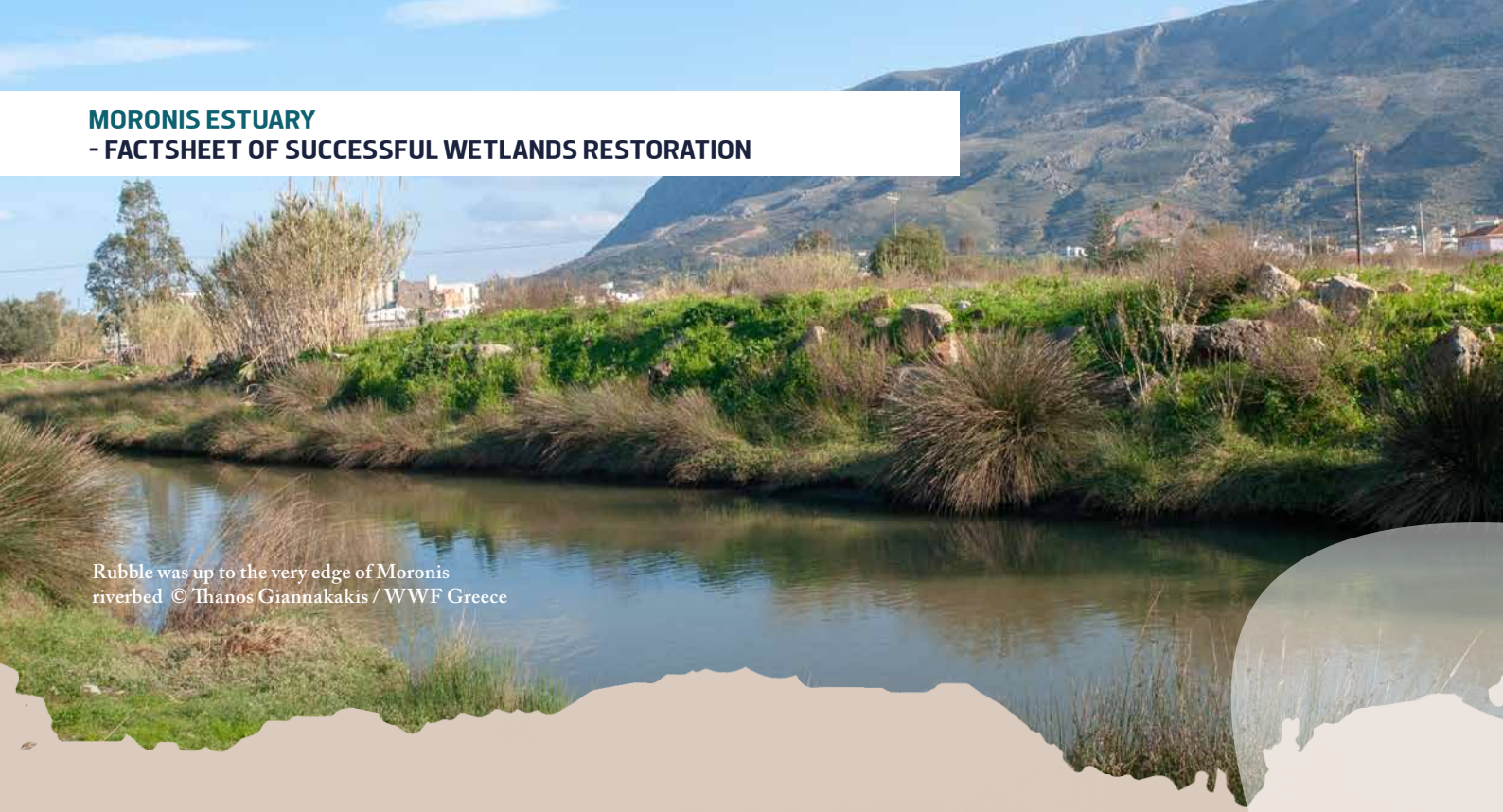

Rubble was up to the very edge of Moronis riverbed © Thanos Giannakakis / WWF Greece

