LIFECHARCOS

Conservation of Temporary Ponds in the Southwest Coast of Portugal

LIFE CHARCOS Project
LIFE12NAT/PT/000997

Layman Report

Fairy Shrimp Pair (*Branchipus cortesi*)
These Large Branchiopoda Crustaceans of the Anostraca Order live inside the Temporary Ponds for a very few weeks in winter. With a maximum size of 2,2 cm, swin with the belly up and have no carapace.

Caropsis verticillato-inundata
Small-sized creeping plant with very restricted worldwide distribution, which is why it is classified as vulnerable by the IUCN and a priority species in Annex II and IV of the Habitats Directive.

Tadpole of a Spade foot Toad
(*Pelobates cultripes*)
The tadpoles of this amphibian species need 3 to 4 months to fully complete their development, which coincides with the hydroperiod of the temporary ponds.

Clam shrimp (*Cyzicus grubei*)
These Large Branchiopoda Custaceans of are included in the Spinicaudata order, which appeared about 400 million years ago. They are an Ibero-Balearic endemism. Their bodies are protected by two reddish valves with a maximum length of 1,5 cm.

Lagoon-thistle or Blue-peaks during the flooded stage
(*Eryngium corniculatum*)
Bioindicator plant of Mediterranean Temporary Ponds. Leaves have different shapes depending on the time of the year. In the flooded phase, the leaves are thick and hollow, looking like small spoons emerging from the water surface. When the ponds dry leaves become rigid and thorny.

Parsley frog (*Pelodytes atlanticus*)
Small frog (max. 5 cm) with a body covered with small green warts, endemic to southwest Portugal.

Spikerush (*Eleocharis palustris*)
Common plant in the central area of the Mediterranean Temporary Ponds, similar to the reeds because it does not have developed leaves and its flower has no petals. It can form dense clusters and measure up to 50 cm in height.

Tree frog
(*Hyla meridionalis*)
Light green frog with a black lateral stripe from the eye to the legs. They have adhesive discs at their fingertips, which allows them to climb through the vegetation.

Coral necklace
(*Illecebrum verticillatum*)
Plant with two distinct aspects depending on the stage of the Temporary Pond. In the flooded stage, the stems look like red threads floating on the surface of the water reaching about 60 cm.

Lesser water plantain (*Baldellia ranunculoides*)
This plant is common in Mediterranean wetlands. The leaves when crushed give off the smell of lemon coriander.

Tadpole shrimp (*Triops vicentinus*)
This Large Branchiopoda Crustacean is an endemismo of the southwest of Portugal.
It has a carapace that covers part of the body. It has about 50 pairs of legs and can reach 7 cm without the tail. The genus Triops is so called because it has 3 eyes (2 compound eyes and 1 nauplian).

MEDITERRANEAN TEMPORARY PONDS

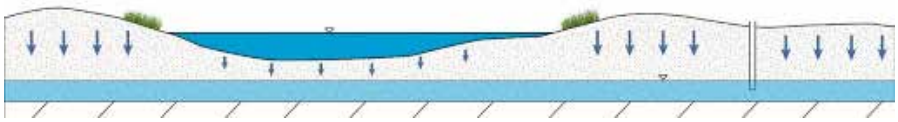
Mediterranean Temporary Ponds are small shallow wetlands, generally less than 50 cm depth, strictly linked to the Mediterranean climate, characterized by rainy winters and hot dry summers.

They are called temporary ponds because they go through a periodic cycle every year, in which they **shift between a dry and a flooded period**. For this reason, they are usually flooded during the rainy season but dry completely during the summer.

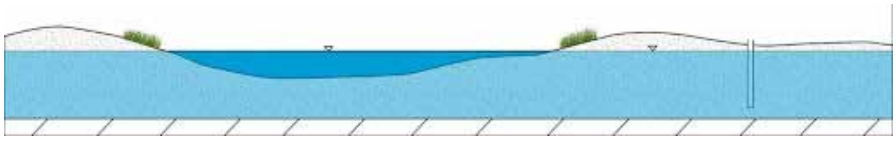
Mediterranean Temporary Ponds are one of the **most remarkable and unique freshwater habitats in Europe**, playing a very important role in the connectivity between other freshwater habitats.

