of a GPS;
– optimized injection nozzle;
– installation of an adjustable stop to determine the number of seeds injected.



Dosage of seeds in the graduated cylinder

1,000 seeds

Mixture of seeds with silt (taken that same morning from the silting basin of the EDF power plant in Saint-Chamas)

Introduction of the soil/seed mixture into the cartridge

Temperature monitoring

Replanting seagrass beds from seed requires a good understanding of the water temperature and salinity of the pond. Indeed, eelgrass seeds germinate in winter, when the temperature drops below a critical threshold.

To monitor these parameters, we began manufacturing water temperature probes in 2024 to record changes in the pond's temperature. The automatic seed water renewal system measures the tank temperature, the pond water temperature, and the ambient temperature once an hour.

At the end of 2024, we will install two autonomous probes that measure the water temperature and conductivity every hour. The data is transmitted via WiFi to the port of Beaurivage, which provides us with internet access.

The probes are designed and manufactured in-house using commercially available electronic modules and a housing modeled and produced using our 3D printer. Battery life is estimated at one year. The probe is designed to be disassembled annually for maintenance and battery charging. We use rechargeable batteries with a very low environmental impact (LiFePO4).

These probes must be placed near a known WiFi network. We can place them at 3 locations around the pond.

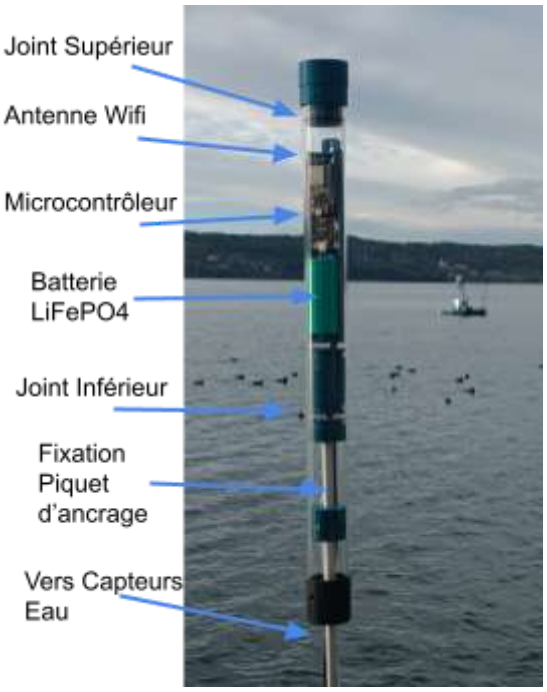
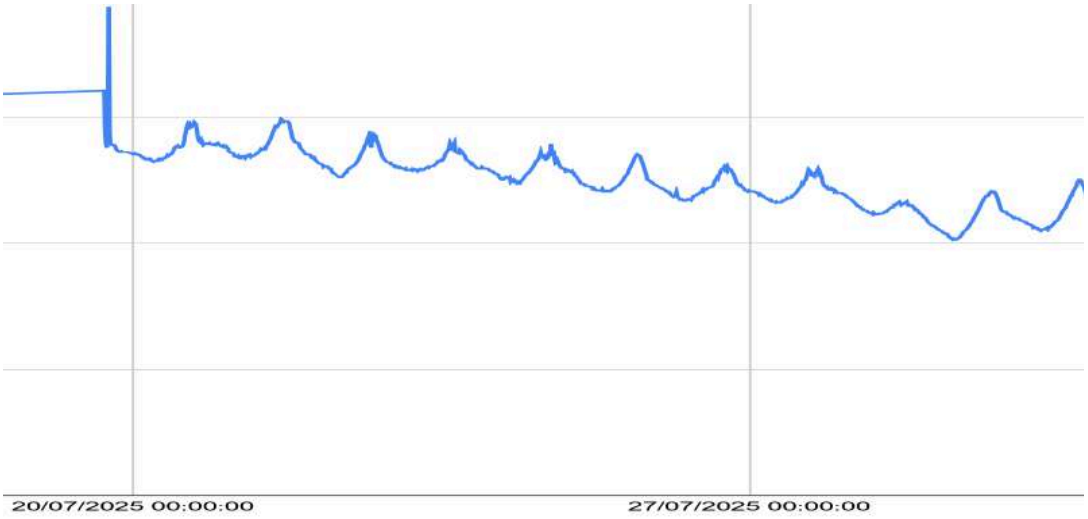


Figure 14: Image of the application used by the project. It shows in real time the two most important temperatures: the temperature of the tank and that of the pond (here, for the Nautile).

