Consulting

Photo credit: SYMADRREM

OUR CHALLENGE

Protecting territories and their residents from the risks of flooding

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Anticipating Rhône floods

Paul and Céline live in Tarascon, a charming town in the department of Bouches-du-Rhône (South of France), in a house they built themselves over 30 years ago. With a stunning view of the Rhône River, a historic river of Switzerland and France and one of the most significant waterways of Europe, their home holds all their family memories and means the world to them.

The region is highly prone to flooding, particularly during Cévenol episodes, meteorological phenomenon that mainly occurs in the Cévennes and its surrounding area. The 2003 flood was the last major flood that devastated the region. The Rhône flooded all the surrounding communes few weeks, causing substantial damage.

Fast forward to 20 October 2021; heavy rainfall is announced and Paul and Céline are prepared. Since the launch of the programme to secure the Rhône dikes in 2007, the residents now feel less vulnerable.

Nevertheless, due to climate change, the frequency and intensity of rainfall-related incidents and the resulting floods will continue to increase.
How can Paul, Céline and all the residents of the region be assured that they will not suffer the consequences of future climatic events?

What solutions are available for anticipating the risks of flooding?

Which means can be used to minimise impacts?

How can these recurring natural phenomena be addressed while limiting the environmental impact of the solutions?

OBJECTIVE

To deploy sustainable solutions to prevent the risks of flooding of the Rhône and mitigate its consequences on residents and property.

110,000 **inhabitants concerned**

⇛ **Improve the living conditions** by reducing the vulnerability of the inhabitants.

⇛ **Build and secure dikes** on the right and left banks of the Rhône.

The major flooding caused by the Rhône flood in early December 2003 affected more than 12,000 people and caused more than €700 million in damage. Consequently, the public authorities launched the large-scale **«Plan Rhône»** to combat flooding. Four years later, the Flood management plan for downstream Rhône was implemented with the aim of building resilience to flood risks. SUEZ Consulting's teams provided support to **SYMADREM** (Syndicat Mixte Interrégional d'Aménagement des Digues du Delta du Rhône et de la Mer) in its programme to secure the flood protection structures on the Rhône, from the Vallabrègues dam, located in a commune in the Gard department, in southern France, to the sea.

A programme with numerous challenges:

- **Managing new urban development** by reconciling risk and regional development
- **Reducing the exposure to existing issues in areas liable to flooding**, e.g. housing, businesses, farms, public buildings and networks
- **Securing flood protection structures** in order to avoid breaches and to reduce the amount of time that land is flooded

SOLUTION

An alternative to raising the height of the existing dikes:

- Accepting the flooding of land upstream of vulnerable areas for infrequent floods
- Securing existing dikes and developing new ones to mitigate exceptional floods

This solution has been implemented on both banks of the Rhône

⇛ Opération Tarascon-Arles, which aims to protect Arles and its surrounding area

- **Construction of a 10 km embankment** on the left bank of the Rhône
- Creation a **5 km section** for overflow resistance along the railway line
- **Extraction of 600,000 m³** of sediment downstream of Tarascon
- Creation of a **river arm located at a distance from the main bed** along the Rhône, over approximately 3 km
- **Rehabilitation of a landfill** thanks to material from the construction site

⇛ Securing the dike between Beaucaire and Fourques to preserve the right bank

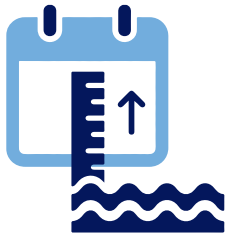
- **Reconstruction and reinforcement of 13 km of dike**, 5 km of which was made to be overflow-resistant, representing more than 1 million m³ of materials
- Creation of a **water intake** 10 m below the dike to supply an irrigation canal
- **Extraction of more than 300,000 m³** of sediment from the Rhône
- Implementation of an **innovative fibre optic** system spanning 13 km, allowing to detect unusual water inflow in the body of the dike in order to facilitate interventions and maintenance

DID YOU KNOW

30%

OF THE RESIDENTS LIVING ALONG THE RHÔNE ARE IN FLOOD-PRONE AREAS, WITH OVER 55% OF THEM LIVING DOWNSTREAM OF BEAUCAIRE

Source: https://www.plan-rhone.fr/dispositifs/inondations/chiffres-cles-376.html



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ONE OF THE RHÔNE'S BIGGEST FLOODS: UP TO 4 METRES OF WATER IN LYON

Source: https://www.maxisciences.com/inondation/ces-inondations-et-crues-qui-ont-marque-l-histoire-de-la-france_art29886.html

24,600

LIGHTNING FLASHES RECORDED DURING A RECORD-BREAKING CÉVENOL EPISODE IN THE GARD ON 14 SEPTEMBER 2021

Source: https://france3-regions.francetvinfo.fr

2,493 mm

WORLD RECORD FOR RAINFALL IN 48 HOURS, RECORDED IN JUNE 1995

Source: http://pluiesextremes.meteo.fr/france-metropole/Records-mondiaux.html

And you, what changes would you like to see implemented to help protect you from the risks of flooding?

Discover all our solutions to counter the risks of flooding on **suez.com**