They are considered a priority habitat by Annex I of the Habitats Directive (92/43/EEC) - Mediterranean Temporary Ponds (3170 *).

1ST FLOODING STAGE
Pond disconnected from the groundwater level (ephemeral flooding)



2ST FLOODING STAGE
Pond connected to the groundwater level (longer hydroperiod)



In temporary ponds connected with groundwater levels the water from the first rainfalls accumulates due to the existence of a more impermeable layer of soil that helps to retain water. When the groundwater exceeds the level of the pond bottom elevation the hydroperiod becomes longer.

THREATS TO THE CONSERVATION OF TEMPORARY PONDS

Mediterranean Temporary Ponds are threatened due to human action and lack of knowledge of their

natural value.

Traditionally considered as non-productive land, this priority habitat is extremely vulnerable, mainly

due to its small size and shallow depth.

In the SCI of the Costa Sudoeste the increase in agricultural and tourist activity in the last decades

has caused a sharp decline of Mediterranean Temporary Ponds.

HYDROGEOLOGY OF TEMPORARY PONDS

Mediterranean Temporary Ponds depend on annual rainfall and local hydrogeological conditions.

The hydroperiod (period of flooding in which temporary ponds have water) may vary from year to year depending on climatic conditions.

The duration of the hydroperiod is crucial for the diversity and development of the plant and animal communities in these habitats.

Depending on the type of soil, there are two different types of pond hydrological functioning: (i) connected to the groundwater level and (ii) dependent only on the accumulation of rainfall in the soil depression.

LIFE CHARCOS PROJECT

The LIFE Charcos Project - Conservation of Temporary Ponds in the Southwest Coast of Portugal (LIFE12/NAT/PT/000997) aimed to reduce the decline trend of Mediterranean Temporary Ponds in the Costa Sudoeste SCI and promote the recovery of ponds in an unfavorable state of conservation.

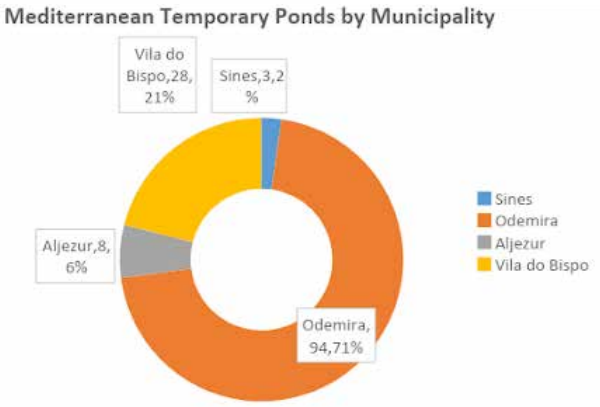
This project arose from the need to protect this fragile priority habitat, which was in sharp decline in the Costa Sudoeste SCI due to the degradation of its conservation status and the regression of its distribution area.

WHERE WAS THE LIFE CHARCOS PROJECT CARRIED OUT?

The Costa Sudoeste Site of Community Importance (SCI) is an area of the Natura 2000 Network, which overlaps largely with the Sudoeste Alentejano and Costa Vicentina Natural Park (PNSACV).

Along this coastline is still possible to found the main concentrations of Mediterranean Temporary Ponds known in Portugal, mainly in the municipalities of Odemira and Vila do Bispo but also in Sines and Aljezur.

WHAT IS THE CONSERVATION STATUS OF TEMPORARY PONDS IN THE COSTA SUDOESTE SCI?