RESTORATION OF THE MORONIS ESTUARY

MORONIS ESTUARY - SOUDA, MUNICIPALITY OF CHANIA, CRETE, GREECE

Coordinates:
24.060476° X
35.492458° Y

Site Size: 16.3 HA

Area Restored: 3.1 HA

→ BACKGROUND

The Moronis estuary consists of the estuarine waters of the Moronis river, a small area of salt marshes, and a marine area with permanent shallow waters. In the past, the whole area of Souda was an extended marshland; the first known human interventions date back to the Venetian period, when part of the wetland was converted into saltpans. In 1872 the saltpans were drained and the area was settled, while pressures continued with drainage, embankments, road building and crop expansions.

In 2010 the wetland was partially restored by the municipality, following a study prepared by WWF Greece. During these restoration actions, more than 10,000 m³ of debris were removed from an area of 0.9 ha. The most significant habitat types based on the EU Habitats Directive classification in the wetland are Estuaries (1130) and Soft substrata without vegetation (119A), while other habitats are Salicornia and other annuals colonizing mud and sand (1310), Mediterranean salt meadows (*Juncetalia maritimi*) (1410), and Reed thickets (72A0). In regards to flora, the most common species are *Phragmites australis* and *Juncus* sp., while *Salicornia* sp. and *Tamarix parviflora* have been developed in the restored area. Finally, 188 bird species have been recorded in the area, of which 22 are nesting.

Wetland Type:

A - Permanent shallow marine waters in most cases less than six metres deep at low tide; includes sea bays and straits

F - Estuarine waters; permanent water of estuaries and estuarine systems of deltas

H - Intertidal marshes; includes salt marshes, salt meadows, saltings, raised salt marshes; includes tidal brackish and freshwater marshes

Protection Status:

None

WETLAND BASED SOLUTIONS

→ BEFORE RESTORATION

→ THREATS AND PRESSURES

The area to be restored was a marshland until the 1960s, but it was later completely degraded and covered by rubble up to 3 m deep. In 2010, the municipality had plans to create an urban park with lawns and planted palm trees; however, after several meetings and a consultation process, the decision was taken to restore it as a wetland instead. A small part of the wetland (0.9 ha) was then restored but the project was paused for several years due to a lack of funding. Some of the most significant threats and pressures on the site are:

- Soil filled with rubble
- Waste pollution
- Illegal land claims
- Water pollution
- Invasive flora species

→ OBJECTIVES

1. Increase the number of habitat types and their overall area
2. Reduce flood risk
3. Raise awareness

56%

original habitats are to be restored by the project

Water bodies: 7.6 ha | Total land section of the wetland: 8.7 ha
Original habitats modified (from the land section): 5.5 ha

→ IMPACT

1. **Ecological restoration:** The restored area will be covered by wetland flora species such as *Phragmites australis*, *Juncus sp.*, *Salicornia sp.* and *Tamarix parviflora*, thus increasing the area of wetland habitats by 2.2 ha. In total, more than 30,000 m³ of debris will be removed.
2. **Archaeological significance:** The removal of the debris will reveal a wall that was part of the Venetian salt pans.
3. **Disaster risk reduction:** Due to the chronic deposition of aggregates (2-3 m in depth), flood risk was increased in the area. The restoration is expected to reduce the flood risk.
4. **Raising awareness:** More schools are expected to visit the wetland for environmental education activities. Locals and tourists will also have the opportunity to visit the area.

→ BUDGET & SOURCE OF FINANCE

€360,432 has been received in municipal funding.

3.1 HA

of land have been revived through restoration activites

→ WHO BENEFITS?

Around 6,500 citizens in the city of Souda and 55,000 people in Chania will benefit, since the restoration of Moronis will help to mitigate flood risk in the area. Moronis is adjacent to the main road that connects Chania with the local port.

Similarly, citizens and tourists will be able to visit the wetland, as it will be accessible to the public. Infrastructure such as a path, a footbridge, observatories and informative signs will be put in place.