Manufacturing of underwater photography probes

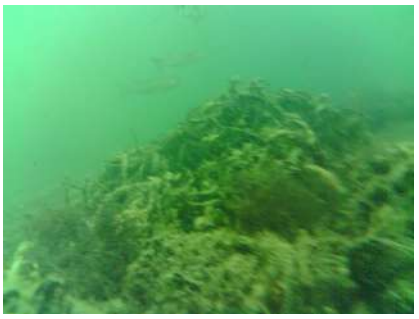
In 2025, we designed a new model that can record water temperature and images over a limited period. These small probes have a maximum battery life of 15 days. They must be regularly replaced and removed for recharging and drying. We then retrieve the data. This allows us to track water temperature changes as close as possible to the eelgrass beds, enabling us to monitor their development. A camera mounted on the sensor captures an image every 15 minutes. We can then follow the evolution of the seagrass beds and the animals that live within them.

The temperature of the sensors could not yet be calibrated.



In 2025, the prototype we developed yielded excellent results and allowed us to observe a specific case in the cove by the dike in Saint-Chamas. In June 2025, this area experienced a rise in water temperature to 35°C, accompanied by a severe aquatic eruption. We first observed a proliferation of yellow algae at the canal mouth, likely due to the runoff of agricultural fertilizers. This observation was followed by an exceptional mortality rate among most of the aquatic species in the cove. We were able to record the temperature fluctuations as well as the death of the eelgrass beds that were present in this area.

20/07/25



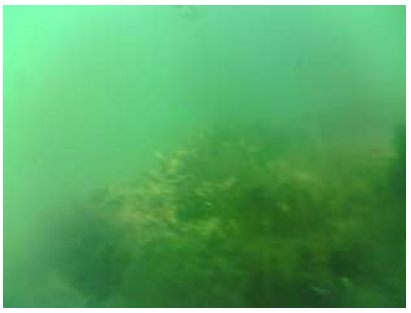
21/07/25

22/07/25

23/07/25

24/07/25

25/07/25



26/05/25

27/07/25 (storm)

28/07/25 (storm)

29/07/25

30/07/25

Communication, volunteer recruitment, relations with other organizations

FromZoRRO2, the pickupEastexclusively carried out according to the methodsareivantes :

Graines	PMT (fins, mask, and snorkel)
Rhizomes	Kayak (the most efficient) On foot along the beach: collecting in the water and searching in the wrack line in case of a large bed of dwarf eelgrass

We have indicated these conditions to the volunteers of ZoRRO3, 4, and 5, which still limits the volunteers to those who are comfortable in the water (sometimes cold).

You can find on the**site internet** https://8vies.fr/projet-zorro.htmlA brief overview of the project and a calendar including the dates of upcoming ZoRRO releases. Annual reports are also included.

And**WhatsApp group**The "Rewilding of the Étang de Berre" group was created in early 2024. Anyone interested in the project is invited to join (either manually or via a QR code displayed during our workshops). This group allows us to share project progress and announce upcoming outings. It also facilitates carpooling arrangements.

Dates and information about outings are also published in the**newsletter** (launched in 2024) as well as on the social media platforms Facebook and Instagram. They are shared in groups in towns near the harvesting and replanting sites. This aspect needs to be optimized for 2025 in order to reach and mobilize more people.

The WhatsApp group enabled the return of several volunteers at the beginning of the year.