COSTA SUDOESTE SCI:

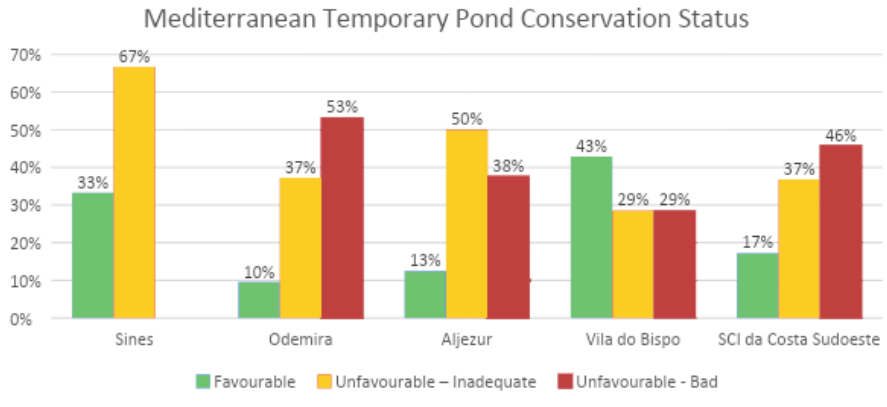
- ✓ 133 Mediterranean Temporary Ponds
- ✓ Flood area between 50 m2 and 7,3 ha
- ✓ Total Area of 88 ha

New tools available for the conservation of Mediterranean Temporary Ponds in the Costa Sudoeste SCI:

- ✓ Conservation Status Assessment Index
- ✓ Definition of Protection Areas
- ✓ Guidelines for Management Practices

To assess the conservation status of Mediterranean Temporary Ponds it is necessary to consider;

- ✓ Topography
- ✓ Structure and state of the vegetation
- ✓ Human activities present
- ✓ Flood area trend

