

# COPERNICUS & ME

## Monitoring water turbidity during the port extension works at Port-la-Nouvelle



THE OCCITANIE REGION NEEDED TO MONITOR WATER TURBIDITY.



DATA FROM SENTINEL-2 AND SENTINEL-3 PROVIDED A "WATER TURBIDITY WEATHER FORECAST" NEARBY THE WORKS.



DAMAGE TO THE NEARBY NATURAL AREAS WAS AVOIDED WHILE EXTENDING THE PORT.



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# COPERNICUS



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## INFRASTRUCTURE WORKS NEARBY THE SEA CAN NEGATIVELY AFFECT WATER QUALITY.

Port-la-Nouvelle is a French town in the Occitanie region, in the south of France, on the Mediterranean coast. With 11 kilometres of beaches, the town sees its population of 6.000 increase up to 30.000 people during the summer season.

The historic port of Port-la-Nouvelle extends over 2.5 kilometres and it represents a major economic asset in the area. Owned by the Region, it includes a commercial port, a fishing harbour, and a marina. The Chamber of Commerce of Aude is responsible for its daily management.

The annual traffic of the port represents two million tons and 350 ship visits, while the global port activity generates 1.600 direct and indirect jobs [1].

This commercial port has historically specialised in the import of oil and the export of cereals.

**IN 2018, THE OCCITANIE REGION DECIDED TO START IMPORTANT WORKS TO ADAPT THE COMMERCIAL PORT OF PORT-LA-NOUVELLE TO NEW TRAFFICS AND ALLOW FOR THE DEVELOPMENT OF NEW SECTORS.**

Notably, the regional plan foresees the installation of floating wind-turbines and the creation of a green hydrogen production plant as from 2024.

These works are part of a regional policy that aims at combining the economic development of the region with the valorisation of its environment.



Indeed, commercial ports are vital elements of the Occitan regional economy, and the Region spends a large part of its annual budget in the regional transport infrastructure.



In 2015, the national law on the new territorial organisation of the Republic (loi NOTRe) strengthened regional competencies in France and the region became the owner of certain marinas and of portuary areas.

In 2016, the Occitanie / Pyrénées-Méditerranée Region created a Directorate for the Sea within its administration and launched the Plan Littoral 21 (Coastal Plan 21), aimed at preserving while also modernising the littoral.

The Plan's objective is to promote investment in infrastructure and coastal preservation. It includes actions to support sustainable development projects, coastal resorts and marinas, fishery, and aquaculture activities.

Among these measures, the Plan includes continuing development projects in the ports of Sète, Port-La-Nouvelle and Grau-du-Roi [2].

The works to extend the commercial port of Port-la-Nouvelle are part of the plan for the development of the Coast and are managed by different entities. For the Region, the Directorate for the Sea is in charge of ensuring the environmental sustainability of the project.

The project includes the construction of two large dams of about 2.5 km long, of a new quay to assemble the future floating wind turbines, and of a new basin to allow large ships to enter and exit the port.

Carrying out such works implies dredging, which can bring back to the surface sediments on the seafloor, hence endangering the marine environment and the natural areas nearby.

**TO AVOID DAMAGE TO THE ENVIRONMENT, THE REGION WANTED TO MONITOR WATER TURBIDITY DURING THE WORKS.**





## OCCITANIE / PYRÉNÉES-MÉDITERRANÉE REGION

Type of organisation: Public regional administration

Country: France

Annual budget in 2020: More than €100m

Previous experience with Earth observation data: Yes

The Region was particularly concerned with the risk of a turbid plume entering the pond of Bages-Sigean, a lagoon pond located on the shores of the Mediterranean Sea, on an area of 5.500 hectares.

The Narbonnaise ponds are crossed by the Roben Canal, classed as UNESCO Natural heritage site. The pond of Bages-Sigean communicates with the sea by the inlet of Port-la-Nouvelle and the beach of the Vieille Nouvelle, today classed as a regional natural reserve [3].