One of the volunteers, who joined us via word of mouth, has become very active in the project and supports us on several levels (proofreading reports, planting seeds and rhizomes, monitoring plantings).

Finally, we are still a "player in the United Nations Decade for Ecosystem Restoration", a label obtained in 2023.

DÉCENNIE DES NATIONS UNIES POUR LA
RESTAURATION DES ÉCOSYSTÈMES
2021-2030

Stands

The ZoRRO project was presented at several environmental education booths, including:

- at the 2nd edition of the "Odyssey" Games and Nature Festival in St-Chamas on May 31, 2025
- at the 2nd edition of the St-Chamas Sport and Nature Festival (joint stand with GIPREB), October 12, 2025

Both times, the stand featured

- the mobile laboratory "the Nautile"
- a periscope operating with a smartphone having in memory a 360° image of a pond bottom with eelgrass (from ZoRRO), giving visitors a real impression of diving.

Figures 6 and 7: banners from the 2 events mentioned above.

The project was alsopresented at the headquarters of the Marseille Water Company, during a day dedicated to positive solutions for the environment called “Ecosystems”. We presented ZoRRO using our explanatory rollup (similar to the dibond of the Nautile) as well as a game, “The 6-meter Pond”, which introduces the idea of restoring the marine ecosystem of the pond in a playful way.

Figure 8: The 6-meter pond game at the Marseille Water Company

Conference

A lecture on the seagrass beds of the Étang de Berre was given by Pascal Bazile (administrator of 8 Vies and initiator of the ZoRRO project) on March 18 at the Cornillon-Confoux media library as part of the "Rendez-Vous avec l'histoire locale" series. Seventeen people attended.

Figure 9: P. Bazile's lecture in Cornillon-Confoux

Students

The 3 BCPST students from the Lycée Hoche in Versailles who had worked a little on ZoRRO at the end of 2024 as part of their TIPE, finally chose another subject, the eelgrass reacting too slowly for this type of work where results are needed within a period measured in months.

Two students participated in the rhizome harvesting day on April 6th.

Finally, twoDesign students from ENSCI in Paris contacted us as part of a project on biomimicry in the seabed. Their work focused on the protection and recolonization of seagrass meadows, and they asked us written questions about several aspects of our project.

The Nautilus

The Nautile is a caravan parked in the St-Chamas marina car park from May to October. It is intended to welcome the public to discover our activities, raise awareness about the biodiversity of the Étang de Berre and participate in our operations.

This place has several roles: it serves as a hatchery for our seeds, allows us to collect and centralize data and images of the seabed, and facilitates mediation with the public.

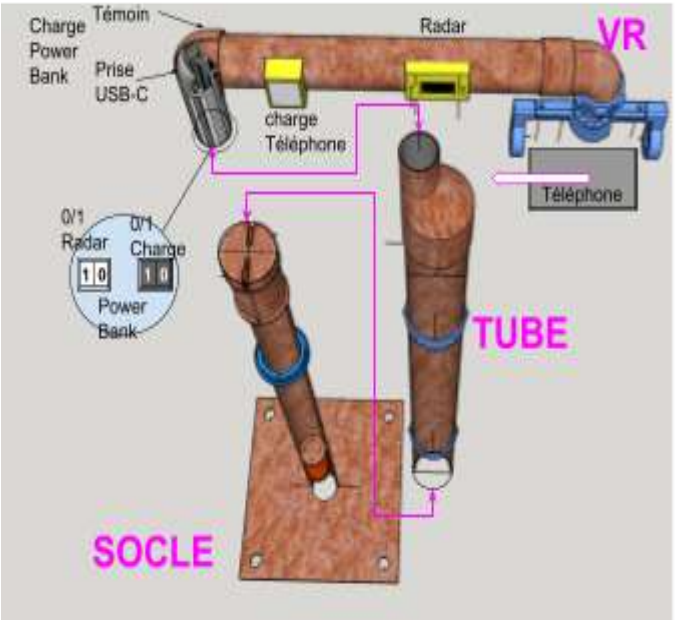
That is why we gave it, more or less, the name of Jules Verne's submarine: "The Nautilus - Observatory of the underwater world".