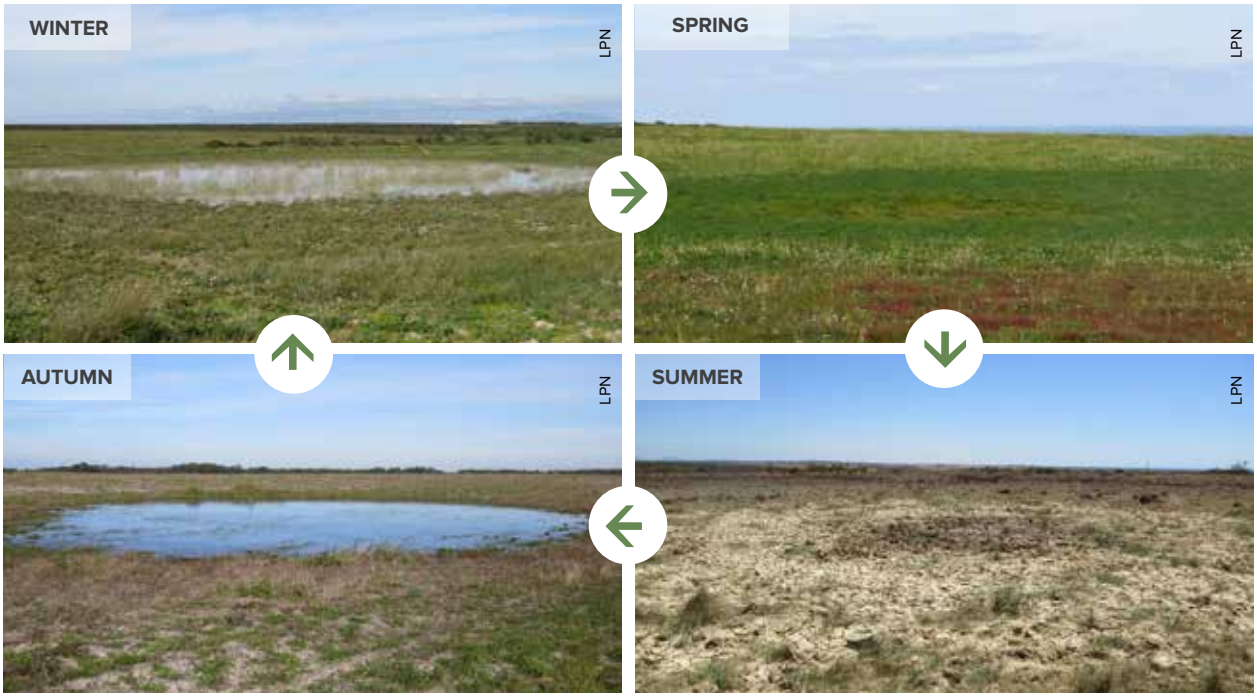


OUTSTANDING BIODIVERSITY!

The species of fauna and flora that colonize the Mediterranean Temporary Ponds, **many of which are rare and endangered**, are adapted to live in submerged conditions for a **few months and then withstand drought conditions.**

The life cycle of the large branchiopod crustaceans is an example of these adaptive strategies, which is limited to the pond flooding period. However, their cysts (encapsulated embryos resembling eggs) are deposited in the soil and resist the dry period, to hatch in the next rainy season when the pond starts to flood again.

The flooding dynamics throughout the year determines pond species composition and zonation for each Temporary Pond.



Annual plants have a quick growth once there is enough humidity. In early spring, floating aquatic plants spreading their leaves and flowers on the water surface can be easily observed.

Amphibious plants begin their development still submerged and bloom only when the water begins to disappear, persisting until the beginning of summer. **Perennial plants** will remain in dormant underground forms (rhizomes or bulbs), waiting for the new rainy season.

The Mediterranean Temporary Ponds are a feeding and breeding area for several species of amphibians, reptiles, mammals and invertebrates, **being crucial for the existence of several uncommon species with limited distribution species**, such as **the large branchiopods and some amphibians**.

Species diversity in a temporary pond is very high, usually greater than in other freshwater habitats like permanent pools or streams.

Biodiversity of Mediterranean Temporary Ponds in the Costa Sudoeste SCI

Plants	Large Branchiopods Crustacean	Amphibians	Bats	Micro-mammals
248 species	6 species 12 in PTc*	13 species 19 in PTc*	15 species 25 in PTc*	2 species

*PTc - Continental Portugal


LQ


LQ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LQ


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CPC

ACT TO CONSERVE!

In the Costa Sudoeste SCI there was a reduction in the distribution area of the Mediterranean Temporary Ponds, due to destruction and to degradation of the favorable conservation status.

To improve the conservation status of the Mediterranean Temporary Ponds in the Costa Sudoeste SCI during the LIFE Ponds Project several management and recovery measures were carried out.

9 Agreements with Landowners → **29** Temporary Ponds with conservation measures → **18** hectares of land with Temporary Ponds with best practices management

22% of the Costa Sudoeste SCI Temporary Ponds

20% of the Costa Sudoeste SCI Temporary Ponds area

Management actions implemented:
- ✓ Control agricultural and livestock activities
- ✓ Improvement of the outer vegetation belt
- ✓ Control of terrestrial vegetation
- ✓ Drainage ditch elimination

Recovery actions implemented:
- ✓ Topographic profile reestablishment
- ✓ Eradication and control of invasive vegetation (acacias or wattles and iceplant)
- ✓ Restoration of plant communities with planting and sowing of species characteristic of Mediterranean Temporary Ponds
- ✓ Restoration of the outer vegetation belt with planting of species characteristic of the outer border of Mediterranean Temporary Ponds


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IMPORTANT RECOMMENDATION!

Management and recovery interventions in Mediterranean Temporary Ponds should only be carried out when the habitat is degraded, must be implemented by specialized technicians and with the official permits from the competent authorities.