**TRUSTABLE AND EASY-TO-USE DATA ON THE WHOLE BASIN EXTENSION WAS NEEDED TO PREVENT, MONITOR AND RAPIDLY INTERVENE IN THE EVENT THAT A TURBID PLUME SPREAD TOWARDS VULNERABLE AREAS**



I-SEA, a company based in Aquitaine, supported the port authorities. I-Sea specialises in monitoring marine environments and the coastline by combining field measurements with observations by UAVs/USVs, airborne or spaceborne sensors.

I-Sea develops geo-information solutions for public administrations and private actors in the water and energy sectors, making use of data from the Copernicus Sentinel satellites to enhance environmental surveillance.

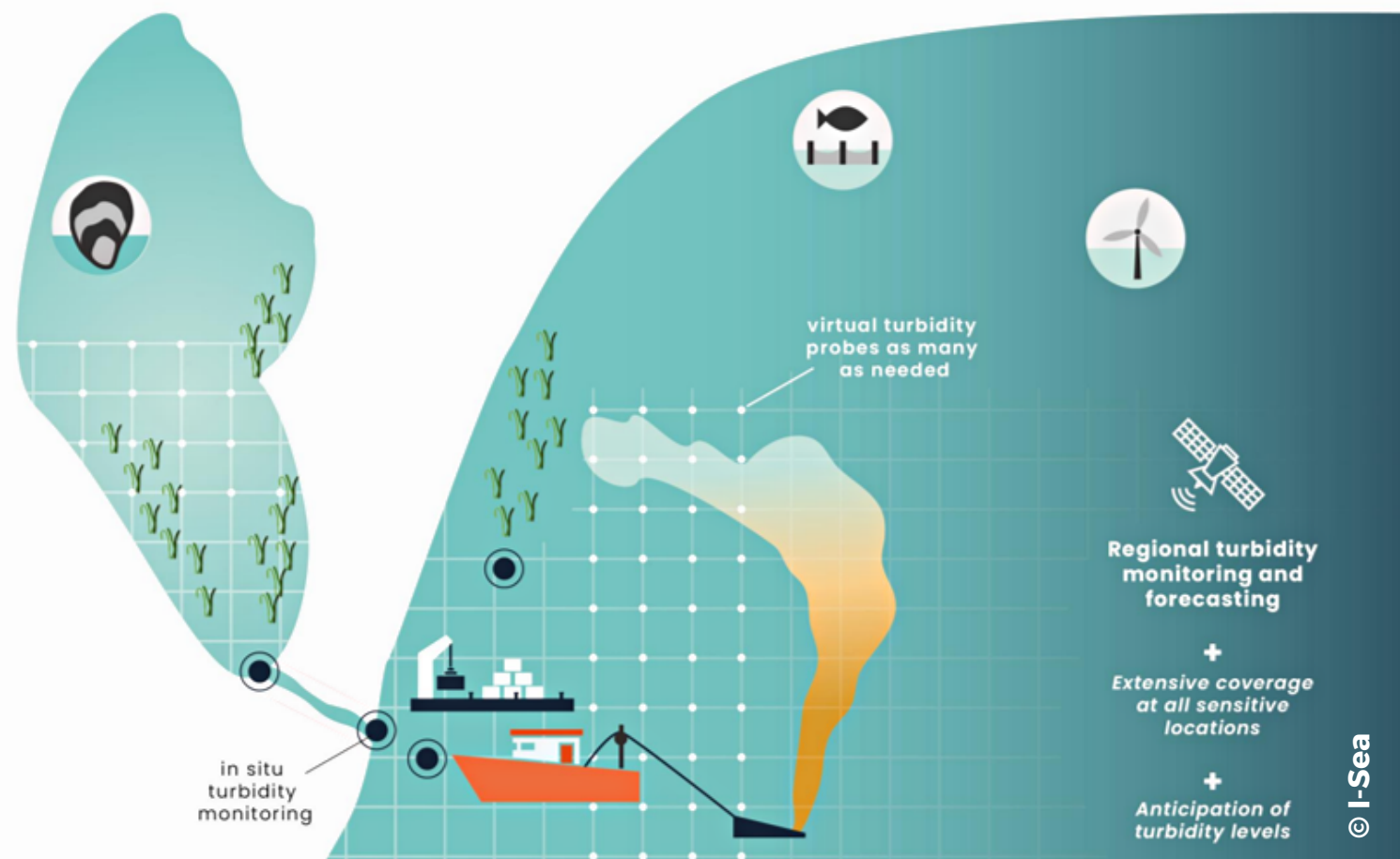
The freely available Copernicus satellite imagery provided data on water turbidity in the past and in the near-future. The data were used to monitor water quality and to forecast water turbidity during the days of the works.