Figure 10: The Nautile equipped with its new communication tools

The decoration of the Nautile was provided by the Empreinte association, with whom we are partners.

In 2025, the original sign, damaged by the elements, was replaced. The new sign, along with the porthole offering a view of eelgrass, was designed by a local graphic designer with whom we collaborate regularly: CréaGraphik. The materials on which they were printed are more robust and will better withstand the elements.

Finally, the caravan is now equipped with a dibond that allows passers-by to discover the ZoRRO Project.



The periscope

The periscope offers a 360° view beneath the surface of the pond. We can observe the seagrass beds that we havereplantedWe discover their multiple roles: pillars for structuring the silty bottom of the pond; oxygen producers; CO_2 sinks$_2$three times more powerful than terrestrial seagrass beds and nursery grounds for aquatic biodiversity.

The periscope's base consists of two sliding tubes in which a counterweight moves, allowing the system to rise and fall to easily adapt to each person's height.

Figure 11: Diagram of the periscope

The periscope head is equipped with an augmented reality headset featuring two handles for spatial orientation and camera control. Unlike augmented reality headsets that attach to the head, the periscope doesn't remove us from reality. It simply allows us to explore the seabed using an observation device.

Figure 12: Seagrass bed on the rocky coast of Istres seen through a periscope

This video is also available in VR360 format on the YouTube app: @8viespourlaplanete

Partners

GIPREB

On July 11, 2025, we met with GIPREB to discuss our respective actions.

In October, 8 vies and GIPREB had a joint stand at the 100% sport and nature Festival in Saint-Chamas.

In November 2025,We planted 3,000 seeds jointly with GIPREBat a ReHAB site in Berre.

University of Groningen

Since 2025, we have been testing the DIS method proposed by the University of Groningen. We designed specific tools for this method and provided them with the

plans so they could test it under their conditions during their sowing in the Netherlands in March 2026.

Financial Partners

Conclusion

The 2025 campaign is the fifth of the ZoRRO project. It has been marked by:

- the destruction of part of the source seagrass meadow (by dredging the Mazet canal), therefore
    - The number of rhizomes and debris found was lower than in previous years.
    - Collecting the seeds was a little more difficult: it had to be done by going further than in other years (by going into the St Antoine canal)
- Two days cancelled due to mistral winds (March 9th and September 4th)
- The number of seed maturation trays has been increased to 4 (1 per harvest) for more accurate statistical purposes.
- the adaptation of the DIS method for sowing seeds
- a collaboration with GIPREB.

Appendix 1 – Dredging of the small canal (Mazet canal)

This dredging destroyed many patches of eelgrass that we used to harvest and severely disrupted ZoRRO 5 (for demonstrations aimed at beginners; you had to swim in the Grand Canal St. Antoine to find patches in good condition). It definitely deserved two photos.

We can see the sediment deposits on the north bank (on the right in our photos) and if there are still patches of eelgrass, they were much smaller than in previous years and these patches did not produce reproductive stems in 2025.

The dredging was done before February 2025.

Appendix 2: Photos of the seed sowing on November 12, 2025, with the invaluable assistance of GIPREB

Silt is collected from the bottom of the Berre pond and filtered using a flexible net.

seed counting

mixing of seeds with sediment

Sowing seeds with our new injection tool

Appendix 3: Acknowledgments to the volunteers

A few photos from the main days…

Figure 13: Anthony and Priscilla during the replanting day on April 6th

Figure 14: Day of May 11: Delphine, Victoire, Nicolas, Damien and me

Figure 15: Adults on May 25th...

Figure 16: ... and the children from that same day, May 25th

Figure 17: June 1st: Delphine and her daughter Violette, 3 members of the Esperen association (the photographer and another who hadn't arrived yet), Damien and me

Figure 18: Day of October 5 - after collection

Figure 19: Replanting on October 5 – preparation of the anchors

Figure 20: Replanting on October 5th - planting