RESULTS OBSERVED

- Increase of the large branchiopod crustacean species richness, growing rate and maximum length
- Improvement of the vegetation spatial structure
- Increase in the hydroperiod and in the maximum depth
- Flora species richness increase, including for the species that are indicative of the habitat favourable conservation status
- Reduction in the area occupied by the Iceplant (*Carpobrutus edulis*)
- Disappearance of the Acacia tree layer and in the number of plant sprouts
- Increase in the species richness of amphibians
- Increaase in the species richness of bats and in their frequency in temporary ponds
- Reduction of the Creeping bentgrass (*Agrostis stolonifera*) that competes with the temporary ponds flora

EXTENSIVE GRAZING IS BENEFICIAL

Over time, agricultural and livestock activities have been compatible with the conservation of Mediterranean Temporary Ponds.

The tests carried out during the LIFE Charcos Project show that grazing contributed to increase species richness and the frequency of occurrence of flora.

Grazing is beneficial for the conservation of temporary ponds if it is:

✓ Preferably sheep;
✓ Carried out at the correct time of year: only during the summer when temporary ponds are dry and the plants have already completed their life cycle and produced seed;
✓ Livestock up to 2NH/ha for the land parcel where the temporary pond is located;
✓ Maintaining small patches of native shrub vegetation on the edge of temporary ponds that will function as areas of refuge for fauna.


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MC

IMPROVING CONECTIVITY

In the Costa Sudoeste SCI Mediterranean Temporary Ponds usually occur in clusters, functioning as a complex of ponds.

In each complex there is a variable number of ponds, with different degrees of connectivity.

During the LIFE Ponds project several measures were implemented to improve connectivity between ponds in the same complex, promoting the movement and exchange of individuals between ponds of 5 clusters.

Measures to improve pond connectivity carried out during the LIFE Charcos Project	Observed Results
Construction of 2 small dams in a temporary pond cluster and topographic redefinition of 2 areas in other pond cluster	Establishment of population connection with the colonisation by amphibian species in the new wetlands and adjacent temporary ponds
Construction of 28 shelters for fauna in 4 temporary pond clusters and installation of grass and scrub vegetation corridors in other pond cluster	Naturalisation process and colonisation by the fauna is slow but use in 28% of the monitored shelters has been confirmed, demonstrating the importance of these structures as important places of fauna refuge among temporary ponds
Construction of 1 road barrier to direct amphibians to safe pass ways with 180 m of length	Drastic reduction in the amphibian run overs, without occurrences after the placement of the barrier, and improved connectivity between the temporary ponds on each side of the road

SEEDS PRESERVED

Germplasm banks, also called seed banks, serve to safeguard the genetic resources of flora.

It is an important tool to preserve the genetic diversity of flora, especially of rare and endangered plants.

Germplasm preservation is a complement to conservation actions on the field, providing an “insurance” against the extinction of species in their habitat.

What was done during the LIFE Charcos Project:

✓ Seed harvest between 2013 and 2017

✓ 212 collections in different temporary ponds of the Costa Sudoeste SCI

✓ Seeds of 116 species of plants were collected, sorted and treated, of which 87 are characteristic of temporary ponds and 29 of their edges

With the LIFE Charcos Project it was possible to:

✓Establishment of a specific Germplasm Bank for the flora of Mediterranean Temporary Ponds at the University of Évora

✓ Acquisition of equipment

✓ Specialized training of human resources

✓ Duplicates of seeds of 23 species sent to other germplasm banks: Seed Bank of the Botanical Garden of Ajuda at the Instituto Superior Técnico of the University of Lisbon and Millenium Seed Bank of the Botanical Garden of Kew in the United Kingdom

UNDERSTANDING TO BE ABLE TO PROTECT!