→ RESTORATION ACTIONS & METHODOLOGY

During the first restoration activities in 2010, the following actions were taken:

- Rubble and construction debris were removed from an area of 0.9 ha. The total amount of material removed was ~10,000 m³: heavy machinery (bulldozers) was used for this purpose.
- The rubble was removed to expose the original wetland soil surface. After the removal of the rubble, the final landscape was formed to comprise a diversity of micro-scapes with small mounds, openings to the seawater and flat areas, thus permitting the growth of a range of flora species. The more delicate work was carried out using light machinery or by hand.
- Seeds from adjacent flora species (*Juncus* sp., *Salicornia* sp. etc.) were spread over the restored area.
- The area was then left untouched to recover.

Similar approaches will be used in 2022 for the removal of rubble from an additional area of 2.2 ha. In addition, the following works will be implemented:

- Creation of a perimeter path for visitors
- Installation of informative signs
- Construction of a wooden footbridge across the Moronis river
- Construction of two or three observatories.

→ AFTER RESTORATION

PROJECT DATES:

June - September 2022: earthworks (removal of ~30,000 m3 of debris)

Dates TBD: Installation of infrastructure (path, observatories, footbridge, informative signs)

→ SOCIAL SUPPORT

The restoration of Moronis is supported by the local community of Souda.

→ AUTHORITIES SUPPORT

The project is being implemented by the municipality of Chania, with the support of the region of Crete.

→ OTHER PARTNERS

WWF-Greece.

→ STAKEHOLDERS

Chania Municipality, Chania Water Supply and Sewerage Company, Ministry of Culture and Sports, Harbour Management Organisation of the Prefecture of Chania.

During the first phase of the restoration in 2010, more than 10,000 cubic meters of rubbles were removed. © Thanos Giannakakis/WWF Greece

"For many decades, the management of the Moronis river estuary was a stalemate for the entire surrounding area. A wetland of unique beauty, which unfortunately in recent years at an increasing rate had been turned into a landfill and embankments. Without any further delay, we are moving into action by protecting, restoring and making visible again the natural ecosystem of the Moronis estuary. Ultimately, alongside the major stakeholders and other partners involved, we aspire to deliver to the citizens an open green space with functional and environmental benefits for the wider area and for future generations."

Panayotis Simandirakis, Mayor of Chania

→ LESSONS LEARNT

The genesis of the restoration of the Moronis estuary goes back to 2009, when the municipality decided to transform the degraded wetland into an urban park. After extended meetings between WWF Greece and the local authorities, the initial plan was changed and it was decided to restore part of the wetland instead. In order to engage the local community, a series of actions were implemented over the last 12 years, such as:

- Numerous presentations and public events (e.g. clearing of the wetland)
- Environmental education activities for students
- A summer camp with 15 volunteers
- Door-to-door questionnaires and briefings
- Meetings with municipal and regional authorities.

Despite these efforts, the restoration of the remaining part of the wetland was paused for more than a decade for various reasons, including delays in securing the necessary permits and a lack of funding. Although some efforts were made at a municipal and regional level to overcome these obstacles, progress was very slow. Finally, in 2020-2021, the municipality of Chania committed to take over the restoration of Moronis and provide the necessary funds for the work.

Specific lessons can be learned from the process:

- Restorations can take a very long time, so patience and persistence are absolutely necessary.
- Keeping the topic in the public consciousness is crucial – this can be achieved with a presentation, a meeting with the authorities, an article in the local press etc.
- It is important to keep in close contact with local champions (active citizens, NGOs etc.) and to help, strengthen and encourage them.
- Among the most time-consuming and resource-heavy parts of the process are: i) gaining the acceptance and engagement of the local community, ii) securing the politcal will, iii) having one public authority to take over the lead, iv) getting all the necessary permits in place.

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→ CONTACT DETAILS

Thanos Giannakakis
t.giannakakis@wwf.gr
NbS Coordinator, WWF-Greece

Michalis Tsoupakis
mtsoupakis@chania.gr / dimos@chania.gr
Deputy Mayor, Municipality of Chania

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