Before the works started, satellite imagery allowed I-SEA and the Region to better understand the hydro-sedimentary processes of the site of Port-la-Nouvelle.

## DATA FROM SENTINEL-2 AND SENTINEL-3 COPERNICUS SATELLITES HELPED MONITORING WATER QUALITY NEARBY THE WORKS.

During the works, the data contributed to in-situ monitoring, by providing a big-picture of water turbidity levels and a forecast of the turbidity levels expected within the next three days.

This is the very first time that this turbidity forecast model is used within the context of operational works in a port.





## THANKS TO THE COPERNICUS DATA, IT WAS POSSIBLE TO AVOID DAMAGE TO THE NEARBY NATURAL AREAS AND TO PREVENT THE INFILTRATION OF A TURBID PLUME IN THE POND OF BAGES SIGEAN.

The satellite-based predictive method provided the personnel responsible for the implementation of the works in the Region with daily objective tools to monitor the impact of the works on water turbidity in the area.

In 2024, the commercial port of Port-la-Nouvelle will welcome the first floating wind turbines in the Mediterranean Sea.

*“We do our best efforts to ensure that economic development is based on the safeguard and valorisation of the region’s natural resources”. Benjamin Grente, Directorate for the Sea, Occitanie Region.*

When we visit the site, in the summer of 2021, thousands of tetrapods are being moulded on the worksite. The shapes of these concrete structures are conceived for marine life to adapt to them throughout time, as if they were natural rocks.

They are being used to complete the rows extending the breakwaters at the entrance of the commercial port, to allow big cargo boats to enter and exit the port easily.



## LINKS

Port-la-Nouvelle website: [https://www.port-la-nouvelle.com/presentation-generale/Littoral et Croissance bleue](https://www.port-la-nouvelle.com/presentation-generale/Littoral-et-Croissance-bleue) (in French), Occitanie / Pyrénées-Méditerranée Region: <https://www.laregion.fr/Littoral-et-Croissance-bleue>

Plan Littoral 21- La Région et l'Etat lancent l'édition 2021 de l'appel à projet « Avenir Littoral », Occitanie / Pyrénées-Méditerranée Region, March 2021. Consulted on 20 October 2021: <https://www.laregion.fr/Plan-Littoral-21-La-Region-et-l-Etat-lancent-l-edition-2021-de-l-appel-a-projet>

I-SEA website: <http://i-sea.fr/en>

I-SEA, ESA Business Applications, ESA BIC Sud France: <https://spacesolutions.esa.int/business-incubation/esa-bic-sud-france/company-profile/i-sea>

## REFERENCES

- [1] Port-La-Nouvelle General Overview. Consulted on 20 October 2021: <https://www.port-la-nouvelle.com/general-overview/>
- [2] Littoral et Croissance bleue (in French), Occitanie / Pyrénées-Méditerranée Region website. Consulted on 20 October 2021: <https://www.laregion.fr/Littoral-et-Croissance-bleue>
- [3] Etangs du Noarbonnais, Parc naturel régional de la Narbonnaise en Méditerranée. Consulted on 20 October 2021: <https://www.parc-naturel-narbonnaise.fr/decouvrir/sites-a-decouvrir/le-littoral/lagunes-et-marais/etangs-du-narbonnais>

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