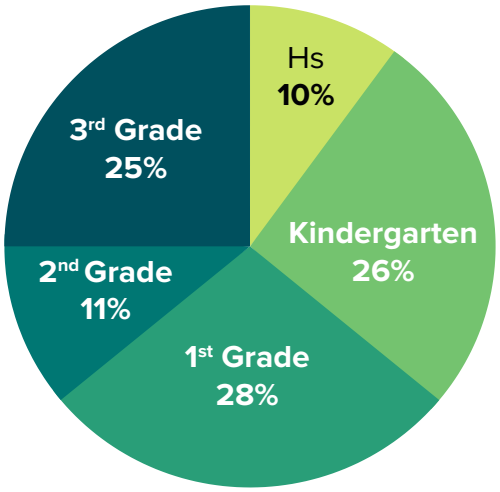
The lack of knowledge about Mediterranean Temporary Ponds and their extraordinary biodiversity have been one of the causes of the destruction and degradation of this habitat.

The LIFE Charcos Project implemented several awareness actions for the conservation of Mediterranean Temporary Ponds, aimed at different audiences.

SCHOOLS

- 26 schools
- 156 classrooms
- 3202 students

- Vila do Bispo
- Odemira
- Sines



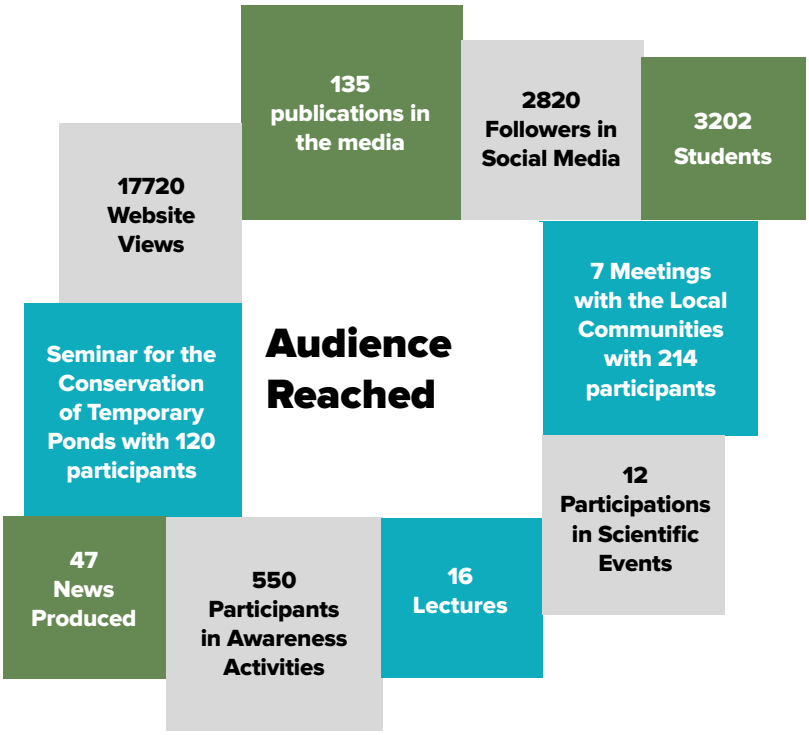
- Training for teachers
- 128 presentations
- 91 field visits
- 13 children's tale readings
- 4 plays
- 1 floor game

Educational Pond

- Recovery of a cluster with 5 temporary ponds
- Installation of a Visitation Center to support awarenss activities
- Establishment of a visitation trail

Raising Awareness for the Conservation of Temporary Ponds

- Increases knowledge about Temporary Ponds
- Promotes sustainable development
- Promotes the protection of rare and endageread species
- Promotes the connection with nature
- Promotes the conservation of natural heritage

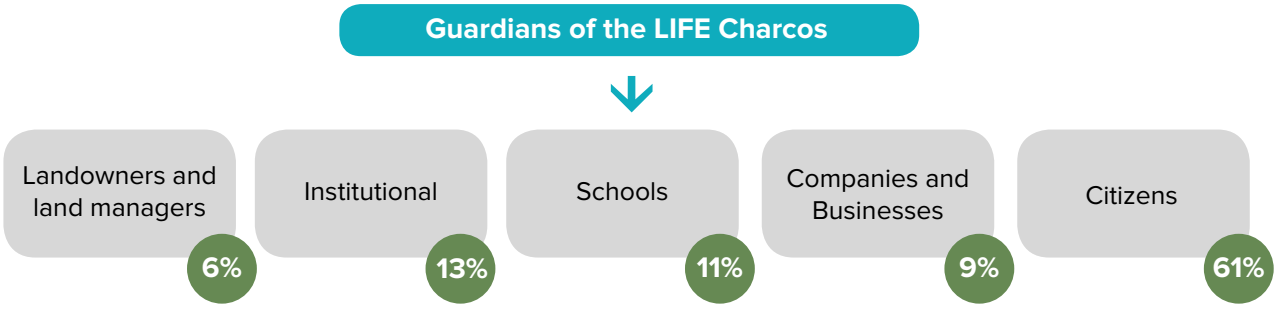


GUARDIANS OF THE TEMPORARY CHARCOS

During the LIFE Charcos Project, a Land Stewardship **Network was established for the conservation of temporary ponds**, called the Guardians of the Temporary Ponds.

Land Stewardship Networks promote the involvement of the civil society, whether at a collective or individual level and of a private or public nature.

The purpose of this Land Stewardship Network is to **establish collaborations that contribute to protect and conserve this remarkable habitat!**



"I think the Land Stewardship Network is a good initiative because it allows me to make my contribution to the preservation of these habitats. I think that awareness was the key to the survival of these ponds, making each one of us a guardian"

– **José Pacheco, Guardião dos Charcos Temporários**

LIFE CHARCOS IN NUMBERS

Conservation and Awareness

133 Meditrranean Temporary Ponds mapped	More than **5000** Citizens directly involved in Temporary Pond Conservation	**29** Temporary Ponds with conservation measures	**1** Seed Bank to preserve 116 flora species of the Mediterranean Temporary Ponds	**6** Pond clusters with measures to improve habitat of **20** Temporary Ponds

Socioeconomics

9 Direct jobs created and 3.26 to 6.24 indirect jobs per year	**20%** of expenditure on social contributions and taxes (VAT and IRS)	**15%** of the expenditure incurred in the Costa Sudoeste SCI	**64%** and **14%** of expenditure invested in the Alentejo and Algarve region	**233** suppliers involved, of which **13%** are based in the Costa Sudoeste SCI

LIFE Charcos is an indispensable project for the conservation of a rare and ecologically fragile habitat such as Temporary Ponds [...] with plural approaches and the recovery of a pond for educational purposes that are the strengths of this project.

Rita Costa, President of the Tic Tac Association

LIFE Charcos Project
(LIFE12NAT/PT/000997)
"Conservation of Temporary Ponds in the Southwest Coast of Portugal"

Coordinating Beneficiary: Liga para a Protecção da Natureza (LPN)
Associated Beneficiary: Universidade de Évora (UÉvora), Universidade do Algarve (UAlg), Câmara Municipal de Odemira (CMO) and Associação de Beneficiários do Mira (ABM)
Project Duration: 1 de Julho de 2013 a 30 de Setembro de 2018
Intervention Area: Site of Community Importance (SCI) da Costa Sudoeste (Portugal)
Project Total Budget: 1.977.465,00 €
Funding from the European Union (LIFE): 1.483.098,00 € (75%)
Funding from the Beneficiaries: 464.334,69 € (23,5%)
Funding from the Portuguese Government (Fundo Ambiental): 30.032,31 € (1,5%)

The **LIFE Program** is the European Union (EU) environment financing instrument. The general objective of LIFE is to contribute to the implementation, updating and development of EU environmental policy and legislation for pilot or demonstration projects. In particular, the LIFE Program - Nature co-finances Projects that aim to restore and conserve endangered natural habitats and protect priority conservation species in the EU.

Natura 2000 - The Nature of Europe for you! - This project was implemented within the Natura 2000, which is the European Network of Natural Areas. It was selected because it includes some of the most endangered species and habitats in Europe. All countries in the European Union are working together on the Natura 2000 network to protect Europe's natural heritage: diverse, rich and for the benefit of all.

Project Coordination Contacts:
LPN – Liga para a Protecção da Natureza
Centro de Educação Ambiental
Herdade do Vale Gonçalinho
Apartado 84, 7780 – 909 Castro Verde, Portugal
Tel.: +351 286 328 309
E-mail: lpn.cea-castroverde@lpn.pt

www.lifecharcos.lpn.pt

Credits

Coordination of the Edition: Rita Alcazar (LPN)

Texts and Revisions: Rita Alcazar (LPN), Edgar Gomes (LPN), Cristina Baião (LPN), Artur Lagartinho (LPN), Maria Lopes (LPN), Carla Lúcio (ABM), Margarida Cristo (UAlg), Margarida Machado (CCMAR), José Paulo Monteiro (UAlg), Núria Salvador (UAlg), Carla Pinto-Cruz (UÉvora), Anabela Belo (UÉvora), Erika Almeida (UÉvora), Nuno Pedroso (UÉvora), Filomena Patrício (CMO)

Photographic Credits: AidNature (AN), Bruno Martins (BM), Carla Pinto-Cruz (CPC), José Pacheco (JP), Luís Quinta (LQ), Margarida Cristo (MC), Paula Canha (PC), Pedro Veiga (PV), Rita Alcazar (RA), Vasco Flores Cruz (VFC), Liga para a Protecção da Natureza (LPN)

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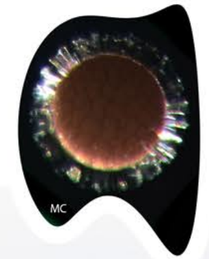
Several bats species use the Mediterranean Temporary Ponds
Of the 25 species found in mainland Portugal, 15 of these are present in the Costa Sudoeste SCI temporary ponds, as they find food and water there.

European pond turtle
(*Emys orbicularis*)
This pond turtle lives near wetlands and has the conservation status of "Endangered" in the Red Book of Vertebrates of Portugal. Their populations in the temporary ponds of the Southwest Alentejo may be seriously threatened by changes in the farming practices.

Western three-toed skink
(*Chalcides striatus*)
This small reptile has a very slim cylindrical body which resembles a snake but has tiny legs with only three fingers.

Southern marbled newt
(*Triturus pygmaeus*)
Iberian endemism, can reach 13 cm in length. It has a shiny back with black spots. At breeding season the female has an orange dorsal line and the male a dorsal crest.



Cist of a Fairy shrimp
(*Chirocephalus diaphanus*)
The cysts of the Large Branchiopoda are encapsulated embryos that are in the soil of the temporary ponds and will hatch when the pond has water again in the following year or in future years.

Cabrerae vole (*Microtus cabrerae*) and its tunnels
It is the only endemic rodent of the Iberian Pennisula.
They live in colonies located in areas dominated by tall grass with high humidity in the soil which are used for food and use the bushes around temporary ponds for shelter.

Coral necklace
(*Illecebrum verticillatum*)
They look like a compact and stretched red-white mat when the pond dries up, reaching 60 cm. The white colour is due to the extremely small flowers and fruits.

Lagoon-thistle or Blue-peaks during the dry stage (*Eryngium corniculatum*)
Bioindicator plant of Mediterranean Temporary Ponds. Their leaves become rigid and thorny when the pond starts to dry.
It has blueish flowers, grouped in a structure looking like a “half-pompom”, with a central thorn similar to a horn.

Cist of a Tadpole Shrimp (*Triops vicentinus*)
These Large Brnchiopoda Crustaceans of the Notostracae Order are considered living fossils because they exist for more than 200 million years.

Ribbed newt
(*Pleurodeles waltl*)
It is the largest tailed amphibian (Caudata) of the Iberian fauna, reaching up to 31 cm in total length. It has a pair of side rows of pores and orange spots where the ends of the ribs can protrude when threatened.

TEMPORARY PONDS: A NATURAL HABITAT TO PROTECT!

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